Understanding Usability Issues in a Public Digital Library

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INTRODUCTION

Designers often design for themselves unless they are trained to realise that people are diverse, and that users are unlikely to be like them. The more errors that can be avoided "up front" by the right method, the less work both test-users and designers will have to put in to refine prototypes to improve their usability. Landauer (1995) points out that it is not good enough to design interactive systems without subjecting it to some form of evaluation, because it is impossible to design an optimal user interface in the first attempt. Dix Finlay, Abowd, and Beale (1998) argue that even if one has used the best methodology and model in the design of usable interactive systems, one still needs to assess the design and test the system to ensure that it behaves as expected and meets users' requirements. Nielsen's (1993) advice with respect to interface evaluation is that designers should simply conduct some form of testing.

As digital libraries (DLs)—interactive systems with organised collections of information—become more complex, the number of facilities provided by them will increase and the difficulty of learning to use these facilities will also increase correspondingly. Like the Web, DLs also provide non-linear information spaces in which chunks of information are inter-connected via links. However, they are different in character from the Web in several important respects: a DL represents a collection for a specific purpose containing text-based and/or geospatial content and has search strategies that are clearly defined and more powerful.

After a decade of DL research and development, DLs are moving from research to practice, from prototypes to operational systems (Borgman, 2002). In the digital world,

real world cues such as face-to-face interactions with human librarians and thumbing through hardcopy books have been replaced by drop-down menus, search screens, and Web page browsing. In DLs, users must map their goals onto DLs' capability without the assistance of a human librarian. As a result, wide acceptance of DLs will only be achieved if they are easy to learn and use relative to the perceived benefit (Borgman, 2000).

BACKGROUND

In recent years, government services across the world are going online, replacing old bureaucratic service lines with accessible information and services, available 24/7, directly from the desktop, using powerful new technologies like digital signatures and electronic forms, and creating a new phenomenon called "digital government." Implemented or proposed digital government initiatives in many countries are an attempt to move more of their citizens online, thus shortening the queuing lines at traditional service counters.

According to the U.S. official state government Web site (see http://dis.wa.gov/index.htm; retrieved March 6, 2005), *digital government* offers a "one-stop shop" to many government services through the state's Internet portal. It is a fundamental shift in government culture, allowing those in public policy and government to respond much more quickly. The U.S. digital government initiatives, for example, embrace the following objectives: (1) make the process of accessing government services immediate, simple, seamless and intuitive; (2) reduce paperwork within government, and reduce costs so funds can be moved into direct delivery of services; and (3)

improve service delivery to all segments of the population, whether they are connected to the Internet or not.

In Singapore, the power of the Internet and information technology is radically altering the way the Singapore government relates to her citizens and the business community. Singapore, ranked among the world's top three e-governments by World Economic Forum in 2003, and by management and technology consultancy firm, Accenture, in 2004, aims to be "a leading e-Government to better serve the nation in the digital economy" driven by the Ministry of Finance, and executed through the Infocomm Development Authority of Singapore (IDA, 2001).

Hence, the purpose of Singapore's official digital government site, eCitizen Centre (see http://www.ecitizen.gov.sg/), is to provide easier, more convenient and more comprehensive, round the clock access to government services. Citizens can access among many library information services online via *eLibraryHub*, the National Library Board (NLB) Digital Library (see http://ele.ecitizen.gov.sg/lib/lib01.htm).

The *eLibraryHub* (see http://www.elibraryhub.com), launched on September 7, 2001, aims to provide its four million individual users access to information resources and services anytime, anywhere (Chan, 2002). It is also a one-stop integrated digital library for immediate access to vast amount of information and resources. It is both a content and community portal (Chia, 2002) and caters to users from multiple environments, from individuals, businesses, professionals, corporate to community groups (Abu Bakar, 2002).

On the content side, the library resources in the *eLibraryHub* include some 13,000 electronic magazines, journals, and online databases; 10,000 electronic books and more than 700 CD-ROM and 900 video-on-demand titles. In the "Reference Library," links to resources selected by NLB's information specialists are provided. In a bid to target the information needs of niche markets, NLB has plans to create specialized libraries within the *eLibraryHub*. Its first offering launched in end-2002 is the "China Resource Library" that provides business-related information about China. Another two specialized libraries that are being planned will cater to children and teenagers.

SETTING THE STAGE

This article reports a study conducted on the *eLibraryHub* as part of NLB's on-going efforts to improve services of the public library, in particular, for the purpose of this article, the usability of the *eLibraryHub* in meeting users' needs via the eCitizen Centre. We also hope this study would contribute to the under-studied usability research

on DLs constructed by community organizations such as public libraries and hospitals, as highlighted by Borgman (2002).

The study, conducted in early 2003, evaluated the effectiveness of the *eLibraryHub*, looking at users, uses, and usability issues of the DL. It attempted to employ a quantitative approach based on questionnaire survey to evaluate the perceived value of the DL and the effect on the intention of use by users.

Questionnaire Development

The development of the questionnaire involved an iterative process of formulation and evaluation by five peers who were taking the Master's in Information Studies course at the Nanyang Technological University, a means of obtaining feedback from a small, convenient sample of potential respondents. The purpose was to determine the relevance of the questions and the extent to which there may be problems in obtaining responses.

The final refined questionnaire was structured such that all respondents, regardless of whether they are users of the *eLibraryHub* could answer the first part comprising demographic questions.

Users of the *eLibraryHub* were then asked in the second part about their usage of the DL. For *user satisfaction*, the users assessed the resources and services of the *eLibraryHub* as well as the overall effectiveness.

The questions asked were:

- How satisfied are you of the resources used?
- How satisfied are you of the services used?
- Overall, how would you assess the effectiveness of *eLibraryHub?*

They were asked to rate their satisfaction of the resources and services on a Likert scale from "1" (most satisfied) to "5" (least satisfied) in terms of four factors: availability, accessibility, quality, and effort. The factors were based on the second major class (Class B: "Interaction") of the taxonomy derived by Saracevic and Kantor (1997). They were also asked to rate the effectiveness of the *eLibraryHub* from "1" (most useful/usable) to "5" (least useful/usable). The purpose was to find out if the *eLibraryHub* fulfilled users' needs, if there was a difference in satisfaction level for different factors, and if users found the *eLibraryHub* equally useful and usable.

To study *user intent and user perception*, six statements were presented and the users were then asked whether they agree of disagree with it. They were:

- I can obtain the resources and services I need when using *eLibraryHub*

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