

DIGITAL LIBRARIES ENVIRONMENT: IMPLICATIONS ON USERS AND INFORMATION SERVICES

By

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ABSTRACT

The focus of the paper is to emphasize the importance of user studies on the design and development of digital libraries. User needs form the central consideration around which the system is designed. It discusses the information need analysis in terms of the information content retrieved for a query, form or format of dissemination and provision of access. It further discusses the design of services and implementation. Further, the new role of the information intermediary in the changing digital environment is emphasized.

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0. Introduction

An information system model is a dynamic one encompassing several activities from location and acquisition of information items to dissemination. The most significant inputs for the varying parameters of the system are from the results obtained from user studies and needs analysis. Now these results have their impact on the input end of the system and also at the output side in form of the feedback and required adjustments or even sometimes a complete overhauling of the activities, design and content. In any, case the central consideration is the user and information needs.

The challenge lies in the fact that the user seldom can express the information need in exact terminology. Usually a human intervention, maybe in the form of an intermediary such as a reference librarian, leads to interpreting the user needs in terms of the system terminology so that a reasonably acceptable set of items is retrieved for a query. Even in such an instance many aspects such as language, level of exposition to subject and standardization of terminology and many others, pose as barriers in efficient retrieval.

In the modern information system, the whole system operates in a distributed environment. As with all the other components, the users are at some other point in relation to the collection. In fact, there is no collection but only a confluence of the intermediary, the end user and the information item for that point in time when the information need arises. This frame work leads to the definition of 'Digital Library'. According to the Working Group of U.S. Govt.'s Information Infrastructure Technology and Applications (IITA) 'Digital Libraries are systems providing users with coherent

access to a very large, organized repository of information and knowledge' Among various other points, the group points out that 'from the user's point of view, there should appear to be a single digital library system. (1)

1. Needs Analysis

The information needs of the users are very fluid in nature, more so with the trends in modern environment. The need is instantaneous and also the retrieved information is often a link leading to the other activities of an individual, more often of a research group. This aspect makes precision in retrieval, a crucial issue in today's context. The information needs of the users in the modern environment need to be analyzed in terms of:

a. Information content/item:

In a digitized environment and distributed fashion of functioning, the information need demands a pinpointed capsule of information in return for a query. Search algorithms, which retrieve a large set of items in the generic area of the query, are really of not much use. Let alone, the other search engines which are widely available on Internet, make no efforts to correlate the scope of a query to the retrieved set! In the process of analyzing the needs of the users, it is to be noted that the information requirement of the user of a digital library and that of the traditional library are similar while considering the content. The difference is in the expectancy levels. Digital libraries, by definition, promise to be a confluence of the user, information item and an intermediary at the time of the search. In the light of this, the user needs are expected to be answered in more precise terms and in much lesser time.

The environment also places a different connotation of the retrieved items. The work involved becomes a little more complicated than taking a document or a few of them off the racks in the library and presenting them to users for selection. Most of the users are today looking for the information itself rather than the items. So, the system should take care of the information product design at the time of analyzing the information needs. In any case, it still stands that the user is looking for sources of information answering the query. The marked difference in the digital library system is the distinctive manner in which the search, retrieval and services are to be designed.

b. Format or form of service:

The digital environment has had a profound impact on the form and format of information services. The emphasis is on the network centric services. That is to say that the information items are retrieved and made available to the end user at the work place itself. Again each user and instance of the use of the system maybe unique. In a case, it becomes very difficult to design a reasonably acceptable model across the sections of the users.

The first consideration is whether the information itself or the information regarding the item will be delivered. The traditional forms of bibliographic services, of course, have their significance. But in an online distributed system, such secondary information

services should also give a real time linking to the documents. Copyrighted information is not readily available to be offered to the end user in networked environments. This is a major hurdle for digital library projects that aim to digitise and store collections online.

The second consideration is the time factor. As emphasized earlier, the need of the moment is the information itself less often the items containing the information. The user does not have the time to go through a larger retrieved set to locate the appropriate information. In such a case, the responsibility of analyzing the information needs and supplying the pertinent information lies upon the digital library. The information maybe in one or more documents and in one or more forms. For an effective information service, considerable efforts at information consolidation and presentation have to be made. Again time and manpower are important factors.

The third factor to be considered is the portability and flexibility of the output. Once a user gets a set of items retrieved, it should be in form and format that is acceptable by most systems in use and must be easily adaptable to other systems. Standardization of the bibliographic information of data interchange is much beaten track. In any case it has a special significance in the digital library environment as the retrieved information may often be used as a link or input to some other system.

c. Access:

The access points to system should be created. The search language should be flexible. The system maybe supplemented with a list of standard terms or a thesaurus. The different data elements included in the database maybe displayed so that users can decide their access points.

d. Liability on users:

The system should be available to users without much liability on their part. The system should expect the least upgrades, if any, in terms of hardware and software. In any case, a system with an Internet browser as a front-end would make access possible to the users who already have Internet access.

