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# Cross-Cultural Understanding of Interface Design: A Cross-Cultural Analysis of Icon Recognition

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## 1 Abstract

This paper reports the findings of a small-scale study that investigated cultural aspects of understanding the website of a virtual campus. Results indicate differences in expectations and understanding due to the users' knowledge of everyday life and real world experience, and suggest that the campus-metaphor that was used is not universally transferable.

## 2 Introduction

How universal is the campus metaphor? The context for this question is the emergence of virtual universities and colleges, which are beginning to deliver distance learning courses and programs of study on the web. The recipients of this type of education may rarely, or even never, come into physical contact with the academic institution, other students or the teaching staff. They may be located in different parts of the world throughout their studies, and represent a wide range of cultural and linguistic backgrounds. Typically, their first impression of a virtual university and what it has to offer comes from visiting its website, which in many cases features a pictorial representation of a campus (such as a map). Examples of virtual campuses are: DirectED Campus Centre (<http://www.directed.edu/core.html>), Clyde virtual university (<http://cvu.strath.ac.uk>), IDEA Demonstration Campus (<http://www.ivu.com/level2frame.html>), Virtual-U (<http://virtual-u.cs.sfu.ca/vuweb/>), and PIONEER Prime Interactive online Educational Environment (<http://www.medc.paisley.ac.uk/pioneer.htm>).

The challenge in creating a virtual campus is to "turn the buildings inside out", so that their content and function is immediately discernible. This appears to be the thinking behind the design of the website of a Canadian company, DirectED, which offers distance education courses over the web. Their campus homepage is a stylised drawing of ten eye-catching "building" icons connected by paths (see Figure 1.).

Preece defines icons as small pictorial images that are used to represent system objects, application tools and utilities and commands (Preece, 1994). The authors believe that the pictures of buildings in the DirectED website can be treated as icons since they are pictorial representations that represent the underlying webpages

### 2.1 Human-Computer Interface Design and Culture

There is a body of literature on cultural differences in attitudes towards computers (e.g. Weil and Rosen, 1994; Marcoulides and Wang, 1991), interface design (e.g. Evers and Day, 1997) and internationalisation and localisation (e.g. Nielsen, 1990; Galdo and Nielsen, 1996). An extensive review of these areas and more references can be found in Evers' literature review on cross-cultural understanding of interface design (Evers, 1999). The findings of these studies are consistent in showing that culture does indeed influence attitudes towards computers and preferences in interface design. However, very little of the work on cross-cultural aspects of interface design has looked at users in real environments. The study described in this paper is part of a research project which aims to address this issue by carrying out observational studies of real users from diverse cultures to see what kinds of issues and problems occur in using international interfaces.

## 3 A User Study

DirectED's campus homepage was chosen as the focus for an empirical research project aimed at investigating how users from different cultural backgrounds understand aspects of website interface design (in this case the campus metaphor and the meanings of the various components of the campus). It was hypothesised that the expectance of which information would be behind an icon would depend partly on the user's understanding of the icon, the label that goes with it, or a combination of both. The interpretation of both icon and label was likely to be dependent on one's cultural background.

The main aim was to find out how users from different cultural backgrounds interpret the meaning of graphical and textual elements of a campus metaphor.

In the pilot phase of the project, users from four cultural backgrounds were involved (English, Dutch, Sri-Lankan and Japanese). The initial results are now available for 4 English, 6 Dutch, 4 Sri Lankan and 2 Japanese participants.

### 3.1 Methodology

The subjects evaluated for the pilot were mostly students in secondary education. The English sample consisted of students from an urban secondary (non-selective) school whilst the Dutch students were from a secondary school known as a Regional School Community. The Sri Lankan professionals were part of a visitors group to the Open University and the Japanese students (both girls) are from a local International School.

The pilot used the following methods and instruments:

- A website was chosen to be evaluated by the students. The site used was the DirectED Campus Center homepage (<http://www.directed.edu.core.html>) which is based on a map of a virtual campus (Figure 1). The website informs people about distance learning courses and is used to communicate with students. It is very colourful and graphical and likely to appeal to students around the age of 17 that are interested in going to university.
- A task/question list was developed that informed subjects about the study, explained how to get to the DirectED website, and guided the subjects through the site in a structured pre-set sequence. The questions were designed to find out what the subjects think the objects on the screen represent, what their real world knowledge is of each object, what they expect to find after clicking on the object and to record their reactions to the information 'behind' the object.
- The subjects each participated in individual interview sessions of approximately 45 minutes in which they evaluated the DirectED website. The researcher sat with the student and asked questions as the students worked through the site. The student also received a copy in the question/task list so they could read where they were and what to do next. The researcher encouraged the subjects to think aloud and asked additional questions to probe the users' thoughts as they navigated through the site.
- The researcher made notes and interviews were audiotaped for later reference.

