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CROSS-CULTURAL UNDERSTANDING OF METAPHORS IN INTERFACE DESIGN

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Abstract. Current cross-cultural interface research addresses cross-cultural attitudes towards computers and some cross-cultural interface design issues. However, it does not address cross-cultural perception and understanding. Much of this work is based on surveys and self reported evidence which does not provide the empirical data that is needed to understand this area of research. This paper outlines the main literature and proposes a study that aims to evaluate users' perception of interface metaphors. This will be done by observing users working with an interface in their everyday environment. The research seeks to provide evidence for the fact that understanding of metaphors differs cross-culturally and hopes to provide better insight into cross-cultural user perception and understanding.

1. Introduction

All computer interfaces are metaphoric (Lovgren, 1994). All the features on the screen represent something else. Real files or folders do not exist, these objects are all created by the designer to help us tap into our metaphoric memory. This way we use our knowledge of the real world to help us out in understanding the interface. For example, we can associate a file with the contents of a filing cabinet and documents with books or papers.

A metaphor provides a method by which people can quickly learn to use a system. Through metaphors, users map aspects of the real world source onto the software objects (Lundell and Anderson, 1995). As such, metaphors bring knowledge of the real world to the computer.

The problem in cross-cultural interface design is that the real world changes dramatically from culture to culture (Fernandes, 1994). Localising interfaces requires localising metaphors, which is mostly done by redesigning the objects

in a certain metaphor (e.g. the icons in a desktop metaphor) to accommodate for the target culture. This paper explores problems of the metaphorical kind. It is argued that "translating" a metaphor might not be sufficient. When localising a user interface to a new target culture it is likely that the whole metaphor needs to be reevaluated and perhaps replaced to make the interface intuitive to its users.

In the following sections I will discuss some of the literature on this topic by giving an overview of the various disciplines involved and propose research that will investigate whether and in what way understanding of interface metaphors differs across various cultures.

2. Theoretical background

2.1. METAPHORS

Metaphors are traditionally used in language to talk about a concept in a familiar and accessible form. According to one classification you can find verbal metaphors, virtual interface metaphors and composite metaphors in interface design (Preece, 1994).

Verbal metaphors are used in spoken or written instructions to talk about a new technology in terms of a familiar concept (e.g. talk about a word processor in terms of a typewriter).

Virtual interface metaphors take the familiar concept approach one step further. Whereas a verbal metaphor is used to talk about a system in terms of familiar concepts (as if the word processor is a typewriter), the interface metaphor is used to hide the actual system and creates the illusion of a familiar environment for the user to work in (such as a desktop or a book).

Composite metaphors were created to present the new functionality that the computer brought and that never existed before. The metaphor was combined with objects that were based on different metaphors to include these new computer based actions. Desktops for example can have windows with scrollbars which are not typically associated with the desktop but are based on different metaphors so that users can still use them instinctively.

2.2. LANGUAGE AND INTERFACE DESIGN

Metaphors are a good example of the inter-relationship between language and culture in interface design. Kukulska-Hulme (1998) stresses the relationship between a visual or a conceptual metaphor and language. She points out that recognition of a metaphorically used object or action (e.g. a filing cabinet or

server) does not mean that the user is also familiar with the language that is used to talk about the object as well.

Language is an important aspect of interface design. Griffiths et al (1994) claim that people would be more motivated to learn about information technology if they were able to interact with computers in their own language. Also, Krock (1996) states that it is best to train in the language of the target culture. Speaking English to trainees for whom English is a second language and who are struggling to learn a new software package, lowers the level of their comprehension. Trainers working in Japan found that at least 10% of the trainees dropped out of the training session after being trained in English and those who stayed had relatively low levels of comprehension (Carey, 1998). Keniston (1997) warns designers to be aware that the opinions of the non-English speaking population about software can be very different from the opinions of the English speaking groups.

2.3. SOFTWARE LOCALISATION

In developing global software the designer's world and the user's world can be very different, which makes it hard to develop an appropriate interface. The designer not only needs to be aware of the target culture but also of all the aspects of his/her own culture to make sure there is no bias in the design.

Internationalisation and localisation is a commonly used process to produce software for culturally diverse markets. Internationalisation involves either extracting all culturally specific components or developing a culturally independent set of basic easily localised functions. Localisation is the process in which an internationalised package is extended with a specific cultural context.

There is ample literature available on the technical aspects of software internationalisation and localisation (Luong et al, 1995; Taylor, 1992; Taylor and Todd, 1995; Uren, Howard and Perinotti, 1993; Microsoft, 1990; Apple, 1992a, 1992b; Digital, 1992; Kano, 1995; and O'Donnell, 1994), however, there seems to be a lack of research investigating the effects of such localised and non-localised packages on target culture users.

