

## NETWORKING THE LIBRARY CATALOGUE: LESSONS FROM THE KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY LIBRARY, KUMASI, GHANA

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### **Abstract**

*This paper describes the general procedure that the Kwame Nkrumah University of Science and Technology (KNUST) Library followed for carrying out the automation and subsequent networking of its library catalogues. The highlights of these activities include choice of software, selection of vendors, conversion of records and training of staff. It emphasizes networking of catalogues as a sure way of providing gateways to library resources and a solution for the problems of accessing library materials. It finally highlights the lessons from KNUST Library's experience with automation, challenges encountered and presents it as an example for other Ghanaian academic libraries which have plans to automate to learn from it. Recommendations have also been given to pave way for modest beginnings for libraries which cannot afford automation of catalogues with comprehensive but expensive library management systems to use CDS/ISIS.*

**Keywords:** LIBRARY AUTOMATION, ONLINE CATALOGUES, RETROSPECTIVE CONVERSION, INFORMATION RETRIEVAL

### **Introduction**

The core modules of a library catalogue have always functioned as identifying the location of materials in the library, the cost of the materials, and the status of materials- that is, they are either on the shelf or are circulating (Kinner and Rigda, 2009). However, these core functions of the library catalogue are fast changing. This is because library users are no longer limited by the walls of a particular library. While many libraries in countries around the world - United States, Europe, Asia and Africa- have taken advantage of automation and have had their catalogues networked, it is regrettable that many libraries in Ghana are yet to take the full benefits of automation and subsequent networking of their library catalogues.

It is in this vein that the Kwame Nkrumah University of Science and Technology (KNUST) Library embarked on automation of its library catalogue to facilitate the needed unlimited access to its resources as part of a comprehensive library automation project for the library. This paper reviews the processes and challenges the KNUST Library went through in the course of its automation and presents them as an example to be learnt by libraries that intend to automate.

### **Objectives of the Study**

The paper seeks to propose a procedure for carrying out automation and networking of library catalogue with reference to the following:

- i) Choice of software;
- ii) Retrospective conversion;
- iii) Data entry/ importing data into new database;
- iv) Selection of vendors;
- v) Training of staff;

- vi) Challenges; and
- vii) Recommendations

It also seeks to highlight the experience of the KNUST Library for the benefit of libraries which intend to automate.

It is however worth mentioning that this study focused only on the cataloguing module.

### **Literature Review**

Kumar and Car (1995) defined library automation as “the application of computers in housekeeping operations such as acquisitions, cataloguing, circulation control, serial control and interlibrary loans”. They further added that library automation is application of computers in information retrieval services such as catalogue search by (author, subject, keyword, title, etc), indexing, current awareness services, selective dissemination of information, retrospective search services and bibliographies. Daniels’ (1980) definition of library automation is not so different from that of Kumar and Car. According to him “library automation is the application of automatic and semi-automatic data processing machines to perform library functions such as acquisition, circulation, cataloguing, reference service, and serials control”.

Automation of the library catalogue began on stand-alone computers and these automated catalogues were the preserve of the individual libraries. These later gave way to Online Public Access Catalogues (OPACs) which allowed public interface with the Automated Library System (ALS). By the late 1990s, the ALS was functionally complete with good MARC support but varied network support (Andrew, 2007). There was an obvious need for libraries to transform the way they provide information to their clients. Lynch (2000) discusses this transformational time as a networked revolution. He describes it as “a vast constellation of digital content and services that were accessible through the network at anytime, from any place, could be used and reused, navigated and integrated, and tailored to the needs and objectives of each user”. Coyle (2004) states very eloquently that the function of the library catalogue had changed from that of identifying a shelf location to pointing to a networked location that can exist anywhere in the world. This gives the catalogue more active or dynamic characteristics.

In a study of the extent of library automation in African libraries, Garcha and Buttlar (1996) noted that only nine (12.5%) of the responding libraries had automated their card catalogues. According to them thirty-two libraries (47.1%) owned micro-computers for word processing and other applications with Ghana having the highest percentage when analyzed by country. They further mentioned UNESCO’s Micro CDS/ISIS as the most used software package by these libraries studied.

In an evaluative study of library automation in Ghana, Amekuedee (2006) discovered that most university libraries in Ghana are lagging behind in terms of automation of library process compared to libraries in the developed countries. He intimated that even though the university libraries realize the importance of library automation, they are hampered by lack of funds, support from the university administrations, and skilled staff to embark on automation of all library processes. He therefore recommended the automation of the entire library processes, since that can go a long way to enhance the inter-library loan capacities of the libraries through networking their library resources online.

