Internationalization and Localization of Websites: Navigation in English Language and Chinese Language Sites

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Abstract. Guidelines exist for the internationalization and localization of websites, but these do not mention possible changes in the layout of navigational elements on websites. Two studies were conducted to investigate the importance of navigational layout for Chinese and English language speakers. In the first study it was found that major Chinese and North American/European companies did not significantly adapt the navigation on their websites in relation to the target linguistic/cultural market. In the second study it was found that there were significant difference in the preferences of Chinese and English native speakers for navigational layout on websites. The implications of these studies are discussed.

Keywords: localization of websites, internationalization of websites, navigation in websites, user perceptions of websites.

1 Introduction

Within 20 years of its invention, the World Wide Web has become one of the dominant means of communication of information, commerce, education and entertainment throughout the world. Although the Web is accessible from almost anywhere in the world (apart from certain issues of censorship) and anyone in the world can contribute to it (particularly with the development of Web 2.0 tools), the content of the Web is still predominantly in the English language. Figures from 2002 [1] found that 56.4% of pages were in English, 7.7% in German and 5.6% in French. The most commonly used non-European languages were Japanese with 4.9% and Chinese with 2.9% of pages. However this situation is rapidly changing. Although more up-to-date analyses of languages of pages could not be found, analysis of country code top level domains (ccTLDs) [2] show that in July 2008 China (.cn) had the most registrations (12.36 million domains), surpassing Germany (.de) with 12.15 million domains. Germany (.de) had long been the world's largest ccTLD, but between 2006 and 2008 .cn domain names increased by more than 950 percent. In addition to the country specific ccTLDs, in mid 2008 there were approximately 107 million top level domains (TLDs) which are not country specific (for example, .com, .net, .biz), making approximately 170 TLDs in total.

This makes it clear that creating websites for non-English readers is becoming an increasingly important topic. A number of authors have developed excellent guidelines and principles for the internationalization of websites and other interfaces to digital systems [3 – 5].
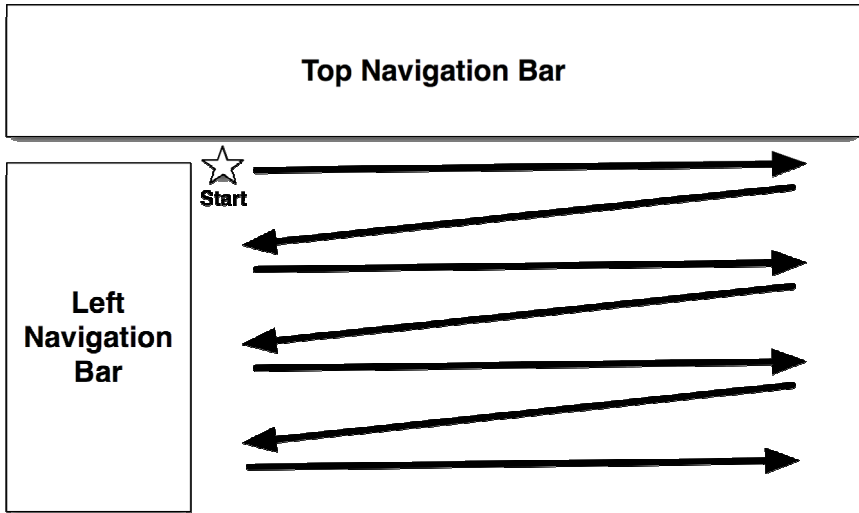
Top Navigation Bar

Start

Left Navigation Bar

Fig. 1. Typical arrangement of navigational elements on an English language website with the typical scan pattern by a native speaker of English

These guidelines mention the need to align text and graphics appropriately for languages that are written and read from right to left or vertically, but none mention the effects of different writing arrangements on navigational styles in websites. Yet the placement of navigational elements in web pages is clearly important for their effective and efficient use. Many English language websites now use a "top and left" navigation style, with a navigation bar across the top of pages and another down the left hand side of pages (see Fig. 1). This makes sense when one considers that native speakers of English will tend to initially look at the top left of a page and then move down the page in a series of left to right eye movements. Experimental studies [6 - 9] have shown that native English speakers perform best when information for problems is presented in this manner. However readers of languages such as Chinese, Japanese or Hebrew do not traditionally orient themselves this way and often will perform better when information is presented in orientations that match the presentation of their languages. This leads us to hypothesize that the now "default" arrangement of navigation bars will not be optimal for speakers of languages which differ from the left-to-right/horizontal arrangement of English (and other European languages).