2.4. CROSS-CULTURAL RESEARCH

A number of cross-cultural studies have investigated differences in attitudes towards computers by means of English or translated questionnaires (Weil and Rosen, 1994; Allwood and Wang, 1990; Omar, 1992; Sensales and Greenfield, 1995; Makrakis, 1992; Collis and Williams, 1987; and Marcoulides and Wang, 1991). Six of the seven studies found cultural differences in attitudes towards

computers.

Other research has compared end-user characteristics (Igarria and Zviran, 1996), has used more practical methods (Choong and Salvendy, 1998; Griffith, 1998; Teasley et al, 1994), has evaluated culturally diverse preferences in interface design (Evers and Day, 1997; Evers, 1997), or has investigated culturally determined usability problems (Bourges-Waldegg and Scrivener, 1998)¹.

The studies mentioned show that culture indeed influences attitudes towards computers and preferences in interface design. Therefore it is probable that culture also affects perception and understanding of interface design and inherently, metaphorical aspects of interface design. Tractinski (1997) argued that the HCI literature on cross-cultural issues is scarce and limited. There is no theory of cross-cultural HCI, and recommendations are not based on thorough empirical investigations.

Bourges-Waldegg and Scrivener (1998), claim that as more cultural differences are found, more guidelines are being developed. This makes the design process more complicated while products still fail to meet many users' needs. There is no research that examines the occurrence of these problems in HCI and what influence the cultural factors have that cause these problems.

Although research by Evers and Day (1997) and Bourges-Waldegg and Scrivener (1998) addresses this topic there is a need for more research. The lack of studies using methods such as observation is striking. Direct observation of users in their local environment while working with an interface or case studies is needed to provide a reliable, real world understanding of phenomena that otherwise would be self reported.

2.4. INTERCULTURAL INTERFACE DESIGN

There is ample literature available on intercultural interface design. Many of the authors have outlined a range of cross-cultural elements to keep in mind when designing interfaces (del Galdo, 1996; Fernandes, 1994; Russo and Boor, 1993; and Carey, 1998). These studies mostly agree upon the fact that designers should not just change text and date, number and time formats but should also pay attention to aspects such as collating sequences, icons, symbols, colours, flow of information, functionality, menu accelerators (positional keys, drag 'n drop), dialogues, title bars, status messages, on-line help, training materials, macro languages, sample programs and so on.

Some researchers have critically assessed the current trend towards

¹ For a more detailed evaluation of the literature mentioned see Evers (1998).

localisation. Mrazek and Baldachini (1998) discuss the process of localisation and state that there is a tendency to over-emphasise cultural characteristics that do not necessarily drive design. They warn against studies that falsely attribute differences in users to culture. Keniston (1996) asks if there are limits to localisation and proposes that partial localisation might be justified in some cases. Nakakoji points out that localisation is a moral obligation and stresses the need for intercultural design in order to avoid the break down of communication between cultures (1994, 1996a, 1996b). Barbour and Yeo (1998) state the need for facilitating exchange of data between cultures in order to support the international trade and communication which are crucial for continued peace and prosperity.

2.5. DISCUSSION

Users from different cultures have different associations for the same real world objects and therefore different ideas on how to interact with the objects. An object does not mean anything in itself, it only has the meaning that the user attributes to it (Trillo, 1997).

In the light of the recent push towards localisation, metaphors are an important factor to consider. Cross cultural interfaces are not "universal" products that can be all things in all cultures. Most localisation efforts are done after the interface has already been designed for a particular culture (mostly North American). Filling in the appropriate objects in an existing metaphor might not be enough to ensure intuitive use for users involved.

From the literature we can deduce that culture does indeed have an impact on interface design and that globalisation brings with it the need to tailor-make software for the target-market and culture. The major gaps are:

- Few publicly available studies that investigate the effects of localised and non-localised interfaces on users' perception and understanding
- Little empirical work investigating the differences in cross-cultural perception and understanding of interface design and
- Not many studies using methods such as observation or case studies to investigate cross-cultural aspects of interface design

Considering the factors above the following section will discuss a research project located at the Open University which will be carried out over the next two years.

3. Research

3.1. PILOT STUDY

The aim of the pilot study is to test direct observation methods in cross-cultural research; to investigate which interface design features are most culturally sensitive and; to get an idea of how understanding of interface design varies across cultures.

The subjects involved are mostly students from secondary education between the age of 17 to 20. The sample consists of several groups of 6 to 8 students from different cultural backgrounds. Non-English subjects are resident in the UK on a short-term basis and speak English as a second language. A group of Dutch subjects are evaluated in their home-country of the Netherlands.

The subjects each participate in individual observation sessions of approximately 45 minutes in which they evaluate a website of a virtual campus. Think aloud protocols and audiotaping is used for data recording. Also, the subject is guided through the website by a question-sheet that they can read and is also being read aloud by the observer.