2. Design Aspect

The central focus of an information system is of course the user requirements. Therefore the design of the system entirely depends upon the inputs from the users and users studies. There are various factors to be considered at stages in the design and development of the system to suit the user needs. To enlist a few:

- ? Scope
- ? Level of exposition
- ? Types of services
- ? Forms of document delivery
- ? Modes of dissemination
- ? Feedback incorporation
- ? User orientation

? User interfaces and interaction

The results of the user needs analysis culminate in providing user-friendly information products. The information services of a digital library take on a new perspective in the sense that the product is expected to give the information in a nutshell instead of a listing of documents in reply to an information query. Design of the services and implementation therefore form the crux of the work involved.

a. Services

Information services of a digital library make it distinct in its operation and purpose. But a distributed environment has to cater to a more heterogeneous user community than a traditional library setup. This makes the planning and implementation of various services a challenging task. Neither the applications for which the system will be used, nor the level of performance deemed acceptable can be fixed. (2). Further user needs and expectations develop along with the system, and their experience with the present and other systems will affect their expectations and evaluation (3). The main issues to be tackled in planning and implementation of the information services are:

Scope: The digital library should have distinct core of information according to the interest of the users and interest of the collaborating organizations. This may be supplemented with links to other sources such as Internet and other library databases for the service.

Level of the services: Usually the users in a digital library environment expect information and not the documents. The presentation is however important. It is to be determined whether the information needs to be consolidated, qualified and whether other kinds of manipulations into formats desired by the users can be provided. It is to be determined at what levels of users, the information services are aimed. It may be to assist policy makers, researchers, system developers and teaching faculty etc. A common system, catering to a heterogeneous group, may have to adapt to repackage the information to suit the varied requirements and power of assimilation.

Mode of Delivery: It is expected that most of the services are to be delivered on the desktop at the user's workplace. However, the need for the documents in print may exist. So, the system can have a sub-system, which may look into document delivery, based upon the nature of the information need. It is also desirable to determine the time frame for each query to the system so that after some iteration the system response time may be optimized. For example, a current awareness list of additions to the collections may be sent to the user every week, if so required, by the users. Users may also be notified online as and when documents/information in the interests expressed by them may be added.

b. Implementation

Much emphasis is laid on design of user-friendly interfaces to system. Internet has made it possible to inter-connect all kinds systems and databases. Any database with ODBC (Open Database Connectivity) may be used as a back end system. This facilitates

the designing of user interfaces to the digital library on the web using scripting languages. The most familiar clients available are the Internet browsers who act as the front-ends.

c. Feedback and Re-adjustment

The modules developed rely upon the user requirements. The fact that the users and their requirements vary, emphasizes that the system must be dynamic. The system designed should accommodate the feedback from the users and should be open to re-adjustment without the need for major over hauling. So the general model for operation is as shown below:

3. Retrieval Issues

The success of the digital library of course lies in efficient retrieval. The system should have a flexible search language with online help at every stage. Further, the system can be enhanced with the search options such as Boolean query or providing a drop down menu of the subject strings from which the user may be able to choose from pre-coordinated strings. A set of example search queries and syntax may be provided to direct the users to formulate the search queries. The retrieved set should be available with abstracts so that they reflect the contents. Further links can be provided to full text documents to the extent possible.

The case of retrieval of information using the Internet as a source poses an entirely different challenge. From the user point of view, Internet has a solution for every information need. But how can the web documents be traced at the time of the need? The various search engines available on the Net are hardly adequate tools to give impressive information services to the users. Most of the search engines search the terms in the title or the first few lines of the documents. However there are several projects trying to index the web documents. There are also efforts at document description such the Dublin core set of elements. In any case the indicators are in the direction of continuous research for improving retrieval on the Net.

4. The role of the intermediary

It is often a concern whether there is role of the intermediary at all in the digital library environment. There is an enormous responsibility on the part of information specialists from the stage of design through to the stage of implementation and information delivery. It is true that, to a certain extent, the user could operate independently with adequate orientation, documentation and online help. But the real role of the information professionals is the maintenance of this very dynamic model. As more and more information is available in different forms and formats and on the other hand user demands being more specific and mission oriented, striking a balance is a crucial task. The majority of the work ahead lies in R&D areas in design of better and efficient models for retrieval and dissemination. There is, therefore, no doubt that the role of information

professionals is vital in coordinating the information available and the information needs of the users.

5. Conclusion

The concept of the digital library is truly in the philosophy of the information for all, at the point of need. In a distributed environment, where the crucial advantage of the personal exchange of thought is removed, achieving user satisfaction becomes more complicated than usual. It is important to set the scope and level of the collection as well as the services. The question arises how specific or generic it should be? Further, there are several other issues such as matching the system terminology with the user terminology, setting the syntax, providing user-friendly interfaces and manipulation of the output formats. Before a decision is made on any of the listed activities, a detailed analysis of user needs is absolutely necessary. It is also to be noted that while in a crucial input, getting definite and conclusive results out of user studies projects is also arduous task. Several models based on scientific principles in user studies and information seeking behaviour and pattern are leading towards getting more concrete results, which may give definite pointers in the design of efficient digital library system of the future.

6. References

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