

Key Aspects in Planning an Interoperable University Library

Access Portal (ULAP): a Conceptual Model

By

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ABSTRACT

The academic environment is becoming more and more competitive in its dealings and functions and the academic culture is fast transforming as enterprising in nature. The academic library as the centre for scholarly communication faces many challenges in meeting needs and behavioural patterns of users of the university. Among the solutions used in libraries in providing information, an access strategy through web is very much requested by modern users. A university library access portal (ULAP) is the solution for information needs of academic users to facilitate teaching, learning and research. ULAP is supposed to provide updated information and access to e-resources to cope up with the changes and challenges of the curricula and learning outcomes planned under new educational strategies. The paper tries to identify important aspects to consider in portal design and attempts to build up a conceptual model of One Point Access portal for academic users. It is hoped to integrate academic environment and the electronic information environment fulfilling information needs of teachers, students and researchers.

0. INTRODUCTION

It is said that the modern world is distinctly information dependent. This is addressed to the need of speedy processes needed by the society in every aspect of

acquiring, holding and delivery of goods and services. The systems where the modern social activities depend tend to change as the transaction and operation media change, especially where the Information and Communication Technologies (ICTs) are in use. This effect of e-technologies is not only visible in the commercial sector but in every turn of the social life. Academic environment is also not spared.

Since the time, when people knew the oldest university, academic environment is seen by outsiders as a temple of knowledge where a community of intellectuals belongs. According to Wilson (Wilson, 1995), university still depicts old ideal of community of scholars, researching to advance the boundaries of knowledge, teaching to communicate that knowledge to new generation. University or the higher education environment is a place where teaching and learning as well as research are treated as core activity areas. There is no argument that all these main activities and related activities are knowledge centric. Knowledge is the input of the academic organizations as well as the output. There are also knowledge products and knowledge based services.

It is also noted that new academic drives tend to change with the market economy. Some universities have introduced an Enterprising Culture leaving aside the nominal rates and planning fee based services. Productivity of these institutions is highly discussed nowadays. Higher Education is increasingly becoming more and more competitive with the advent of modern teaching and learning systems. E-teaching and e-learning systems are prominently seen as the expectation of the modern knowledge society. The behaviour of academics hence changed accordingly and there is a visible effort to cope up with the changing scope of demand for knowledge. Teaching tasks of academics are not simple and straight forward now, with increasing number of students, and meeting requirements of new curriculum. The students on the other hand demand more learning rights and compare their own status with that of students in developed countries.

Librarians of these institutions too have no time spare for relaxation behind well organized book racks, well polished and efficiently maintained card catalogues with well mannered staff. Time is gone for them to sip their tea while other academics are engaged in hot arguments for grabbing their share or in making justifications in decision making. The academic librarian himself now is the hot topic in academic meetings. There is a share in almost all the teaching, learning and researching issues for the librarian to answer. The modern academic librarian finds some answers for these issues through library automation and through electronic library services.

1. Necessity of a University Library Portal

In a university environment teacher inquires basically on the knowledge to be added to the curricula and lectures, secondly for their research and other scholarly communications. Researchers and teachers in an academic community may need to know the processes and strategies that the fellow researchers use when they originate a research or a study. It is equally important for them to obtain a clear idea relating to the whereabouts of pieces of knowledge, when instructing students, in finding relevant information on a given topic. The students in turn, with the new curricula and semester system introduced in universities, show an increased enthusiasm in finding supplementary information, external to the knowledge disseminated by the lecturers.

It is observed that teaching and studying assignments of both of these communities are becoming more and more congested. As a result, the visit to the library is a postponement at many times and sometimes academics obtain their information elsewhere rather than getting it from their own library. One of the reasons for this behaviour is unavailability of an access point to the library at their desk top PCs of the office and homes. Hence library onsite approach for the academics and students is not enough. The modern solution for the problem is a Library Access Portal or e-portal provided for remote access.

