

# **Library Automation with Impact of ICT on Academic Libraries**

## **ABSTRACT**

Academic libraries in India are facing sweeping changes on account of information, communication, and technology applications in libraries. They are progressing well in automating the house keeping operations of libraries, such as automated circulation system, acquisition of books, e-books, acquisition of periodicals, e-journals, databases, and hosting of OPACs (i.e., Online Public Accesses Catalogues) on library web pages and refining old services and starting fresh ones. Library automation is perceived in a Simple sense as a process of mechanization of library operations which are of a routine and repetitive nature. This covers usually housekeeping functions such as acquisition serial control, cataloguing circulation reference etc. Thus library automation is a process that brought and will continue to bring profound change to the library world in terms of both technology and the involvement of people.

## **HISTORY AND DEVELOPMENT OF LIBRARYAUTOMATION**

The replacement of manual operations in libraries by computerized methods is linked to the history of modern day data processing and computer technology, the situation has not been the same in developing countries, especially for public libraries. The movement towards the use of computers in libraries in developing countries really began in the 1980, the decade that saw rapid development and growth in sales of microcomputers.

The arrival of the microcomputer, also known as a personal computer (PC) or desktop computer, changed the face of data processing and information management in organization. For the first time computers became affordable both to individuals and institutions that could not previously afford the expensive minicomputers and mainframe computers. The opportunities presented by microcomputers, coupled with their relative low price, led some libraries, especially university and special libraries in developing countries to consider automating some of their functions and activities. In general, there is a paucity of literature documenting the status and use of information and communication technologies (ICTs) in public libraries in developing countries.

**Keywords:** - *Automation in Libraries, Provision of ICTs to the community, Technical support for ICT facilities and ICT skills, Problems of Automation in Libraries.*

## **Automation in Libraries**

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communication technologies (ICTs) in public libraries in developing countries. Although some attempts to automate library processes, especially in university libraries, can be traced to the 1970s, successful implementation of most library automation projects in developing countries began in the early 1980s.

### **Computer Servers**

While some libraries are using PCs as servers, mainly as Internet proxy servers (serving as an interface between the local Internet enabled PCs and ISP's Internet server) others have installed purpose-built, brand-name servers to services are among the most underfunded institutions, it is very difficult to imagine how some of them will be able to acquire the equipment indicated without donor assistance. In almost all cases, computers are distributed throughout the library systems, including branch libraries, with the central library or headquarters having a large share of them.

### **Software: Operating Systems**

Library services that have computer servers use different operating systems to run their servers. Many libraries use Windows 95/98 on its server. Although Windows 95/98 has some networking ability, it is not really a network management system, and lacks the advanced functions found in systems like UNIX and Windows NT. However, given that purpose-built network software systems require skilled manpower to manage, and are also expensive in terms of user license fees, it is not surprising that this library has settled for Windows 95/98. Most public library services cannot afford to employ skilled IT staff, and therefore cannot even use free open-source UNIX systems like Linux.

Microsoft Windows, especially Windows 95/98, is the most common operating System installed on PCs and laptops. The wide use of Microsoft Windows operating systems is due mainly to the fact that it is bundled with new Intel-based PCs, which was not the case in the past when it was necessary to purchase the operating system separately. Regarding the large number of machines with Windows 95/98, can be attributed to the fact that most of these machines were purchased in the 1990s when it was the most commonly pre-installed operating system on PCs. Nowadays, new computers purchased are more likely to have Windows XP as the pre-installed operating system.

### **Software: Office Applications**

With regards to office application software, the automation libraries services in developing countries generally use the Microsoft Office installed on them have laptops also have Microsoft Office installed on them. Other application software installed on all the library services' computers is Microsoft Internet Explorer and Microsoft Outlook. The reason for this is easy to understand, as they are bundled with the Windows operating systems that are in use in all the libraries. However, it should be noted that the availability of Microsoft Outlook does not necessarily mean that it is the most widely used electronic-mail client software. Because some of the library systems have only one official e-mail account provided by their Internet Service Provider (ISP), staff that requires their own private or personal e-mail accounts have to use the free. Web based e-mail services of Yahoo, Hotmail, Excite or others, resulting in their use of Web browsers rather than Outlook to access their accounts.