### **Importance of Library Automation**

Library automation comes with a lot of benefits to both the users and the librarians who man the libraries. Some of the benefits are discussed below.

In the course of library automation materials in poor condition are repaired so that at the end of the process materials will not only be available but also in good condition. It also enables reconciliation of call numbers so that copies of the same title will not be located at different places in the library. It also facilitates weeding out books that have outlived their usefulness.

The end result of library automation is increased access; that is users are able to search for materials within the library and from remote locations via search terms as author, title, subject, call number and keyword. It also ensures that machine-readable catalogue can be accessed and displayed in a multitude of ways that simply are not possible with a manual catalogue (Delsey, 1990). Libraries are also able to conduct inventory during automation exercises.

### **Some Automation Procedures to be considered**

#### **Choice of software**

Libraries attempting to venture into automation should first of all take a decision on the type of software to be used. The software can either be selective (this is where the library concerned picks only the module that will be useful to a specific library service) or comprehensive (that is containing all the modules). Software compatibility is essential if the library has an existing database and will eventually import the existing records into the new software. Other issues to consider include user friendliness of the software, its robustness, affordability and ability to detect wrong and multiple entries. There is also the need to consider whether maintenance of equipment and training support for library staff from the vendor (technical and operational) are available.

#### **Retrospective conversion**

There is the need to recapture all bibliographic records of materials in the library on catalogue cards or in whichever format that may be appropriate to the library concerned. The information to be captured usually include: author or editor, title, place of publication, publishers, date of publication, physical description, series (if any), notes, ISBN, and accession numbers or barcode numbers.

#### **Data entry into the new software**

The information is entered in the new software after all the needed bibliographic data have been captured on cards. Data entry can be done by the staff of the library concerned or be contracted to data entry companies. In-house entry enables the library to ensure that the right thing is done always. According to Olorunsola (1997) data entry by staff of the library “is cheap and the number of errors made during the data-entry is low provided that quality control is maintained”. On the other hand, in-house entry of data is always very slow because they are usually very meticulous and would want to ensure accuracy. Data entry companies will use a shorter period to have all the data entered in the database, but this will come with some form of corrections such as typographical errors. Libraries should, therefore, weigh their options and then decide on which of the two will give them a better result.

#### **Importing into the new software**

Another option that can be employed by any library interested in retrospective conversion will be to import all their records in an existing database into the new software. Issues to be considered here will be the compatibility of the existing database with the new one. If the

new software is not compatible with the old one, then it will be appropriate to contract it to a conversion company or the data should be entered afresh into the new software by staff of the library.

### **Selection of vendors**

There are various factors to be considered in choosing vendors. These factors include cost, timeliness, schedule, number of the records to be converted, experience of the agency, that is, who the developers are -whether an institution, or reputed company or few individuals. The preference is for an institution. One has to be skeptical about the software developed by individuals as continuity would not always be guaranteed. Again the number of times the software has been revised since the time of its first launch and the number of parameters available for each module should be considered.

In selecting vendors one also has to take into consideration training and guidance after installation, whether the software is available on major operating systems or whether it has web interface. Others factors are according to Epstein (1998) the size of the collection, types of subject headings, age and language mix of the collection, distinctiveness of the collection, classification schemes, amount of data to be included in each record, and the hit rate against the vendor's database.

Epstein (1998) states that at the height of conversion projects in the mid-1980s, there were more than 20 vendors including bibliographic utilities and their networks- especially AMIGOS AND SOLINET- and other commercial vendors such as OCLC, WLN, UTLAS, Brodart, and The Library Corporation (TLC). Each of these competed for services in retrospective conversion. This therefore made it possible for libraries to have several options in terms of which vendor to contract based on the services they provide. Vendors can be selected either through competitive bidding, recommendation by a consultant or visits to libraries with experience in automation.

### **Staff training**

Training of staff of the library, especially those who are going to be responsible for the automation programme, is an essential component towards a successful exercise. They should be trained to know how to input data into the system correctly, how to trouble-shoot when problems occur and should be able to train prospective users of the software. The Systems Librarian with his IT team and Heads of the various Departments of the library are usually responsible for this training.

