On-Line User Interaction with Electronic Catalogs: Language Preferences Among Global Users

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In this paper we study the behavior and performance of bilingual users in using an electronic catalog. The purpose of this research is to further the knowledge required for building electronic commerce systems that operate in multiple languages in global settings. We describe a bilingual electronic catalog that can be used by online retailers for selling products and/or services to customers interacting in either English or Chinese. We investigate into the nature of user interactions in multilingual electronic catalogs. We have defined three different groups of users: only Chinese speaking, only English speaking, and bilingual. We are specifically interested in investigating into the language preferences of the third group of users. In order to test language preferences, we have selected two types of products: office supplies and ethnic food. We hypothesize that bilingual users will exhibit differential language preferences for the type of products and the tasks performed in using the electronic catalog. Furthermore, learning curves and interaction effects are also tested. Three different task categories have been designed: browsing, directed search, and exact matches. In the first case, the user is a general browser who is looking for what is available in the catalog. In the second case, the user is looking for a class of products but is unsure of the exact item. In the third case the user knows exactly what item he/she is looking for. We propose to test the efficiency of usage by measuring the time as well as studying the path followed by the user in retrieving product information. This research will shed light on the important issue of designing multilingual electronic catalogs for both local and global applications.

One of the major challenges facing organizations involved in electronic commerce today is to organize and summarize information in such a way that end-users can effectively and efficiently search for and analyze relevant information. Users can look for both structured as well as unstructured information in a system designed for electronic commerce. An example of structured information is the price of a specific product. Unstructured information, on the other hand, is one that is not well specified, or can have multiple specifications. For example, the user may be looking for spices for cooking a shrimp dish, where they can choose from a number of options, may have individual preferences for the selection of spices, and may not know exactly how the information can be found in the system.

The problem of finding relevant information is exacerbated in global information management, especially in global electronic commerce. While globalization is presenting new opportunities for people and businesses worldwide, several challenges must be addressed in order to realize its full potential. Examples of these challenges include differences in culture and language, which can be an obstacle to unrestricted and free access of information, as well as the disorganization of the potentially precious knowledge asset. While language technology (Nirenburg, 1992; Onyskhevych and Nirenburg, 1995; Sheremetyeva and Nirenburg, 1996) is making rapid progress, much research is needed in managing and accessing multilingual information in order to reach full potential of global electronic commerce (e.g., Malhotra 1997, 1998).

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The purpose of this research is to further the knowledge required for building information systems that operate in multiple languages. Specifically, we focus on studying user behavior in performing various tasks in a multilingual system.

In order to study user behavior and performance in a multilingual electronic commerce setting, we have designed a bilingual electronic catalog which can be used by on-line retailers for selling products and/or services to customers interacting either in English or Chinese.

An electronic catalog is a graphical user interface that presents product and/or service information to users, typically using the World Wide Web. An electronic catalog is a key component of electronic commerce that has been used for business-to-consumer commerce as well as business-to-business commerce (Adam et al. 1998). Although the term electronic catalog might sound like an electronic extension of paper catalogs, it offers features that are far beyond those found in paper catalogs. Such features include computational services such as efficient browsing and searching, online order processing such as checking out products using shopping carts and secure payment mechanisms, and backend processing such as integration with company databases (Segev et al. 1995). These features have extended the role of electronic catalogs to the point of being used as electronic storefronts.

With the rapid proliferation of electronic commerce both in local and global markets, there is an increasing need to provide support for internationalization such as foreign currencies, different date and time formats, sort order, and multiple languages (Broin 1999). The need for providing multilingual support is echoed by the rapid increase of non-English speaking users on the Internet. For example, it is reported that 60% of the users on the Internet will be non-English speaking by the year 2002 (Computer Economics 1999).

In this paper we describe a bilingual electronic catalog and describe its usability based on product characteristics and tasks performed by users. The electronic catalog supports two languages: Chinese and English, and may be extended to multiple languages.

The rest of the paper is organized as follows. In the next section we describe the electronic catalog and its components. Next, we design an experiment for testing user interaction with the catalog, followed by experimental design and analysis of results. The last section contains our conclusions and future research directions.

### Methodology

#### Description of the Catalog

A prototype electronic catalog has been implemented on the World Wide Web using ColdFusion 4.0 as the front-end, which is connected to a Microsoft Access database at the backend, using an ODBC driver. The catalog is composed of two identical interfaces in two languages: English and Chinese. Following the unified content model (Doherty 1999), the English interface has been translated element by element into the Chinese interface, with the only difference being the order in which the products are sorted.

The purpose of using the unified content model was to eliminate any presentation bias in user preferences. The front-end interface in Figure 1 shows two language options (English and Chinese) and two separate applications (Office Supplies and Food Market). Figures 2a-2b show the second-level interface that is invoked once a user selects the Food Market application in the English and Chinese versions respectively. There are three modes of operations that a user can select in order to interact with the system: browsing.