Towards a Secured Digitized Library: Challenge, Solution and Implementation

[1]Azeez Nureni Ayofe and [2]Wasiu Olayide Lawal
[1]Department of Computer Science, College of Natural and Applied Sciences,
Fountain University, Osogbo, Osun State, Nigeria
[2]University Library, Olabisi Onabanjo University, Ago-Iwoye, Ogun State, Nigeria

Abstract: Due to the high rate at which researchers and students all over the world are intensifying efforts towards adequate and resource oriented research and findings in their respective areas of disciplines the use of automated library cannot be underestimated and over-emphasized if there is need to meet up with challenges of the 21st century. Of course, there is no way a researcher will decide to make remarkable findings on a particular subject matter without referencing any available literature (s) either the electronic or printed version if for at least to see what other researchers have done in the same area. The high rate at which people are making reference to various journals, books and manual that are available online has made us in this research work focused on the design of a secured automated library for the Fountain University, Osogbo for both students and lecturers to meet up with the current global challenges in research and learning. Also in this research work we have identified the problems we are currently facing in implementing a digital library in Nigeria and offered possible solution that will assist us in circumventing these problems.

Key words: Library, digitization, university, 21st century, implementation, Nigeria

INTRODUCTION

Agosti and Masotti (1992) define digital library as organization that provide the resources including the specialized staff to select structure, offer intellectual access to interpret, distribute, preserve the integrity of and ensure the persistence over time of collections of digital work so that they are readily and economically available for use by a defined community or set of communities.

Dick Turner simply defines a digital library as one in which all the texts and the spoken books would be held as digital files.

Fountain University, Osogbo is one of Nigeria's first private universities, opening its doors in 2008. Like other universities, its functions include teaching, research and community service. Ifidon and Okoli (2002) note that universities now have additional functions:

- Pursuit, sponsorship and dissemination of knowledge
- Provision of scholarly leadership
- Manpower development
- Promotion of social and economic modernization
- Promotion of intra and intercontinental and international understanding

Digital Libraries represent the meeting point of many disciplines and fields including:

- Data management
- Information retrieval
- Library sciences
- Document management
- Information systems
- The web
- Image processing
- Artificial intelligence
- And human-computer interaction

This multidisciplinary nature has led to a variety of definitions as to what a Digital Library is each one influenced by the perspective of the primary discipline of their proposer.

From these functions, university libraries have derived their objectives to include:

- Provision of materials for undergraduate instruction, term papers and projects as well as for supplementary reading

Corresponding Author: Azeez Nureni Ayofe, Department of Computer Science, College of Natural and Applied Sciences, Fountain University, Osogbo, Osun State, Nigeria

- Provision of materials in support of faculty, external and collaborative research
- Provision of expensive standard works especially in the professional disciplines
- Provision of materials for personal development
- Provision of specialized information on the region within which the university is situated
- Cooperation with other academic libraries with a view to developing a network of academic library resources that are at the disposal of all scholars

LIBRARY AUTOMATION AND COMPUTERIZATION

Universities libraries in Nigeria are realizing the need to move from their isolated past into integrated systems and networked operations. As Khalid (2000) observes, networked and integrated functions draw on the experiences of the evolution of libraries in developed countries. Academic libraries in Nigeria are trying their best to catch up with their counterparts in the developed world. University library automation in Nigeria which started in the late 1980s are at various stages of automation of library services. The Federal Government of Nigeria through the National Universities Commission (NUC) which supervises all the universities and disburses funds to all the federal universities in Nigeria introduced projects aimed at computerizing university services across the country. They initiated Management Information Systems (MIS) and started the Nigerian Universities Network (NUNET) project. NUNET was aimed at developing a viable local and wide area network in each institution. This was followed by the National Virtual (Digital) Library Project. The mission was to provide in an equitable and cost effective manner, enhanced access to national and international library and information resources and for sharing locally-available resources with libraries all over the world using digital technology. (UNESCO).