### **Challenges**

Challenges may occur in the course of any automation exercise, but these can be managed. These challenges may include time constraints, lack of funds, expertise (personnel) and institutional support, irregular power supply, fear of adverse impact on employment, apprehension that the technology could be too expensive and logistics constraints. For example, inadequate number of personal computers and their accessories can unduly delay the speedy implementation of the automation process.

### **The KNUST Experience**

#### **Resources of KNUST Library**

Located at the centre of Kwame Nkrumah University of Science and Technology, Kumasi-Ghana, the main KNUST Library together with six other College Libraries constitutes the University Library System. The six colleges are: Engineering, Science, Agriculture and Natural Resources, Architecture and Planning, Art and Social Sciences and Health Sciences.

The main University Library holds a collection comprising over 230,000 volumes of printed books and about 3,500 journal titles. Of the journals, 360 are current titles. By virtue of its membership of the Consortium of Research and Academic Libraries in Ghana (CARLIGH), the Library has access to over 15,000 paid online journals in databases, CD-ROMs in specific subject areas and access to about 9,000 free online journals. The role of the librarian encompasses assistance or instruction in the timely use of the library's resources (both print and electronic), hence there is the need for library automation to promote effective and efficient service delivery.

In an attempt to facilitate unlimited access to its resources, the KNUST Library embarked on library automation.

### Data Collection

Data collection began in June and ended in September 2009. Data were collected on all the existing libraries in the University Library System by the researchers.

The University Library System consists of the Main Library and six other College Libraries. These are the libraries of College of Agriculture and Natural Resources, College of Science, College of Health Sciences, College of Architecture and Planning, College of Art and Social Sciences and College of Engineering. Data on the following aspects were collected:

- i. Holdings of library materials;
- ii. The Classification Scheme in use;
- iii. Any existing software (Database in use);
- iv. Manpower and allocation of staff.

### Holdings of Library Materials

Table 1 below illustrates the holdings of the Main Library and those of the six College Libraries.

**Table 1: Holdings of the Main Library and the Six Colleges of KNUST**

Main Library	238,626
College of Agriculture and Natural Resources	11,000
College of Architecture and Planning	6000
College of Science	12,736
College of Art and Social Sciences	17,554
College of Engineering	6000
College of Health Sciences	17,248
<b>Total</b>	<b>298,164</b>

*Source: University Library, KNUST, 2009*

In all the University Library System holds 298,164 volumes (KNUST, 2009). These books were to be checked for accurate call numbers, imprint, physical description, labelling and finally entry into the database. It must be noted that the figures given are the reflection of what exist in the catalogues of the Main Library and the six College Libraries.

### Classification Scheme in Use

It was noted that apart from the College of Health Sciences Library which uses the National Library Medicine (NLM) classification scheme, all the other libraries use the Library of Congress (LC) classification scheme. To ensure uniformity, the College of Health Sciences Library was directed by the University Librarian to revert to the LC classification scheme.

The College Librarian has therefore since October 2009 been converting to the LC classification scheme.

### **Existing Software**

The Main Library started some form of automation in the mid-nineties with a free CDS/ISIS for Windows software. CDS/ISIS is an information retrieval package developed by UNESCO. An attempt was made to replicate this in the College Libraries so as to have intra connectivity among the libraries within the University. Though this project was not completed, the libraries of the Colleges of Agricultural and Renewable Natural Resources and Science had their records captured into the CDS/ISIS. Thus they were the only two colleges which used the CDS/ISIS software in addition to the Main Library.

### **Manpower and Allocation of Staff**

The Main Library has two IT specialists, a technician, thirteen professional librarians and several other assistants who are computer literate. The College Libraries are also manned by professional librarians with assistants who are computer literate. Since the College Libraries do not have IT specialists, they rely heavily on the expertise of the IT specialists in the Main Library.

### **Data Analysis**

The data collected was analysed to gather information on the following:

- i. Choice of software;
- ii. Availability of funds/logistics;
- iii. Time frame for the automation; and
- iv. Processing and maintenance.

### **Choice of Software for KNUST Library**

A committee was set up by the University Librarian involving the System Librarian, the Head Cataloguer, Acquisitions Librarian, all the six College Librarians and a Consulting Deputy Librarian to advise on the software to be used for the retrospective conversion and subsequently the total automation of the library's services. This participatory approach was to bring together all stakeholders of the automation process, so as to make them feel part of the process and to own it. After series of meetings involving the University Librarian, the heads of departments in the Main Library, all the six College Librarians and upon expert advice from the IT specialist, the Library settled on the Alexandria Library Management Software developed and licensed by the COMPANION Corporation in the USA. This software has among others the cataloguing, circulation, acquisitions and serials modules.