A portal is a web based interface where user comes into contact with a networked system where diverse services are provided through a single entry. Portal is the dissemination point for any electronic governance system. A university portal is the place where users come into interactive terms with the university electronically. Library portal is an interface where information user comes into contact with library resources as well as other resources. University Library Portal is meant specially for the users in academic environment engaged in higher education.

Kelleher says government portal is a gateway or a single point of access through which government's functions can be delivered to its constituents (Kelleher 2000). Through his definition, we are able to coin our own definition for University Library Access Portal –ULAP, as a gateway or a Single Point of Access through which university library functions can be delivered to its constituents. The access is not limited only to the university users. An e-portal ensures user's right to have access to relevant information through 24 hour/ 7 days electronic access strategy in more accountable, friendly, communicative, interactive, efficient and effective manner.

2.1 Location of the Library Portal

There are basically two ways a library portal can be originated:

- a) As a sub site of the main university site
- b) As an independent library site

The two options are necessitated by the institutional policy considerations in maintaining organizational standards.

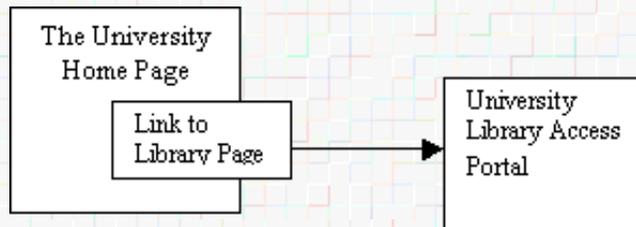


Fig. 1

Architecture of planning an e-portal basically is Vertical and Horizontal in view of providing access to users. Feeding information to users in Top to Bottom way is a static approach address to Vertical approach without providing complicated linking to other sites or resources. This means providing access to library databases and other information available within a particular library. The function can be grown more sophisticated later integrating intranets, extranets, web based services etc. within the university it self as well as out side environment. This is the Horizontal function of a LAP allowing a user to access different sites in dynamic approach

upon one User Authorization. The portal function as a Single Point of Entry (SPE) ensures ideal access point for interacting with electronic information products and services of the university and connected information across the web.

2.2 Goals and objectives of setting up a portal

Objective of setting up a ULAP will be approaching the remote user to make available library services as given to the on site user. Sathyanarayana(2000), points out that e-access models are planned at three objectives, Remote Access model, Onsite Access model and Access through Databases. Objective of a ULAP is to facilitate following operations interactively and efficiently to both remote user and onsite user.

- **Provide basic awareness on library products and services**
- **Provide routine reader services**
- **Interactive inquiry handling**
- **Facilitate searching OPAC**
- **Other information retrieval through e-resources**
- **Document delivery requests through ILL and DDS**
- **Provide access to related sites and subscribed sites**

Achieving these objectives would support;

- **Learners to achieve productive outcomes for the learning contracts undertaken**
- **lecturers and instructors are able to explore and recommend curriculum based and extra resources for the students to carry out learning contracts**
- **researchers to obtain the information needed in more effective way**
- **saving the time of teacher and student and both again as a researcher**

3.0 Main Considerations in Planning Interoperable LAP

Kelly elaborates the very idea of the university library :

“an academic library is a common wealth of knowledge. Any user, anywhere will have immediate access to relevant information in desired format, at affordable cost. It is assumed that much of this will be electronic or capable of easy transformation into electronic format.” (Kelly, 1992)

Even though the definition is in traditionally accepted frame, the idea depicts the ultimate motive of the university academic library. Planning an e-portal would flourish the very idea of academic library and motive of 'reaching the user where ever he is'. This section of the paper hopes to bring out and discuss key strategies that are to be accomplished in planning ULAP.

