Chapter 1
Experiences with Developing a User-Centered Digital Library

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ABSTRACT
The purpose of this study was to find out whether users should be involved in the design stage of a Digital Library (DL). Hence an experiment has been undertaken to find out the level of user satisfaction with a user-centred DL (UDL) compared to a non-user-centred DL (NDL). In this experiment, the UDL prototype has been compared with the NDL prototype. The two prototypes were then evaluated by separate users with various Information Technology (IT) backgrounds. Results show that users’ task performance was better in the UDL version of the prototype.

INTRODUCTION
The importance of keeping users foremost in mind when developing DLs is well known among developers of DLs. However, there are still those who develop DLs assuming that users will find their services easy to learn. These assumptions should really be backed up by an earlier user feedback and evaluation (Manduca et al., 2005; Wilson, 2005). In fact, in order to be successful in the evaluation process of the DL application and be accepted by its users, the application should be user-centred so as to meet the needs and goals of the end users (Bolchini & Paolini, 2002). Indeed, Schmiede (2004) stated that a system cannot be designed and implemented solely by IT specialists but has to be realised by end-users in co-operation with the specialists. Although there are many studies focused on user-centred DLs, they are not inherently user-centred. Therefore, the potential benefits of considering users in the design process of DLs are clear, but the details of the methodologies through which this might be best achieved are not.
There are several studies which have followed the user-centred design process by conducting usability tests, surveys and more in order to elicit users’ requirements from the users’ point of view rather than from their own perspective. One of these is the Envision project, a study conducted by Fox et al. (1993), which interviewed users and experts in three areas: library, information and computer science. The aim of this project was to build a user-centred DL, by interviewing users about potential decisions on system functionality. The project focused on 12 participants who were professionals in the area of computer science and information retrieval. Participants were questioned on four topics:

1. current information retrieval practices
2. current information dissemination practices
3. desired information retrieval and manipulation capabilities
4. demographic data.

The result of this project was a usable DL prototype and a set of nine principles for DLs. One of particular interest to this study was the eighth principle, which declared that a user-centred development approach should be adopted and that the design focus should be on users, as otherwise DLs would not communicate effectively and efficiently with their users. The research described in this paper is closely related to the Envision project; however, as opposed to the Envision project, our participants will be from groups with a variety of IT backgrounds.

The structure of this paper is as follows: the next section presents related work; this is then followed by a presentation of the design implementation of our UDL and NDL prototypes. The results of our study are then presented and analysed. Lastly, conclusions are drawn and possibilities for future work identified.

**RELATED WORKS**

Very interesting early work was conducted by Marchionini (1995), who initially focused on user-centred methods for library interface design. The suggestion was to have a working group which would involve participants from four types of users in libraries (Library staff; Frequent and Sophisticated users, who regularly use library services; Occasional users; and Potential users) who would work alongside the design team. Nevertheless, only one type of users of the working group usually works with the team at each stage of the design. For example, Frequent and Sophisticated users will be used for usability testing for an advanced version of the prototype design, while Occasional users will participate in verbal interviews or written questionnaires.

Marchionini et al. (1998) also used the same approach and focused on user needs in a DL, developing interface prototypes for the DL. Here, a team of designers from the University of Maryland worked with the Library of Congress (LC) staff to develop the interfaces and tools for the LC National DL Program. In order to capture the basic functionality for National DL interfaces, the team started with regular meetings to brainstorm and sketch design and a series of four public briefings at LC to focus attention on key user-centred design topics. With regards to the actual user involvement in the process, a user needs assessment was conducted to elicit feedback from LC staff, teachers (involved in National DL courses), school library media specialist supervisors in the state of Maryland and parents and workers at a day-care facility in Michigan. The results gathered from the user studies were a set of design challenges in the implementation of the DL interfaces, such as serving a wide range of users and a wide variety of information needs. These challenges were approached in the second phase of the project which was Interface Design. Although the user-centred method and the elicitation techniques used in this study focused on users...
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