2   Study 1: A Comparison of English Language and Chinese Language Commercial Websites

The first study investigated whether major commercial organizations with websites that are originally English language or originally Chinese language alter the navigation when they create a website for the other market. So for example, do major

Table 1. Chinese and European/North American websites used in Study 1

European/North American companies	Chinese companies
British Broadcasting Corporation (BBC) English: www.bbc.co.uk Chinese: www.bbc.co.uk/china	**Air China** Chinese version: www.airchina.com.cn English version: www.airchina.com.cn/en/
Bayerische Motoren Werke (BMW) English: www.bmwusa.com Chinese: www.bmw.com.cn	**Alibaba** Chinese: china.alibaba.com English: www.alibaba.com
Cisco English: www.cisco.com Chinese: www.cisco.com/web/CN/	**Bank of China** Chinese: www.boc.cn English: www.boc.cn/en/
eBay English: www.ebay.com Chinese:www.eachnet.com	**China Mobile** Chinese: www.chinamobile.com English: www.chinamobile.com/en/
Hongkong and Shanghai Banking Corporation (HSBC) English: www.hsbc.com Chinese: www.hsbc.com.cn	**Chinese National Petrochemical Corporation** Chinese: www.cnpc.com.cn English: www.cnpc.com.cn/en/
IBM English: www.ibm.com Chinese: www.ibm.com/cn/	**Haier** Chinese: www.haier.cn English: www.hairereurope.com
Morgan Stanley English: www.morganstanley.com Chinese: www.morganstanleychina.com	**Huawei** Chinese: www.huawei.com/cn English: www.huawei.com/europe/en/
Nestle English: www.nestle.com Chinese: wwww.nestle.com.cn	**Lenovo** Chinese: www.lenovo.com.cn English: www.lenovo.com/uk/en/
Reuters English: www.reuters.com Chinese: cn.reuters.com	**Sina** Chinese: www.sina.com.cn English: English.sina.com
Sun Microsystems English: www.sun.com Chinese: cn.sun.com	**Tsingtao** Chinese: www.tsingtao.com.cn English: www.tsigntao.com.cn/2008/en

European and North American companies change the navigation on their website when they create a version for the Chinese market? Similarly, do major Chinese companies change the navigation on their website when they create a version for the European/North American market?

2.1 Websites

Twenty websites were chosen for analysis: ten from European or North American companies which also have a website in Chinese and ten from Chinese companies which also have a website in English. These are listed in Table 1. In each case, only the home page of each website was analysed.

2.2 Calculation of Navigational Change

A method was needed for calculating the degree of change in the navigational structure, specifically the positioning of navigational elements between the Chinese and English language websites. The navigational elements are the individual items within a navigational structure, usually the words or icons indicating links to other webpages or other parts of the same webpage. For simplicity, a webpage is thought of as a rectangle with four quadrants (see Fig. 2) and changes in position were calculated between these quadrants.
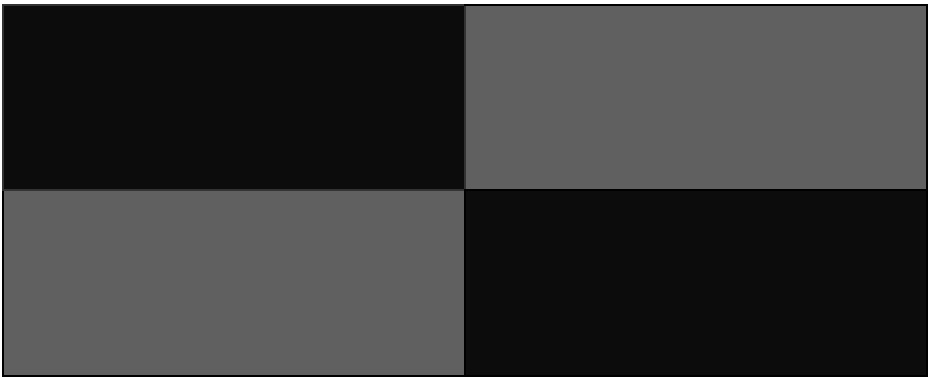
Fig. 2. Quadrants of a webpage for measuring navigational change

The two possibilities for position change are therefore:

- Top/Bottom (T/B): the position of a navigational element changes from either of the top two quadrants to either of the bottom two quadrants of a page or vice versa
- Left/Right (L/R): the position of a navigational element changes from either of the left two quadrants to either of the right two quadrants of a page or vice versa

In addition, the orientation of the navigational element could change from vertical to horizontal (V/H) or vice versa.