3.1 Library Automation

Library automation is the key concept that is to be accomplished first in providing web based access. The minimum requirement, of presenting the library catalogue (OPAC) online, is enough to understand the importance of Library automation. Library automation is a continuing process with ever advancing interactive library software systems. Library automation refers to using modern ICTs to enhance the access to and delivery of necessary information and services to the readership as well as efficient and effective management of information by the library and information technology staff. Neelameghan (1995) says that digital libraries are among the major outcomes of developments in ICTs.

Most Important benefits of library automation anticipated by the readers are; making the library or information centre more accountable to readers, helping them to attain their missions more effectively and efficiently, bringing about more convenient and appropriate ways of access to relevant information. The information specialists, in turn, expect the library automation to be an efficient tool for information management, problem solving technique as well as a resourceful and efficient way of dissemination of information. However the ultimate objective of library automation is to provide right information to a right reader in right format at right time, hence library automation is ultimately for readers.

Library automation basically deals firstly with automation of library functions and secondly, digitalization of the collections or incorporating digital collections. Automation of functions aims at automating almost all technical and user based work flows to be converted to a computer aided system using bibliographic software or text retrieval software, database management software or using customized software integrating many other supporting expert systems on purpose. Routine functions like acquisition, cataloguing and indexing of books, periodicals and other formats, current awareness services, SDI services, budget control and user based functions like the circulation system of library materials, reference services, document delivery services, etc. are served by most of the software packages available in the market. Most of the packages also perform statistical functions and report generating functions. In specialised systems the said functions are customized like using barcodes or other data capturing devices for circulation and digitization of documents, mail merging systems for SDI and for sending overdue notices, web interfaces to launch OPAC and reader services, networking modules etc. according to the needs of the customer. Automated libraries can not function at their full strength if necessary tools and accessories are not incorporated for appropriate applications such as integrated and relational software solutions, meta data frames, function focused expert systems, web based library portals etc.

It is clear that library automation is extremely necessary to achieve or implement digital library or e-library concept. An operational strategy of the web based library portal highly depends upon the efficiency of the library automation system used.

3.2 Computer Networking And Library Networks

Both of these concepts are necessary in providing expected services through the ULAP. Computer networking is hardware based and the library networking is

concept based. Library networking in an electronic environment deals with three main operation clusters. (Dempsey, 1992).

- **Bibliographic networking – building up and interchange of documentation works.**
- **Information networking – interchange and sharing of information through inquiry handling system and documentation services.**
- **Library services networking – ILL, SDI, Current Contents, Document Delivery etc.**

These networking aspects are still valid and will be expected by special user groups in the academic environment as well as general users.

With the development of computer based network systems (LANs, MANs, CWISs etc.) the use of automated library systems have developed into much more beneficial terms for both library management and users. The library management, through network systems, have proved efficient in house keeping and in information dissemination depending on the network type, status and topology.

With the advent of Internet, the world of information was affected the most. Web based technologies are not only used in publishing on the internet, but also used in planning intranets. The practice is very much popular at present in library environments. In addition, implementing web based library services and launching information products delivery online are more sought after by modern users.

The universities of the developed countries and of most developing countries show much more dynamic applications in networking. In the developing world, most of the key libraries are fast transforming into network environments and experiencing the benefits of interconnected, interoperable systems. The special and university libraries of these countries have taken initiative in going for networked environment.

Campus Wide Information Systems (CWIS) are gaining popularity in connecting academic community using web technologies. The CWISs promote an effective dialogue among academics and students themselves, as also between the academic end-users with the library. The environment also supports to integrate all faculty and institutional library services and the main library into “The University Library” platform. This very environment expects to drive academics, students and librarians towards the concept ‘academic integration’ (Heeney & Morgan in Illeperuma, 2001), where the Library and Information Science functions and academic functions are performed in perfect integration. User Portal is the doorway to bring in the academics and students into the library via Internet.