Although many automation library services have access to computers, there are libraries which have not automated any of their library functions. In addition to the automation of basic library functions -such as acquisitions, cataloguing, circulation, and access to OP AC- some library services are also using computers for related activities, including:

- Stock control and stock-taking
- Accounting, community information and book selection
- Book reservations.

The application of computers to library-related activities in some of the library services is very limited, and often on a small scale.

The use of WordPerfect certainly restricts how the catalogues might be accessed if the library decided to make them

available online. Use of a data assuagement system would be more appropriate for the development of an online library catalogue. All the libraries that have not yet automated any of their functions, and those using computers on only a small scale, have plans to automate in future. The reasons given for this are that their existing manual systems are adequate and automation would bring no significant service improvement to users; they library's operations; and no funds are available to meet the high cost of initial software and future updates.

All the services that have automated all or most of their library functions have branch, regional or affiliated libraries. Some also have several service points, located in various places. Most of the libraries that form part of its systems are using automated systems for most library functions. The library services that have branched or regional libraries are using automated systems either at the main library only or at the main library and only a few affiliated or branch libraries.

The major reason given for automating functions only at the main or central Library was a lack of funds to extend automation to all the libraries within the system. Other reasons given were a lack of ICT experts and inadequate supporting infrastructure - for example, no electricity where branch libraries or service points were located.

### **Provision of ICTs to the Community**

Although automation libraries are best placed to serve as universal access points to global information in their communities because of barriers such as the shortage of computers, a lack of funds and an absence of ICT skills, not many library services in developing countries have been able to take advantage of ICT facilities to play this role and benefit their communities. Some library services, however, are making ICT-related services such as CD-ROM services, Cyber cafe facilities; Free Internet access; IT training, etc., available to their communities.

### **CD-ROM services**

The development of CD-ROM technology has had a huge and positive impact on the provision of access to online databases and other information resources in libraries. Instead of an advanced and sometimes complicated infrastructure to obtain access to online databases, CD-ROMs offer a simple but efficient alternative. The widespread availability of PCs with internal CD-ROM drives/readers also means that it has now become easy for libraries to provide their users with access to CD-ROM based services. In developing countries, where it is generally impossible to access online databases have found their way easily into many libraries, especially into university and research libraries. Unfortunately, not all automation library services seem to have advantage of CD-ROM technology.

### **Internet Connectivity**

Internet connectivity, especially access to electronic mail, is available in most of the automation libraries. The lack of connectivity, especially for library users, in those that do not is attributed to the high costs involved. In spite of the large number of automation library services involved. In spite of large number of automation library services indicating that they had number access to Internet facilities, almost none are providing Web-based information services to library users.

### **Internet access control and tracking of URLs**

The introduction of Internet access into automated libraries raised concerns among different groups of people around the world. A major concern was parents, who feared that their children might access Web sites with harmful or objectionable material. This concern has also been expressed in developing counties. In the early days of Internet use, especially Web access, the major concern expressed by most people and governments in developing countries related to the amount of pornographic information said to be accessible on the Web. As a result, many organizations, including governments, spoke out against the introduction of the Internet. Now that the Internet is slowly finding its way into institutions such as libraries, librarians are expected to place some form of control on the

use of their Internet facilities.

Among the controls put in place are restrictions on the length of time that staff or users are allowed to spend on the Internet and blocking sites deemed to be providing pornographic material. The major reason for restricting the duration of staff use or the Internet was to reduce the cost of telephone bills associated with dial-up Internet access. However, in one case it was reported that the number of PCs available for Internet use was limited, so it was necessary to restrict their length of time spent on them to allow as many people as possible to use the Internet during the hours that the library was open. Accessing pornographic Web sites was reported in one case to be a waste of Internet resources, therefore requiring such Web sites to be blocked off; the National Free Library of Zimbabwe indicated that pornographic materials are illegal in the country, leading to the need to restrict access to such resources.