If a navigational element changes position or orientation in any of these three manners, it accrues a score of 1. We then take the average change across the three dimensions. For example, if a navigational element changes its from the left to the right of a page and its orientation from horizontal to vertical between the Chinese and English websites, it will accrues two scores of 1 (T/B = 0; L/R = 1; V/H = 1. Average = (0 + 1 + 1)/3 = 0.67.

2.3   Results

Table 2 summarizes the results for navigational changes from English to Chinese and Chinese to English language websites. In each case, the majority of websites did show some change, it can be seen from the figures that the amount of change is very small, and this is true for both the English to Chinese and Chinese to English translation. There were no significant differences in the mean amount of change from English to Chinese and from Chinese English website, regardless of whether we calculate using all 10 websites in the set or only those websites which showed some change.

Table 2. Summary of results for navigational changes in English language to Chinese language and Chinese language to English language websites

	English to Chinese	Chinese to English
Number of websites showing changes	7	6
Mean change per homepage for all 10 websites	0.21	0.28
Mean change per homepage for those websites with change	0.15	0.17

3   Study 2: Preference for Top-Left and Top-Right Navigation by Chinese and English Native Speakers

The second study investigated whether native Chinese and English speakers have different preferences for navigational layouts on websites. To do this, web pages were created with the typical "top and left" navigation and the mirror image of this navigation. Native Chinese and English speakers were asked to assess these pages for their aesthetics and their usability.

3.1   Participants

30 native speakers of Chinese and 25 native speakers of English took part in the study. The Chinese native speakers comprised 20 women and 10 men with ages ranging from 22 to 28 years. 4 were left handed and the remaining 26 were right handed. The English native speakers comprised 9 women and 16 men, with ages ranging from 20 to 56 years. All were right handed.

3.2   Webpages

The homepage for an imaginary university department (the Department of Computer Science at the University of North Yorkshire) was created. Two versions of the page were created, one with the typical top-left navigation (see Fig. 3), the other with the left/right mirror image of that page, with navigation at the top, but right-justified, and down the right hand side of the page (see Fig. 4). Both these versions were created in Chinese and in English.
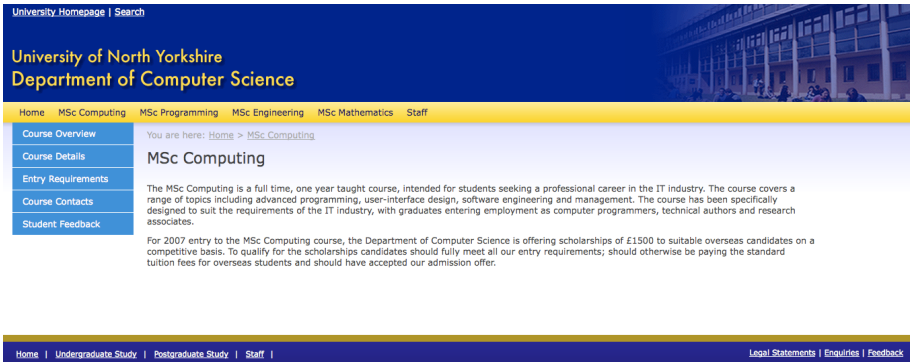
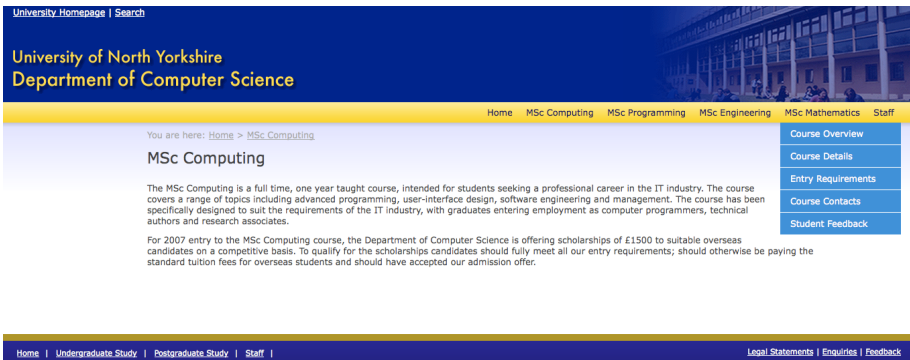**Fig. 3.** Imaginary homepage used in Study 2 (top-left navigation version)

Fig. 4. Imaginary homepage used in Study 2 (top-right navigation version)

3.3   Procedure

Participants were shown the two homepages in their native language. They were allowed to study the two pages briefly, but were not told what the difference between the pages was. Participants were then asked two questions:

(a)   which webpage do you find more attractive?
(b)   Which webpage do you think would be easier to use?