3.3 Digital Content

Digital content is essential in planning a ULAP. The user automatically hopes to access electronic resources when they are in a virtual environment. Digital content can be made available in three planes;

- **Bibliographic plane**

- **Abstracted plane**
- **Full text plane**

If only the bibliographic plane is provided to the user, the treatment is traditional as much as the card catalogue according to the modern terms. Users at present insist for direct connectivity with the source document via bibliographic or abstracted planes, hence it is important to plan digital provision depending on the user needs.

Digitalization is the main issue the developing countries face in going for electronic or virtual library. This is mainly due to the high costs involved. It is not necessary to bring forth many definitions to the word 'Digitalization' as the term is self explanatory for it's meaning. Digitalization refers to transferring information in any 'medium' into a digital format, enabling them to be retrieved through digital techniques later.

There are two basic methods in providing digital content.

- **Obtaining digitized contents – Digital content can be obtained from few methods**
 - **Subscription to databases, information banks, e-journals etc.**
 - **Electronic information transfer through specialized networks**
 - **Purchasing electronic databases like CD-ROMs**

If the library has obtained some sort of electronically accessible resources, ULAP is the place to direct the user into the required resource by providing links, such as URLs of websites and gateways, hyperlinks to the in-house available databases, CD networks etc.

- **Digitalization of related sources available in the library/university**

Digitizing important content available in the university such as local and regional content, institutional content, theses collections, report collections, article collections etc. is another e-provision for the users of e-portal. The idea is striking as these sources may not be available through any commercialized electronic information vendor service.

3.4 Identifying User Categories And User Needs

Even though it is thought that the users of a system are well known to every one in an institution, it is extremely important from librarians' or information professionals' point of view, to study user categories, their needs and their behavior when planning library services and products for the users. According to Hayden,

(2000) it is important to examine information seeking models as what the librarians think what *students actually do*, when searching information. The actual situation may be different from what the librarians imagine. The fact is true in relation with the teachers as well.

There is another important approach brought forward by the Dervin & Nilan. They point out that users are defined in system-oriented genera rather than user-oriented genera. The authors say that,

“Almost without exception information needs have not been defined as what users think they need but rather in terms that designate what it is in the information system that is needed. The definitions have not focused on what is missing for users, i.e. what gaps they face, but rather on what the system possess.” (Dervin & Nilan,1986)

The constraint of the traditional paradigm is clearly mentioned in the above excerpt. The planners of a service like ULAP have to treat the user in *user genera* definitely rather than looking at the user standing from the information supply side.

Main users of a ULAP are;

- Faculty staff, permanent or visiting
- On campus and distant students.
- Users outside the university

Outside users consist of users who enter the main university website and get into the library site in ad-hoc way. Some users deliberately enter the library portal to obtain information through the university library, even though the full range of facilities is not provided to outside user as for the registered university user.

Understanding and modeling user needs is a must in planning ULAP. Maurice Line studied (Line, 1973) the needs of academics and identified Research (personal and contract research) and Teaching as their main needs. Needs of students in turn can be categorized as Learning and Research (under graduate and graduate level). This type of information falls into the category of scholarly information. The category is immensely subject related. There is another category of information important to be provided through ULAP, that is promotional and instructional such as about the interface and facilities provided and using information skills to use the portal with high effectiveness. Therefore the needs that are hoped to be addressed through the ULAP can be categorized as follows.

<u>Type of Information need</u>	<u>Relationship</u>	<u>Nature</u>
Teaching needs	Courses, Modules, Curriculum	Subject related
Learning needs	Courses, modules, Assignments, Tutorials, Projects, etc.	Subject related

Research needs	Personal, Contract, Under-graduate, Post-graduate	Subject related
Other Information	Awareness, Guidance, Skills	General

3.5 Identifying Key Stake Holders/Players

In this section, information supply position for the e-portal is considered. Library portal is a place where many information suppliers get together. It is not only the library which supplies information to the user. It is worth to draw the attention into these streams of information suppliers before designing an interactive service as a portal. Their service is significant in providing and disseminating the information interactively to the portal users. Providers of information in the sector are;

