Cultural differences in the structure of categories among users of clipart in Denmark and China

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ABSTRACT
There is a difference in how Danish and Chinese people group object, method and concepts into categories. Difference in these points has effects on information structure in applications which involves menus, links and directories. This study involve groups from Chinese and Danish cultures and investigates how these two cultures group cards with clipart pictures into different categories and how their cultural background affect the structure of their categories.

Keywords
Card Sort, Information Structure, Cultural Difference, Usability

INTRODUCTION
In this global world different applications must be equally usable across different countries. Cultural factors significantly affect information structure of applications worldwide because these applications are more used outside the countries and cultures where they have been developed and designed [1].Therefore their formation is primarily based on metaphors of the specific country or culture where this application is made and it ignore the fact of cultural based beliefs. Culture also has affect on the results of established methods of usability testing [2]. International usability testing of localized applications may have to be done by using local evaluators [3].

Difference in grouping has an effect on usability of software's. As Nisbett stated in his study, there are dramatic differences in the nature of Asian and European thought process [4]. Designing software for a global audience will increase global acceptance of software. Del Galdo and Nielsen spoke about cultural reflection in the software by stating that truly intuitive cross-cultural software should reflect the cultural orientation of its users and accommodate user's cultural differences [5].

GOAL
To investigate how different cultural groups differ from or are similar to each other when they group objects, functions and concepts into categories during a task. To investigate systematic differences in the structure of categories applied by users of clipart in China and Denmark.

BACKGROUND
Asians and Western cultures organize and group objects with different approaches. Western people tend to group objects into categories on the base of attributes where as Asians people tend to group objects on the base of their relationship. Studies of Ji, Zhanda and Nisbett (2002) showed the same kind of result where Americans participants make grouping on the base of common attributes whereas Chinese participant make grouping on the base of relation of objects with each other [6].

The primary goal of information systems should be to provide uncomplicated information structure to the users by keeping their cultural background in mind. Designers should localize applications in such a way which not only include language transformation but also keep the cultural and intellectual level of the people for which it is going to be made.

RESEARCH METHODOLOGY
In order to understand the difference in grouping of objects in both cultures, a card sorting experiment is performed. Card sorting is a usability method used in software and product design to discover the user's mental model of information structures [7].Card sorting is a useful way of finding the commonality and difference in grouping and categorization of respondents and experts of systems [8]. In this research, repeated single criterion sort is used as sorting technique to gather data from subjects of both cultures. This technique is used because it is more flexible and easier for most elicitors to handle, as users sorts the same entities repeatedly, categorizing in term of a different single criteria each time [8]. Card sorting experiments are performed in Denmark and China.

RESULTS
The participants in this study are one group of Chinese and one group of Danish users. Each group of Chinese and Danish consists of 10 participants; these participants are entitled as 'subjects' in these experiments. Wedding pictures for designing wedding invitation cards are used as Cards for this study. This study comprises of 10 sessions from ten subjects in each culture.

Results of Chinese and Danish subjects showed that Chinese subjects have more variation in their sorts as compare to Danish subjects. In *Sort 1*, Chinese and Danish

subjects were asked to make their own categories related to wedding criteria and they were asked to place cards into these categories. The result specified that there was more use of *other* category in the Chinese group as compare to the Danish group.

In *Sort 2*, Chinese and Danish subjects were provided predefined categories. Two thematically based categories, *two people together* and *Love*, related to wedding criteria were provided to subjects. The result showed that there was greater use of thematically based categories in Chinese subjects as compared to Danish subjects. On average Chinese subjects put 3.8 cards out of 20 cards into these two thematically based categories. Danish subjects put 1.9 cards out of 20 cards into these thematically based categories. Out of 10 Danish subjects, 6 subjects choose one card and one subject chooses no card for one of these thematically based categories. On contrary 6 Chinese subjects choose four or more than four cards for thematically based categories and only two Chinese subjects choose one card for one of these two thematically based categories

In *Sort 3*, Chinese and Danish subject were asked to place cards into categories related to wedding color. Chinese subjects identified red color more than Danish subjects. On contrary, Danish subjects identified white and off white color more as compare to Chinese subjects.

CONCLUSION
These results suggest that physical attribute of items and concepts should be dominant in Danish information and data manipulation of applications. On contrary, the structure of information in Chinese applications should be organized and grouped by keeping relations of entities and tags with each other. The result of *sort 1* also suggests that thematically based categories are more appropriate for Chinese subjects to use in their organization of information structure.

Initial results of experiments provide us guidelines that any method of usability testing, which involves less number of subjects, can be used to test usability of information, categories and menu structure in Danish culture because results of Danish subjects are close to stereotypical structure of categories. In Chinese group, it is helpful to involve such kind of usability method which involves more subjects to see the difference of subjects from stereotypical sort.

Initial results of experiments also provide us guideline that color is an important factor in usability of applications. Foreground color of data and information is important for Danish subjects whereas Chinese subjects observe and judge by keeping background color of information as well in their mind. Usability of colors in information structure largely depends on target audience choice because Chinese subjects identified red color more than Danish subjects. Metaphor and association of colors also changes within culture. Metaphor of colors can help designers to imply such colors that are associated to specific culture for which that application. While comparing the Chinese and Danish

subjects, Chinese subjects considered background color as part of their observation more than Danish subjects. These approximations can help designers to structure the graphic designing of interfaces to support Chinese users' potential need for considering the background color, and Danish users' potential need for considering the foreground when interacting with the computer.

FUTURE RESEARCH
The current study is a pilot for a larger project of cultural usability [2]. In this study, pictures of wedding cards are used to investigate the cultural difference in structure of categories. Future research will include cards for real application. It will also include alternate data collection modes such as interviews, direct observation of user behavior, and focus groups.

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