Regarding the tracking of URLs, the libraries indicated that this is done in Order to:

- monitor and prevent access to banned materials, e.g. pornographic sites;
- obtain statistics on Internet usage and to acquire information on how the Internet Services Could be improved
- monitor possible abuse of the facilities by employees; and
- know what information people are interested in and to create a database of useful URLs.

### **Electronic-mail facilities**

The most commonly used Internet facility around the world is electronic. Mail, and all automated library services that had access to the Internet were using e-mail. However, it should be noted that some libraries had only one electronic-mail account, which was used for official library communication. This account was generally accessed on a computer located in the office of the secretary to the director of the library service. Staff requiring primacy set up e-mail systems such as Yahoo, Hotmail and Excite. The use of Web-based e-mail accounts also has an impact on the use of the limited Internet bandwidth available. Many automated library services have their own web sites.

### **Provision of library and information services via the web**

A large number of automated libraries in developed countries are using the Web to provide access to a wide variety of information resources and services, including online community information, access to databases, online reservation of library materials and many other services. Information provided on the these Web sites is mainly similar to that found in library brochures, such as the services offered, opening hours, general library information, and contact details. The reasons for not providing Value-added services via the Web are many, although a major one could be that most people who use the automated libraries in developing countries do not have access to Internet facilities at home. Therefore, there is no need for the libraries to develop and provide online services when no one will make use of them. Other reasons include a lack of staff with appropriate skills to develop digital library service, and a lack of suitable ICT infrastructure. In most cases, access to the Internet is via dial-up access, which is not suitable for provision of dedicated 24-hour Web-based services.

### **Technical support for ICT facilities and ICT skills**

One notable feature of library services in Africa is a general absence of ICT experts working in libraries. The reason for this is clear: highly-qualified ICT experts can earn more money working in the private sector than in automated institutions-and particularly in automated libraries. Almost all the automated library services are making concerted efforts to develop the capacities of their staff to use ICTs efficiently. They are providing internal training programmes, or holding workshops, or encouraging their staff to attend external training programmes offered by private firms, especially on operating systems such as Microsoft Windows and on application software such as

Microsoft office. In addition, the libraries that have been automated and are using integrated library systems are also providing training on the systems in use in their libraries. Some services have established IT units or departments charged with the responsibility of taking care of the ICT facilities. However, in most cases, these department are supplemented with help obtained from the parent organization's IT department or firms contracted to maintain the library's ICT infrastructure.

**(1) Kind of ICT support issues**

Very few automated library services have IT departments or units that can attend to ICT-related problems on a daily basis. Help is sought from external ICT firms or individuals and, in some cases, from the IT department of the parent organization. However, it is sometimes difficult to obtain help when it is needed and, therefore, members of the library staff have to attend to ICT -related problems on an ad hoc basis.

**(2) Funding for ICT facilities and sustainability**

The first computers installed in some automated libraries were documents from external organizations. Annual costs relating to ICTs in automated library services include the costs of hardware and software maintenance and upgrading, software and software maintenance and upgrading, software license fees, internet access fees, and telecommunication charges. Some libraries meet these costs from their budgets, while in other cases; the costs are taken care of by the information technology (IT) department of the parent institution. Automated library services are using one or a combination of the following three approaches for the maintenance of their ICT facilities:

- The IT department of the parent organization takes care of the library's ICT facilities.
- The library contracts an external ICT firm and pays for its services.
- The library uses its own IT department's staff to maintain the facilities.

The absence of budgets for ICTs in automated library services raises questions about the sustainability of the facilities. It also raises doubts about how most of the services will be able to implement their plans to acquire more computers in the next twelve months. As indicated earlier, this is likely to be achieved only if they anticipate receiving funds from external source, such as donors.

**(3) (ICT) strategies and policies**

Very few automated library services in developing countries have an ICT strategy -i.e. an official, written plan containing objectives and guidelines for their acquisition or use of ICTs. In most cases, the deployment of ICTs is done on an ad hoc basis.