- **The University Library**
- **Academic Staff of the University**
- **Information Networks (academic and other)**
- **Commercial Publishers of e-resources and Service Providers**

The situation discussed in the paper is different from the traditional library environment. In traditional library environment, library it self is the main or only supplier of information. In a digital library environment, the importance has shifted to electronic content providers and the library became an interface and a facilitator to direct the user through bibliographic tools and other IR methods. There are other players, like related information networks and services and also teachers/researchers themselves of the university. The portal can provide links connecting the users to required research projects and programs.

4.0 Modeling the ULAP

A university library portal is specially designed for its own users extensively but not limiting the access of any user to the site. But the active user participation would be limited to the registered users because the services are tailored to the needs of the intended community. Schubert Foo explains how the web based library, operates. The explanation of web based library covers most of the services expected of it.

“..the web has been used extensively for publishing information. When applied to electronic library guides, the web provides an innovative electronic means to effectively introduce library users to library facilities and services. Alternatively, it can be used a public relation tool to establish global presence and heighten public interest, as a marketing tool to advertise library collections and special services, as an information Kiosk to provide up-to-date information and announcements, as a platform to answer frequently-asked questions (FAQ), and as a support tool; to solicit users’ feed back, recommendations and queries.”
(Foo,1998)

The model discussed here is built with an idea to integrate the staff and student community and the library, providing interoperable system to accommodate the academic user in an interactive environment. The ULAP model integrates following main areas.

- **Automated Library System**
- **Academic Users and their Needs**
- **Access to E- Resources**
- **Interactive User interface**

Automated Library Back-End

Automated systems are briefly discussed in sec.3.1 as pre consideration in designing a library portal. The back end is the operational platform where all the logistics are prepared for the front-end. The main facilities of the automated systems that would be used for the user portal are :

- **Interoperability – relational software systems, web based techniques**

In an integrated library software systems all the modules in the library, such as acquisition, cataloguing, periodicals, circulation system, reader and inquiry services, current awareness and SDI modules, are inter related.