The question/task lists focused primarily on the objects that were displayed on the first page of the website (Figure 1). The following is a set of example questions that were used:

- What do you think this page is about?
- Have a look at the picture on the screen, what does it show?
- Look at this object on the screen, what does it represent?
- What are three things you would normally do in a library?
- What sort of information do you think you will get when you click on this object?
- Click on the object and have a look at what information comes up. What do you think of it? Is this what you expected? If not, how is it different?



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

Other questions were used to find out about the subjects' computer experience and their notion of a 'campus'.

It became clear that the Dutch subjects needed to be addressed in their own language in order to get an understanding of their thoughts. Young Dutch adults around the age of 17 have a good understanding of the English language but are not able to express themselves in a way that represents their true opinion. Therefore, English subjects were addressed in English and Dutch subjects were addressed in Dutch. Questions in the question/task list were translated for this purpose.

Before reporting the findings of the study, the concept of a campus metaphor will first be discussed in the following section.

### 3.2 The Campus Metaphor

It has been suggested that the function of a metaphor in human-computer interfaces is to draw on existing knowledge structures to make a new system easier to learn (Carroll and Thomas, 1982). Good software uses a metaphor, which allows people to draw on their mental models of how the world works. All screen objects should fit the metaphor and act in sympathy with the users' expectations. The function of a campus metaphor should be to make it easier to communicate information about a university or college, to direct candidates towards relevant courses, put them in touch with other people, deliver teaching and assessment, and so on. Its effectiveness is premised on users' familiarity with the facilities of a conventional learning institution.

In the UK, a university campus is defined as the area of land containing its main buildings. Only some universities have their buildings on one clearly defined piece of land, so it is not something that is automatically associated with every university. The situation is different in other countries, for example in continental Europe, older universities tend to have buildings scattered over several parts of a city, while in the US, a single location is far more common, and the word "campus" is habitually used. Nevertheless, it is worth noting that the word "campus" is being used with increasing frequency in the UK, to distinguish between "online courses" and "campus-based courses". US usage includes the phrase "off-campus" (I live off-campus; campus and off-campus sites), which would be quite unusual to hear in the UK (usage sentences were found in COBUILD, <http://www.cobuild.collins.co.uk>).

### 3.3 Findings

Initial results indicate that the students involved have different expectations arising from their everyday knowledge and experience. The subjects found it hard to make sense of the virtual campus. Distance learning was outside their experience, and a substantial number of them had never visited a university campus. The campus metaphor was not one that was immediately recognised, so it was only helpful to some subjects. The graphic design of this particular virtual campus brings out the connections or paths between campus buildings. One person remained convinced throughout that the website was about jobs, working abroad, or going on business trips. This person's reference to a "sports campus, like a leisure centre" suggests that "campus" does not necessarily connote a place where a university or college is located (e.g. The "Campus" as Microsoft's headquarters in Seattle is called).

When asked what sort of people the page was for, English subjects tended to say 'students' or 'business people' while Dutch subjects focused on prospective students or people who are considering their future. Subjects often conceded that an unexpected event (one they had not predicted) was, in retrospect, a logical one (e.g. "looking back it is quite logical"). This seemed to be a spontaneous comment that occurred quite frequently, especially with Dutch subjects. 'Logical' is a word used often in Dutch everyday language. The word is 'logisch' and it can be compared to a term like 'that figures'. It is mostly used on its own or in a sentence such as 'that is logical' (dat is logisch). English subjects also conceded in retrospect but to a lesser extent, using terms such as 'it makes sense'.

The remainder of the section will explore the range of possible meanings for several of the icons and associated labels in the DirectED website, incorporating some findings from the user study.

#### LIBRARY

- The "library" picture (a stack of books) refers to an already outdated meaning of "library". When asked what they normally do in a library, 50% of the English, 33% of the Dutch 0% of the Sri Lankan and 05 of the Japanese mentioned using computers or CD-ROMs there (in addition to reading or borrowing books, etc.).
- One Dutch person made the point that although the word 'library' is fine, you have to learn how to use it. Presumably this means you have to learn how it is used in that website, its particular meaning in that context. A composite picture (e.g. books and computers) would help to make the meaning more explicit (if the function of the library in the website was to give details of books and direct access to electronic documents, for instance.). A composite picture could also have been used for the "bookstore", which sells T-shirts and other commercial goods as well as books.

#### STUDENT CENTRE

- The word "student" - in student placement, student centre - was used by several subjects in decoding the overall meaning of the page. Compound words, e.g. "student centre", have the general advantage of being more precise than single words. This precision can be difficult to convey through pictures or icons.
- The "student centre" gave rise to a wide variety of interpretations, (e.g. list of events, restaurant area, asking for help, list of jobs along the lines of a "job centre").