**(4) Barriers to ICTs**

The introduction and effective use of ICTs in automated library services in sub-Saharan Africa is being hampered by a number of factors. Most of the cases presented in this book indicate that a lack of adequate funding and, in some case, a lack of commitment from parent organizations is the major barriers to the deployment of ICTs. Automated services are generally poorly funded, and as a result a large number of them depend on external assistance and funding for their ICT projects.

**Problems of Automation in Libraries**

**Cooperative Automated system**

The fullest statement of the order system specification was given at a conference organized by the group. It is designed to include the majority of output that libraries are likely to require from such a system and in order to make it more widely usable it is being programmed in COBOL number of copies needed. This is an interesting example of one way in which cooperation between libraries can make for simpler automated systems, save time, and reduce costs. Order and auxiliary listings of outstanding orders, receipts, and fund reports are using and IBM 407 accounting machine." On order" cards are filed manually in the public card catalogue and pre-cataloguing is carried

out whenever complete Library of Congress cataloguing data is available. A unique computer-aided system for ordering replacement copies of standard books is now operating in modern technical libraries by selecting a list of titles.

Given information on the quality rating of publishers' editions, the computer prepares monthly lists of replacement order which enable each branch library to have in stock a determined number of copies of all the standard titles, all in good condition. A number of library systems which, because of its size enables substantial discount to be obtained. A number of other libraries have reported automated acquisitions systems to be in operation.

### **Circulation Control**

A typing computer-aided circulation control system is now operational. It being implemented in four stages O increasing sophistication the first of which commenced in operation. The first stage, as a by-product of its operation, produces a book card for each book that is circulated, thus building up an "active" collection of books with cards ready for automatic input of charging data during the second stage of the system. The final two stages provide for on-line interrogation and updating of the loans file. The price which has to be paid for these gradual methods of building up an active collection is the heavy work load involved with the first stage. Borrowers fill in slips for each book they borrow and reserve and data-processing staff keypunch one card for each book that is returned.

The advantage of a crash programmed is that the circulation system can employ automatic collection of charging data right from the very beginning, and that there will be no need to cater for books being circulated without which will in fact never be circulated again, it will not be necessary to punch cards for books that are returned as at Southampton. For a university technical library where it is the newer books that circulate most, it is more economical to prepare book cards for books on loan during the loan period than to carry out a crash programme for the entire collection. And if all technical processing stage possibly as a by-product of an automated order system, than in time only a small percentage of books will be presented for circulation without book cards.

As circulation increases and as filed grow, linear relationships do not necessarily hold, so that it is necessary to include the cumulative costs of a system when evaluating it.

A number of libraries in the United States have now adopted circulation control systems based in either the IBM357 or 1030 data-collection units, accepting data from eighty-column punched book cards and readers" plastic badge cards. An unusual system operates at Johns Hopkins University which represents one solution to the slow charging speeds which are associated with computer-aided circulation control. The price paid is an extra operation in the circulation procedure. Charge and discharge data is captured on microfilm by photographing the reader's identification card and the spines of up to twelve or fifteen books being borrowed by the computer in the normal way.

Printing card punch to create three transaction cards for each loan from punched book and reader cards. One card is filed manually in the issues file and the other two are used by a computer to apply various controls to the system,; to test for overdue books, for example. Eighty-column cards are filled in by borrowers and then keypunched for processing. A computer is used only for printing letters recalling overdue books.

### **Punch Card Techniques**

The Atomic Energy Research Establishment at Harwell produced a printed list of its periodicals holdings by punched-card techniques in 1960. the main library at Harwell is responsible for purchasing periodicals for its own collections as well as for those of twenty-two divisional libraries.

The use of mechanized methods for compiling the list made it a comparatively simple job to supply each library within the system with a frequently updated union list of periodicals. Input can be taken from punched cards and processing is done by IBM 1401 computer. In the case of a widely used list such as this it becomes important that computer typesetting techniques should be introduced quickly, even through the present frequently updated list is an immense improvement on the older ones.