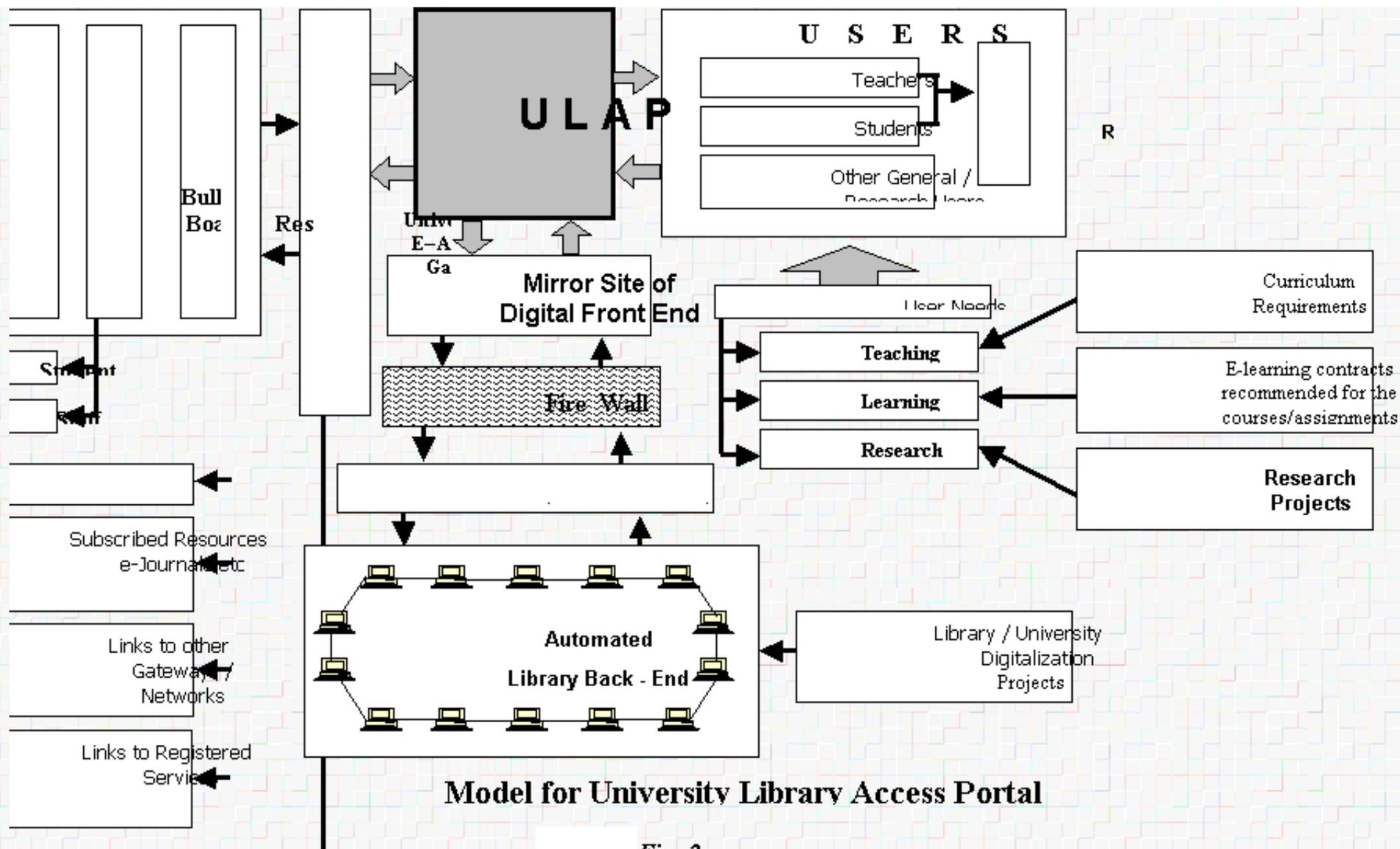


Fig. 2

Main feature of these systems is the interoperability between modules and databases. Within each main module, there are sub databases, e.g. in the circulation system there are membership data and transaction data. When a book is issued, the system checks membership data and book data for the validity of transaction. Book data is available in the catalogue module. But the issuing transaction is performed in the circulation module.

- **Friendly Inquiry, Information Retrieval and Reservation Interface**
- **Facility to connect digitized collections/archives**
- **Web Interface and E-mail connectivity**

The web interface and the email connectivity are the added features into the systems during past few years. Now the facility is a must and essential in going for the web and to maintain a productive dialogue between the users and the library services.

Automated Library Front-End

Front-end is the interface where the user comes into contact with the library system and would hope effective usage of the same at the user portal. The front end meant here is the interface provided for Inquiry, Information Retrieval and Reservation functions. These facilities are powered by the automated back-end activities. The friendliness of the interface could be enhanced by connecting the same to the e-portal providing the user with more skill guidance, more help messages, correct directions etc.

The automated front-end available to the user in the model is a mirror site protected by a fire-wall. The mirror site may be operated in the same database server or in another server connected to the main server.

University E-Access Gateway

The gateway concentrates on the special access to e-resources planned for the university library users rather than outsiders. The university users may have an authorization through a User Name and Password or ID number/Student number.