THE MAJOR OBJECTIVES OF THE VIRTUAL LIBRARY PROJECT ARE

- To improve the quality of teaching and research in institutions of higher learning in Nigeria through the provision of current books, journals and other library resources
- To enhance access to academic libraries serving the education community in Nigeria to global library and information resources

- To enhance scholarship, research and lifelong learning through the establishment of permanent access to shared digital archival collections
- To provide guidance for academic libraries on applying appropriate technologies used in the production of digital library resources
- To advance the use and usability of a globally-distributed network of library resources

A few staff of Fountain University Library has been trained in using internet facilities for promoting academic researches and teaching. They are currently entering all their catalogue data into the catalogue module. Electronic publications are gradually being introduced, audiovisual and multimedia reading rooms are provided and CD-ROMs and the Internet services are offered. Several kinds of information can be found on the library homepages: information about the library, the catalogue, electronic resources, online information services and related links. This will also make interlibrary loan service available online. Users can enter the library homepage, click the relevant button, fill in a form and submit it. Digitization of resources would also allow the creation of electronic reading rooms with computers to access the resources. Students can also do word processing or use Internet-related services on these computers.

CHALLENGES OF COMPUTERIZATION IN NIGERIAN UNIVERSITIES

Computerization especially in the developing countries is fraught with challenges. This is also the case with Fountain University Library.

WAN/LAN: To a large extent, the existence of a University Wide Area Network (WAN) and a Local Area Network (LAN) within the library determines the success of computerization of library services. This is a major challenge to many universities in Nigeria. There is no reliable LAN in most universities. Where this exists, it is achieved through surface cabling which exposes the cables to the effects of fire, storm, vandalization etc.

In Fountain University Library, although, there is a LAN in the computer room where data entry is occurring, achieving a reliable LAN within the whole library is a herculean task. The library building did not originally incorporate cabling for LAN. A LAN would have to be achieved through surface cabling with its attendant risks.

Computer literacy/education: Many of the staff of university are not computer literate especially those in

administration and registry departments of the university. This is a great setback in computerization. Many of the staff are reluctant to jettison their old mindset which resists change.

Many are conservative and traditional and suffer computer phobia. Research results show that although the use of electronic information increases job satisfaction, confidence and the effectiveness of librarians in their work lack of technical expertise can be very frustrating to the librarians (Edwards *et al.*, 1995). There is also a lack of technical support.

Only one two of librarians are formally trained to initiate, develop, implement and maintain computerized applications in the entire university library system. Those who had been trained gain only limited or no access to the packages in which they had been trained. Inquisitive users with IT skills cause serious dissatisfaction to the library staff.

Poor state of power generation: Regular power generation remains a problem in Nigeria. Frequent power outages constitute a serious bottleneck to automation. The cost of running generating plants is prohibitive.

Poor funding of library services: Poor funding is a major challenge to libraries in Nigeria. Academic libraries in Nigeria derive their funds from the government. Although, the federal budget provision has moved from 5% of the approved recurrent budget for library development to 10%, the budget of many academic libraries continues to dwindle.

A high rate of inflation, low and unpredictable national income, the effects of global economic depression and local currency devaluation continue to water down whatever budgetary provision is made for academic libraries in Nigeria and Fountain University in particular. Many academic libraries in Nigeria have not initiated viable income-generating strategies to supplement government funding because of poor economic situation of the university (Abolaji, 2000).

Education and training: Most staff in academic libraries in Nigeria were trained in traditional librarianship. They are finding it difficult to cope with the requirements of the electronic age. Staff training and retraining have not been given a pride of place.

Fountain University Library has initiated computer literacy training for all staff which has had a lukewarm reception. This attitude is a great deterrent to the computerization of library services. These challenges have far-reaching effects on the implementation and sustenance of the automation of library services in Fountain University Library.

DESIGN ISSUES IN DIGITAL LIBRARY FOR FOUNTAIN UNIVERSITY

Each of the elements of a digital library such as its collections, the portals to those collections and its supporting services-plays an important role in determining how the library is used and what impact it will have on users (Ekpenyong, 1997).