The incentive to mechanize was the immediate need to merge the records of the two libraries. An impressive number of different outputs have been produced including a KWIC index of current titles. Semi-automated serials check-in systems have a number of attractive features and have been adopted by several libraries. They can be regarded as an intermediate stage between systems producing a list of holdings and fully automated systems embracing accounting, checking in, and binding routine for periodicals. For libraries which cannot afford to develop fully automated systems directly they are a useful stepping-stone whereby the final goal can be approached by degrees. Periodical parts expected to arrive during the coming month are listed on a line printer.

A book catalogue produced by punched-card methods was introduced to the science and engineering libraries of the University of Rochester in 1962. This short- title catalogue, now made using an IBM 7094 computer, is designed as a supplement to the libraries' regular card catalogues and each entry is accordingly limited to one line only. In the latest editions of this catalogue refinements have been made to the sort programs.

### **Networking problems**

Access to the catalogues must be by means of a microfilm reader, but film kept in cartridge makes for simple handling and a Xerox Copyflo can be used to produce hard copy quickly and cheaply if this is wanted. The Library of Congress project MARC has had a marked influence on libraries' plans for catalogue automation both in North America and Britain. The MARC pilot project, in which cataloguing copy was distributed on an experimental basis to sixteen libraries, began in October 1966 and is still continuing. It will be firmly based on co-operation with the next few years. It will be firmly based on co-operation has already been established in regard to the actual data going into catalogue records as part of the Library of Congress Shared cataloging Program.

### **Mark tapes**

The introduction of standard book numbering to the British book trade has provided a convenient tag for identifying the records in the British MARC tapes and should reduce greatly the problems associated with matching catalogue records by computer. A possible file structure for the weekly for the weekly magnetic tapes produced by the U.K. MARC service might be as follows: firstly, a main file consisting of a series of catalogue records in standard book number order; and secondly, a title index to the first part of the file. The index might also be produced in printed form along with a listing of the SBN's of records in the first part of the file. The entire shelf lists of a sample of these libraries are being converted into machine able form and a thorough investigation will be made into the problems of merging the separate catalogues. Unless entries referring to identical books really are truly identical the computer will include them both in the updated catalogue.

### **Information Communication**

The key requirement in such an age is that libraries should be flexible. This will be manifested in all facets of librarianship; library buildings, systems for subject representation, forms of publications and the reader services provided for the library's clientele. Co-operation between libraries at local, national, and international levels will increase in importance, but it must be flexible so as to ensure that individual, importance, but it must be flexible so as to ensure that individual, seemingly more important goals. Most important of all, perhaps, is the recognition that libraries serve as an intermediary in process of communication between human beings. They are not ends in themselves and the fact that libraries must deal ultimately with people, not merely with inanimate documents and machines, obliges to design systems which treat both readers and library staff with understanding and respect for their personal feelings and needs. The computer has a central role to play in such future library systems. As a reliable, competent, accurate, and cheap manipulator of library information it can bring to fruition many idealistic concepts about flexible library services. It has the capacity to free human beings from much of the repetitive labour that is a necessary concomitant to library work; it can also give us the opportunity to provide personal service to real people. The necessary prerequisite to the wise and proper use of computing machinery in libraries in the future is a body of wise and informed library managers now.

## House Keeping Work

The major area of library housekeeping which librarians tend to regard as being suitable for on-line methods is circulation control. Although no system is under consideration yet, work is either in progress or under consideration at the various college libraries, and at Harwell and Belfast. A proposal for on-line accessioning of periodicals has come from libraries are considering systems for on-line manipulation and cataloguing data. Assuming that it remains essential to make non-programmable alternations either to ordering data or catalogue data from a central agency before it can be added to a library's own catalogue file, then an on-line visual display console equipped with a keyboard and light pen would appear to be an attractive piece of hardware for doing this. All of these on-line systems, however, involve only minor modifications to existing patterns of library activity.