It is important for the university library to have a control facilitating effective usage over the access provided to the users. The e-portal will be an excellent opportunity in attaining this control. The e-gateway is a special page linked to the library e-portal providing the user with facilities to use many electronic strategies to get connected with required electronic source. The gateway model consists of the following:

- **Access to OPAC of the university library and other libraries**
- **Access to subscribed databases, gateways, e-journals, image collections, archives etc.**
- **Access to related and member network sites**
- **Access to special services registered with other institutions**

- **Access to Bulletin Boards**
- **Access to help panel – FAQs, Tips for efficient use of the portal facilities**

The university e-access gateway may provide free, subscribed and registered e-resources. The universities subscribe to e-journals and databases, sometimes, only for their own university users, sometimes as a collaborative practice being within a network, so that access is limited only to the institution/network member institutions. On some occasions the university library hopes to provide special access to selected university users e.g. to faculties, courses etc. Some commercial gateways offer free access to selected institutional or community categories e.g. INASP's (Int. Network for the Availability of Scientific Publications) free access provision to selected commercial publishers for Sri Lankan academic community. Another example is the institutional membership of other information services, where access is valid only for the registered members through customer code authorization.

Library Bulletin Boards (BBSs) are very popular among university users, especially with the students as they always have one or the other question to be answered by the library staff. 'Ask the Librarian' in interactive way, will make the users closer to the library. There will be many special messages to be directed to the user categories by the library. So that special BBSs may be advisable to make available for Staff and Students separately.

Access to help panel consists of FAQs, Tips for efficient use of the portal facilities, information skills tutorials for e-access etc. These kinds of instructions are important specially for first time as well as regular users.

Main user categories and their behaviour

A university library portal is different from a public community portal because a ULAP is specially designed for university users. Hence the controls mentioned above are to be exercised in providing services to its intended users. Main user categories of the university should be accommodated in the e-portal in a careful manner. The categories are discussed in sec. 3.4.

According to a system centered study, users of a computer system were categorized as Expert users, intermediate users and as novices (Seneviratne, 1994). In light of this study, portal users can be categorized in system centric way. The staff users and some experienced student categories are treated as 'Advance users', some students are not much experienced in using web based and computerized systems, they are 'Intermediate users', student categories who are quite new to the system as 'Fresh users'. There are 'Lay users' too, who access the university library portal out side the university.

If the ULAP hopes to approach the users in user oriented way, the portal design should be prepared to accommodate all type of users at equal convenience level. What ever the system facilities provided in the systems connected to the portal, designing user interface counts for the comfortability of the user. A user centric approach of an e-portal should be able to educate less skillful user eventually to become a skilled user in an untiring manner. An e-portal is an opportunity for the inexperienced users to learn skills needed to interact with the web.

Interactive User Interface

Moran in Kemp (1988) defines the user interfaces as those parts of a system, which come in contact with user, physically, perceptually and conceptually. In designing an e-portal, interactive facilities are to be used optimally providing services to all sorts of user categories in a planned way.

Sometimes staff users deserve special treatment than the students. Both staff and students should be separated from the outside users. Controls for the purpose could be achieved through separate set of usernames and passwords, thereby identifying them in separate categories to provide specialized services intended for them.

- **An interactive dialogue can be activated using different techniques and designs. Some of those are given below.**
- **Interactive inquiry system**
- **Dialogue boxes attached to different applications**
- **Ask the librarian panel and recorded answer system for FAQs**
- **Information retrieval interface of the library system**
- **Email prompting**
- **Complaint boxes and feed back recording etc.**

The user interface should be attractive, very friendly, inviting and flexible in its language and dialogue style, appearance, way of helping and dealing with customers. The user interface should be designed in such a way to prompt the first time user to visit again. It should be comfortable to untrained and inexperienced user to interact easily (Trenner and Buxton, 1985 & Kemp, 1988)

5. Conclusion

A ULAP, normally designed as a sub site of the university main page, has to be adhere to the institutional web page policy guidelines of the university. Mainly the guidelines are for physical appearance, web formats, usage of techniques and links to the outside websites etc. An e-portal could be designed with out violating the rules laid, but giving the maximum possible facilities to the users. A library e-portal is intended to be user friendly, giving the users a comfortable, shortest possible and clear access to the expected resource. Through this model, it is hoped to give a generalized conceptual design for a university library portal.

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