The following factors were considered when planning the design of the Fountain University, Osogbo, Osun State, Nigeria:

- Systems requirements specifications
- Storage and file structure
- Security and accessibility
- Software requirements

Software requirements
MySQL server: MySQL server was used for querying the repository database of the digital library. The choice is based upon the following facts:

- MySQL server support import from and export to other files and database types
- It is useful for creating and retaining large dataset
- it has facilities for internet applications
- It is very easy to use

PHP (hypertext preprocessor): PHP (Hypertext Preprocessor) is a web development language written by and for web developers. It is embedded within HTML, some of PHP features that led us into making it one of the software for implementation are:

- Flexible coding environment
- Fynamic language that makes communication possible within a system
- Serves as an interface between the web pages and the database
- It is an open source language

SECURITY ISSUE OF FOUNTAIN UNIVERSITY DIGITAL LIBRARY

To ensure adequate security for the design, each library user (student/staff) is given a password and a user name. If someone who is not authorized or authenticate

attempts to access the digitized library there is going to be an error message, you are not authorized to access the library resources. This security measure has no doubt assisted the university in preventing outsider from accessing the resources with a legal consent and approval.

OPEN SOURCE LIBRARY/JOURNALS

It is a fact that what we currently have in Fountain University Library cannot be sufficient enough for the researchers to carry out their day to day activities and to also meet up with global trend and challenge. It is on this singular note that we subscribed to some journals with high impact factors as well as Libraries that are globally acknowledged for their impact in research.

Among these journals is ACM digital Library, Elsevier and IEEE which the University is currently sharing their resources. MIT and Oxford Universities are currently the universities that are offering open source access to their online academic resources. The Fountain University has therefore linked up with these universities to share their repository and non-proprietary academic resources.

By and large, serious efforts are on ground to link up with other universities to enhance academic research activities of the researchers in Fountain University, Osogbo, Osun State, Nigeria. The above interface (Fig. 1) is the New library user registration. Form which is required to be filled by any intended library user (staff and student or other person) before access could be given for any of the resources. Figure 2 is used as Login page. This

is an authorization page for users. This is intended to screen out illegal library user or an unauthorized user. This is achieved by giving each user a unique password and username.

The interface above (Fig. 3) is basically used as a welcome page for intended. This interface is termed as the Home page. It shows menu on the table list where each user could navigate to in the entire Frame of the university Library webpage.

The choice of a department in the university Library webpage is (Fig. 4) an indication of selection of a particular book. The Fig. 4 is an interface leading to the choice of a desired book (s) in the selected department.

As it can be seen in the departments selected above, the choice of Computer Science and Business Administration show the available books in some selected

Fig. 2: Login page

Fig. 1: Digital library home page

Fig. 3: Home page information

```
┌─────────────────────────────────────────────────────────┐
│      The Fountain University Osogbo Digital Library (FUODL)│
│  ┌────────────┬────────────────────────────────────────┐ │
│  │ FUODL menu │    ┌──────────────────────────────────┐│ │
│  │            │    │    User preferred departments     ││ │
│  │ Welcome message └──────────────────────────────────┘│ │
│  │ Student admission ----------------------------------- │ │
│  │ Research clerk  Computer science    Business administration│
│  │ Contact us      Programming books   Managerial accounting│
│  │ Registration    Artificial intelligence Business management│
│  │ Rules of library Human computer interaction Business statistics│
│  │ Catalogue       Computer and society text Cost accounting│
│  │ Journals        Operating system textbooks Entrepreneurship text│
│  │ Services        Database management Small business startup│
│  │ Resources       Operation research │
│  │ What is new?    Computer architecture│
│  │ Post comment    Computer networks  │
│  │ Departments     Computer security  │
│  │                 Modeling and simulation│
│  └────────────┴────────────────────────────────────────┘ │
└─────────────────────────────────────────────────────────┘
```

Fig. 4: Webpage showing departments

```
┌─────────────────────────────────────────────────────────┐
│      The Fountain University Osogbo Digital Library (FUODL)│
│  ┌────────────┬────────────────────────────────────────┐ │
│  │ FUODL menu │    ┌──────────────────────────────────┐│ │
│  │            │    │        Programming books          ││ │
│  │ Welcome Message └──────────────────────────────────┘│ │
│  │ Student Admission                                    │ │
│  │ Research Clerk      Computer Science Section         │ │
│  │ Contact Us            (programming books)            │ │
│  │ Registration                                         │ │
│  │ Result of library   BASIC Programming Language       │ │
│  │ Catalogue           C++ TEXTBOOK                     │ │
│  │ Journals            JAVA                             │ │
│  │ Services            C language text                  │ │
│  │ Resources           Web programming text            │ │
│  │ What is New?                                         │ │
│  │ Post comment                                         │ │
│  └────────────┴────────────────────────────────────────┘ │
└─────────────────────────────────────────────────────────┘
```
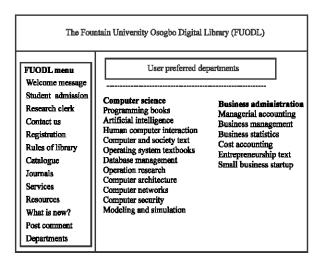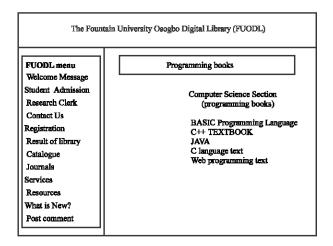
Fig. 5: Books in computer science department