## Conclusion

The automation of library operations can very readily be regarded as a way of escape from the pressing problems of everyday life in a library, ordering and cataloguing books, answering awkward reference questions, tracing lost books. Automation will certainly simplify many of these tasks, but it must be built upon a sure foundation of good library practice which, as far as possible, prevents problems from arising. Librarians' best know what the problems are it is cataloguing, acquisitions work, reader service, and circulation control, and it is important that their knowledge be brought fully to bear on the job of designing automated system in the first place. Librarians must understand fully what automation can do in all areas from book ordering to natural-language text processing. Then this knowledge and experience will enable the goals of automation to be defined rightly and attained more readily. Library automation calls for close working relationship between two disciplines and the men who practice them. The introduction of computer and its various aspects of automation is a part of the process of modernization and hence it should be introduced in various phases. Information technology has now changed the old concept of libraries. Computer technology is growing fast and processing rapidly. The field of searching, generating, manipulation, process, communication, and data more accurately and speedily. The other aspect of automation is to enable the end users to search through large quantities of information. Effective resource sharing nowadays requires information, which permits users to locate materials of interest in both print and electronic format. The success of library automation depends mainly on the appropriate decision taken by the technical institutes and college from time to time. At the same time right. Selection of manpower for data entry and other professional work and however, planning to lead the entire library staff to workers a coordinated team is highly essential. Information library network is computer communication network is an autonomous inter library centre like DELNET, INFLIBNET, ERNET, INFORNET, ETC, for the provisions the technical as well as other libraries of general nature.

## Reference

1. Gibbarlli, P. Library automation: today's successes and concerns. *Journal of the electronic library*. 17 (3) June 1999. p. 17-20.
2. Akinfolarin, W.A. Automation in the Adeyemi college of Education library, ondo. *Journal of library management*. 19( 1) Feb 1998. p. 26-28.
3. Amekuedee, John - oswald. An evaluation of library automation in some Ghanaian University libraries. *Journal of electronic library* 23 (4) Aug. 2005. p. 442-452.
4. Porot, Lynee. Automation of interlibrary loan services: effect on the patron and the library. *Journal of Interblending & Document supply*. 29 (3) Sep 2001. p. 108-113.
5. Kieran, Cardella. Best - Seller: a Canadian library automation system. *Journal of library Hi Tech*. 17 (2) Jun 1999. p. 138-145.
6. Peter E. September. Automation and Academic library Management. A case study. *Journal of Library Review*. 39 (3) Jun 1990.



7. Ezraondari - Okemwa. Managing a library automation project the Moi University experience. *Journal of library Management* 20 (4) June 1999. p 228-234.
8. Maurice B. Line. Forty years of library automation: a personal reflection. *Journal of program: electronic library and information systems*. 40 (2) 2006. p. 118-122.
9. Chand, Prakash. Report of promotion of Library Automation and Networking in North Eastern Region (PLANNER) 2004. *Journal of library in Hi Tech News*. 22 (1) Jan. 2005. p. 14-15.
10. Clare, Connor. Staff training in libraries: The implications of automation, *Journal of library management* 13 (6) Dec. 1992.
11. Garcha, & Buttlar. Profiling African Libraries: Automation in Ghana, Kenya and Nigeria. *Journal of Library Review*.
12. Saarti, the acquisition and maintenance Costs associated with library automation systems in Finnish public libraries *Journal of program: electronics library and information systems*. 37 (1) Mar 2003.p. 25-30.
13. Msuya, Planning the automation of libraries in developing countries : A system analysis approach. *Journal of library review*. 39 (3) Jun. 1990.
14. Biil, Wanyama. Automation and its impact on the job satisfaction among the staff of the Margent thatcher library, Moi University. *Journal of library management*. 22 (6/7) Sep 2001. p. 303-310.
15. Matoria, Upadhyay & Moi. Automation and Networking and public libraries in India Using the e-Granthaliya software from the National information center *Journal of Program: electronic library and information systems*. 41 (1) 2007. p. 47-48.
16. Mohmood, K. The development of computerized library services in Pakistan: A review of literature. *Journal of Asiam libraries*. 8 (9) Sep 1999. p. 307-328.
17. Mohmood, K. The development of the LAMI (Library Automation and Management (Program) software for use in developing countries and its marketing in Pakistan. *Journal of program. Electronic Library and information systems*. 32 (1) Mar 1998. p. 37-48.