#### STUDENT PLACEMENT

- "Student placement" suggested a number of different meanings, including getting a place at that university, and a gathering point for students from all corners of the world. Noticing either the label or the picture of a globe may have influenced peoples' respective interpretations. Asking for information and having conversations with other students featured in subjects' descriptions of what they normally do in a place like this.
- English and Dutch subjects thought it was more a place where students are or can be placed. Sri Lankan's focused on

explaining the exact representation of the picture ('it's a globe'), Japanese thought about student union and meeting place  
CAFÉ CHAT

- A café in Holland is rather like a pub in England. It is traditionally a place where people go to drink alcoholic beverages and talk to each other. A café in Canada (DirectED is Canadian) is a place where people sit down in a quiet environment and drink a cup of coffee, talk and read the paper.
- Chat is generally known because it is widely used as an Internet term.
- Subjects in the study expected that this would be a place where you could talk to others over the Internet (50% of English subjects), that it was a place where you could have a drink (5 out of 6 Dutch, presumably because the Dutch café is a place similar to a pub), Sri Lankan's thought about drinking coffee or tea and a bit to eat. FACULTY
- As with the other words, the role of "faculty" (in the sense of academic staff members) is changing, and the desk picture is of limited use in this context. New terms for online teachers are "facilitator", "moderator", "online tutor", etc.
- "Faculty" was thought to refer to subjects, the headmaster or main person (English subjects), or buildings (Dutch subjects). It was a surprise to see "online support" being offered under this function.
- Faculty is a fuzzy concept in itself. Someone can be a member of faculty and also work in a faculty. Mapping of concepts from the real world to this item cannot be done without additional information that shows which of the two concepts is meant.
- The term is similar to the Dutch word 'faculteit' which is the building or part of a building (the physical space) where a university department resides, the department is called a faculty and so is the building. 'I am going to the faculty of mathematics' would mean I am going to the building where the department of mathematics resides.

#### BOOKSTORE

- The icon represents a pile of books; in this sense it is not readily distinguished from the library, which is also represented as a pile of books (only the size and arrangement are different). Most subjects felt it was part of the computerlab because the two icons were so close together.
- Some subjects recognised this American English word as meaning 'bookshop'; others speculated that it might be a place to 'get information on books', or somewhere to go if you needed 'a quote from a book'
- Book is 'boek' in Dutch and store is 'winkel' (shop) or 'opslag' (storage). The right Dutch word to use would be 'boekenwinkel' (bookshop)

## 2 Discussion and Conclusions

It has long been recognised that metaphors are a pervasive and influential part of our society (e.g. Lakoff and Johnson, 1980) but they are likely to have different cultural meanings. Evidence from this initial study suggests that the campus metaphor in this study is not universal, but has its origins in North American culture. This becomes important if one of the reasons for having a Website and campus homepage is to attract students from across the globe, as students in different locations are likely to have different expectations and interpretations.

Labels can have different connotations for different cultures reflecting the linguistic origins. The function and role of the metaphor is not necessarily at fault but more the fact that users do not have the right concepts to make the mapping back to the real world in order to understand the contents of the website. The metaphor used in this study is not entirely clear (e.g. is this a geographical map, a role map for a non-existing campus or a functional map of an existing company?). Also, parts of the metaphor are inconsistent; the computer lab, for example, represents a physical space (the actual lab) but the faculty-icon represents roles that people play in this institution (people, not the actual physical space). Aspects like this make it more likely that users will attempt inappropriate mappings between knowledge they already have and the virtual world that is presented.

Perhaps the most interesting finding in this study is that the participants' understanding of the overall campus metaphor appears to have a strong influence on their expectations about particular icon and icon-and-label combinations and the accuracy of their interpretation. The expectations of the students who viewed the website as a page about a real university reflected their real world experiences (some subjects for instance, expected to find a menu list of food available in the café when clicking on the café icon). Those students who decided that the site described a course over the Internet made more accurate predictions about what was behind the icons. One implication of this finding, if it is borne out by the rest of the data, is that if the metaphor is indeed not universal, more effort will be needed to make meaning more explicit. The study suggests that at least some of the subjects' difficulties in interpreting the campus metaphor are because they are using real world knowledge drawn from a different cultural background.

In order to convey meaning more explicitly and to make sure that the metaphor makes use of the set of concepts that the target cultural group has, more effort will be required in the design phase. This might be achieved either by customising the website for each target culture or by presenting a more explicit representation of the contents, for instance, by using composite icons.

There are a number of limitations to this study, in particular: Information was lost in translating the Dutch subjects' responses to English; the study draws data from a small sample; and, the study also did not evaluate preferences in navigation through

In E. del Galdo and G. Prahbu (Eds.), Proceedings of the International Workshop on Internationalisation of Products and Systems. IWIPS 1999, Rochester, NY, 20-22 May.

the site (individual exploring was not catered for). This study will be expanded over the next 6 months and carried out with samples of 30 subjects each, evaluating specifically designed software in order to gain a better insight into several aspects of cross-cultural understanding. A future goal of researchers in similar fields might be to combine their efforts and attempt to set up profiles of cultural concepts. That is, a set of concepts that users of a certain culture were found to share. Each of these profiles could then assist to see which concepts are shared among the target cultures to design a metaphor that will most appropriately convey information.

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