The website used is the DirectED Campus homepage (<http://www.directed.edu.core.html>) which is based on a map of a virtual campus (Figure 1). This website is developed by a Canadian company that offers distance learning courses over the web. The site is very colourful and graphical and would appeal to students around the age of 17 that are interested in going to university.



Figure 1. Map of the virtual campus as shown on the DirectED website (©Copyright 1997 DirectED Incorporated).

Initial results have indicated that the students involved indeed have different expectations due to former experiences. Jayne (English, 17 years old) was surprised when she found out that clicking on the icon of a desk with the word "faculty" written on it (Figure 2) brought her to the teachers advice and support page:

"Does this say.. 'online support' ? Then..so, it's advice. It's to do with the subjects and stuff isn't it? It was nothing like I said it would be ..so this picture is very misleading. Faculty, I automatically think of subjects, cause in school we have got science faculty, humanities faculty..and here they mean teachers, advisors. The desk..meaning homework and stuff like that.."



Figure 2. Clickable picture of desk to enter the faculty page (©Copyright 1997 DirectED Incorporated).

When Jayne saw the icon of the desk she expected something to do with subjects, school- or homework. In English secondary schools, subjects are divided up in 'faculties' such as science and humanities. It was hard for her to understand the information on the page that came up after clicking on the icon because it was so different from her expectations.

Ryan (English, 17 years old) is less surprised to see that the page is actually about teachers, however, it is still different from what he thought it would be:

" I suppose it is sort of what I thought it would be with the help and all. It's sort of like a teacher. I expected to get like help.. I didn't think it would be actual advisors on the site. They could have made the word 'advisor' or 'help page' [instead of 'Faculty']."

Ilse (Dutch,22) is also confused about the actual information that comes up after clicking on the icon (Figure 2). In holland a 'faculteit' (translated as faculty) is the place where a particular university department resides. For example the faculty of mathematics is the physical place where the department of mathematics can be found, its tutors and the offices as well as the labs and the lecture rooms.

"I thought it would say what time your lectures are and where, how to get in touch with your tutor, lists of books for the courses they give. Students go to a particular faculty.. Now it seems that it's about teaching staff.. They should have put a few little professors [in the icon of the desktop].. if you don't know what 'faculty' means then it has no value..."

Ilse, also seemed to be a bit more upset than the English students. Jayne and Ryan were a bit disappointed that they didn't give the right answer. Ilse however, showed frustration that it wasn't made clear the page would be about the teaching staff. The picture (metaphor) should have helped, however, was too indirectly related to the label ('faculty') to hint the users on the contents of the next page, causing confusion instead of clarification.

It is too early into the pilot study to say whether some or all of these experiences can be attributed to culture, however, it does show there is diverse understanding of interface objects.

3.2. FURTHER RESEARCH

Following the pilot study, a two year research project will be started that will evaluate users' understanding of interface metaphors across several cultures. The research will consist of two phases:

Phase 1 will be similar to the pilot study and involves observing users from several cultures when using a software package developed by a North American company for the North American market. The aim will be to assess subjects' understanding of the metaphors in the software's interface.

Information from the observation study will be used to develop a portfolio of metaphor usage for the cultures involved. The results will be compared to anthropological literature and checked for consistency. The data from the portfolio will then be used to develop one small prototype interface for each of the cultures involved. These programs will consist of a few GUI mock up-

screens with basic functionality to evaluate a metaphor that accommodates the users cultural background according to results from phase 1. These interfaces will then be evaluated for cultural appropriateness in phase 2.

In phase 2 the prototype interfaces will be evaluated in individual observation sessions. For these sessions, subjects from the same cultures as used in phase one will be involved. In order to test whether metaphors are actually more appropriate for the target culture it is imperative to use different subjects from the ones used in phase 1. This is to ensure that understanding is due to culture and not personal preference.

4. Conclusion

The literature on intercultural interface design that is discussed in this paper shows a clear need for more cross-cultural research into the understanding and perception of interfaces. In order to provide a solid basis for research it is important to find out to what cultural group individuals belong and what an 'appealing perceptual experience' would be for them. Alternative areas of interest might focus on one or several aspects of interfaces in the cultural context. One of these aspects, cross-cultural understanding of interface metaphors, is outlined in this paper.

It is important to develop well defined cultural profiles for each population we study to ensure incorporation of user needs in globally marketed software. This is necessary, not only to improve marketability of foreign software, but also to provide the user with a tool that will not contradict the users knowledge. Software, and in particular, interfaces, should provide a pleasurable work environment that caters for users' needs and conforms to users' cultural backgrounds.

It is imperative that producers of globally marketed software recognise cultural differences in perception of interface design, and that they develop a frame of reference to accommodate these differences. This cultural awareness should be fuelled by the desire to improve widespread use of information technology around the world and offer equal opportunities in technological development for all people.

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