Participants were asked to make their decisions as quickly as possible, based on initial impressions.

The purpose of the study was then explained and participants were asked whether they had any comments on navigation on websites in different languages. Demographic information was then collected.

3.4   Results

Figure 5 shows the results on the attractiveness question. Figure 6 shows the results on the usability question. Results on both questions were very similar and both showed a

significant result (attractiveness: chi-square = 17.5, df = 1, p < 0.000; usability: chi-square = 19.8, df = 1, p < 0.000). For both questions there was an overall preference for the Top-Left navigation, with 78% of participants chosing this option for the attractiveness question and 80% of participants for the usability question. However, there were differences between the Chinese and English speakers. For the attractiveness question, 33% of the Chinese speakers chose the Top-Right navigation page, compared with only 8% of the English speakers. For the usability question, 30% of Chinese speakers chose this option compared with 8% of the English speakers.
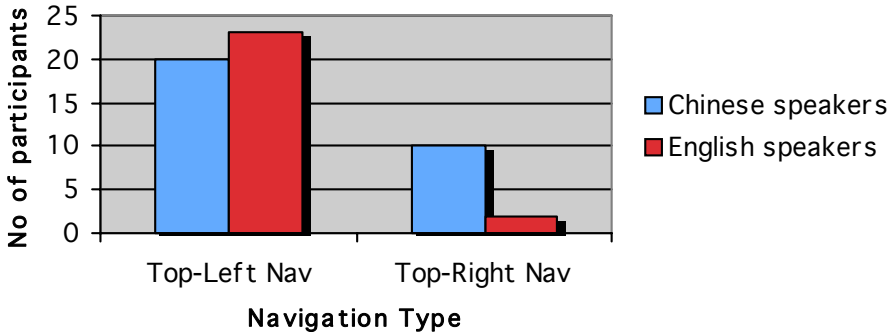

Fig. 5. Results on attractiveness for Top-Left and Top-Right navigation by Chinese and English native speakers
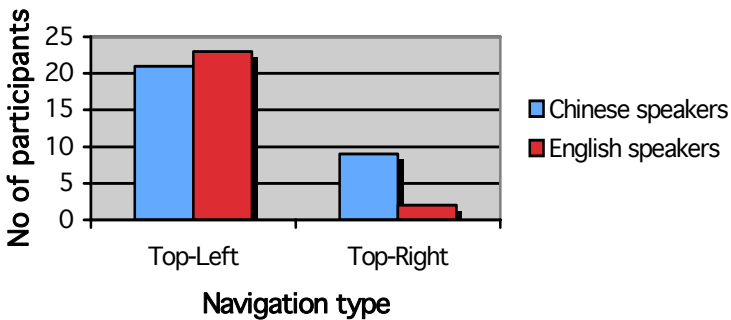

Fig. 6. Results on usability for Top-Left and Top-Right navigation by Chinese and English native speakers

The analysis was repeated with only the right handed participants, but this had no effect on the findings. Unfortunately there were not enough left handed participants to make a comparison between right handed and left handed participants.

4   Conclusions and Future Work

The results of the first study showed that a sample of major Chinese and North American/European companies are not making any adjustments to the navigational

layout of their websites when targeting the different linguistic/cultural markets. However, the results of the second study show that there are significant differences between Chinese and English speakers in their perceptions of the navigational layout on webpages, with significantly more Chinese speakers preferring a top-right layout than English speakers.

The results of the second study show that linguistic/cultural differences may well affect navigational layout and this topic warrants further investigation. In particular, a study of whether differences in navigational layout affects the performance of Chinese and English speakers with websites is needed to complement the results of this study which investigated perceptions. In addition, studies of native speakers of other languages such as Arabic, Hebrew and Japanese, to investigate their perceptions of and performance with different navigational layouts would be of interest.

Acknowledgements

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