areas of specialization which user can easily request. Figure 5 shows various books which are available when a Programming Books is selected under various options in computer science.

GAINS OF DIGITAL LIBRARY

- No physical boundary
- Round the clock availability of resources
- Multiple accesses to a particular book
- Structured approach to information search
- Quick information retrieval
- Preservation and conservation
- Unlimited space
- Networking with other Institutions
- Cost of usage

PROBLEMS AND CHALLENGES OF DIGITAL LIBRARY

- Lack of stable electricity
- Lack of air conditioned rooms where ICT facilities will be kept
- Lack of technicians and repair facilities
- Another issue is the case of copyright law which in many cases will hinder digitalization of books during digital library development
- Lack of stable information technology infrastructure

CONCLUSION

Lack of funds and lack of information resources have been problems for academic libraries in Africa for many years. In addition, automation of information resources and services pose new problems. These include the acquisition, selection and cataloguing of online information resources, the construction of databases, providing information literacy education for library users and the new skills required by and continuing education for librarians.

However, if the library ensures sound and quality automation of services and information resources creates new approaches to user education, pays attention to the provision of continuing education for library staff helping them to master the new techniques required for the management of electronic and the networked information resources and services, the gains of automation are immeasurable.

There will be a need to set up different levels of training programmes to accommodate all categories of users of digital library and even those that will be saddled with the responsibilities of maintaining the new system.

The presented model digital library for the Fountain University, Osogbo is not exhaustive, as the system can be improved upon with time. On a final note, Software engineers should take advantage of the provisions on the World Wide Web to build functional digital libraries for the academic communities to enhance qualities of teaching and research.

RECOMMENDATIONS

The need for staff training in computerized library applications cannot be overemphasized. The success of automation in the university library depends largely on the ability of staff and students to facilitate and implement the process. Proper, frequent and regular in-house IT training is a necessity if the maximum benefit is to be gained from the automation of library services and most

importantly, if the operations of the automated systems are to be independent of any one librarian. The need for organized training on all aspects of automation can be justified by the frequent minor system breakdowns or malfunctions that render the library systems inoperative unless the systems librarian is available.

Most importantly, there is need for the government to make financial resources available to purchase new IT infrastructures and replace the old one as well as procuring adequate bandwidth for efficient and reliable access to resources.

REFERENCES

Abolaji, J.A., 2000. Automation of cataloguing processes in Nigerian libraries: The experience of Hezekiah Oluwasanmi library Obafemi Awolowo University Ile-Ife. Nig. Lib., 34: 1-7.

Agosti, M. and M. Masotti, 1992. Design of an OPAC database to permit different subject searching accesses in a multi-disciplines universities library catalogue database. Proceedings of the 15th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval, Copenhagen, Denmark, June 21-24, ACM, New York, USA., pp: 245-255.

Edwards, C., J.M. Day and G. Walton, 1995. Impel Project: The impact on people of electronic libraries. Aslib Proc., 47: 203-208.

Ekpenyong, G.D., 1997. Automating a large library in Nigeria: The story so far. New Lib. World, 98: 106-110.

Ifidon, S.E. and G.N. Okoli, 2002. 40 Years of academic and research library service to Nigeria: Past present and future. Paper Presented at the 40th Nigerian Library Association, ASCON, Badagry, pp: 22-33.

Khalid, H.M., 2000. Co-operation and networking in library and information systems of advanced countries: A framework for countries with less developed systems. Lib. Rev., 49: 57-63.