The choice of the software was informed mainly by:

- i. Affordability;
- ii. Ease of maintenance;
- iii. User friendliness; and
- iv. Availability of technical support.

Besides, the software was chosen because other sister universities like the University of Mines and Technology, Tarkwa and the University of Cape Coast were using it and it had proved reliable. There was the need therefore to look for a company that could supply the Library with this software, provide the hardware components and other accessories, do the network cabling as a prerequisite for the installation of the software.

### **Award of Contract**

The award of this library automation contract followed the Procurement Law of Ghana through National Competitive Bidding. This was advertised on 8<sup>th</sup> February 2007 under the title Library Automation Infrastructure Project (**Daily Graphic, 2007**). Successful bidders were required to design, supply and install a set of library automation infrastructure, three pieces of high-end servers and fifteen desktop personal computers.

The contract was awarded to Nala Consultancy Services on 14<sup>th</sup> May 2007 after three months of screening the various bids by the University Evaluation Committee with a representation from the Library. What this meant was that Nala Consultancy Services was required to do network cabling to pave way for installation, facilitate the preliminary training of IT experts in the use of the Alexandria software and to supply the software, the hardware and other accessories for the automation.

### **Availability of Funds**

The fund to undertake the project was sought from the Teaching and Learning Innovative Funds (TALIF) by the KNUST Library. This Fund, through the National Council for Tertiary Education (NCTE), supports the promotion of educational research in Ghana. A sponsorship package of \$195,096 was made available for the implementation of the project as per TALIF approved project Round 3- 2005 (KNUSTR/3/017/2005) on Tuesday, March, 14 2006 (**Daily Graphic, 2006**). The Library did not therefore rely on the university administration for the provision of funds for the project.

### **Time Frame for Conversion**

As earlier mentioned, some form of automation had started in the mid-nineties in the Main Library using the free CDS/ISIS for Windows software developed by UNESCO. What this meant was that all the about 27,000 materials catalogued and classified after 1994 were housed in the CDS/ISIS database. These records were expected to be migrated unto the Alexandria database. The Library has to convert over 260,000 materials catalogued and classified from the inception of the library in 1961 up to 1994, into the Alexandria Library Management Software.

It was, however, realized that the over 260,000 records in the catalogue were not the true representation of the materials on the shelves due to several reasons such as losses. More so, the incompatibility of the CDS/ISIS database with the Alexandria database due to the fact that MARC records from these two databases could not match made it more compelling to recapture all the bibliographical records of the materials on the shelves. This was done by the junior and senior staff members of the Library and supervised by the senior members of the library. The recapturing of the data was to be done in just over one long vacation (three months), that is, from June to September when the students and faculty were on recess. The College Librarians were tasked by the library administration to undertake similar exercises to facilitate the integration of their holdings into a common database. The College Libraries have up to the end of August 2010 to complete the recapturing of data into the Alexandria software.

### **Processing of Library Materials**

Barcodes were printed and put in all library materials on the shelves. During this process, bibliographic information such as author, title, ISBN, class mark, place of publication, publisher and the year of publication of the physical materials were captured on "4×3" cards together with the barcode numbers and location of the books in the Library for easy retrieval. Differences in call numbers of copies of same titles, wrong call numbers due to human error

and faded labels were all reconciled or corrected as appropriate in the course of the exercise by staff of the Cataloguing Department.

### **Data Entry**

The Library opted to rely on its own staff members for the data entry into the new database instead of conversion companies. This was to minimize errors and to reduce cost. Data entry was done by library assistants who are computer literate and have had experience working in the Cataloguing Department.

### **Maintenance of Software**

For technical support and eventual good maintenance of the software, the Systems Librarian who has both library and computer science background was sponsored, as part of the library automation contract to go and learn at first hand the intricacies of the software at the Head Office of COMPANION, Salt Lake City, Utah, USA. The training lasted three weeks and gave the Systems Librarian what he needed to train other staff members in the use of the software.

### **Training of KNUST Staff**

All members of staff (junior and senior library assistants and senior members) were trained in batches in the use of the Alexandria software from 7<sup>th</sup> to 17<sup>th</sup> December, 2009. This offered staff members the opportunity to input data into the system and troubleshoot when problems occur. Staff members were categorized into three groups depending on their level of accessibility to the various modules in order to make training easier. Each group was taken through a three-day intensive training in the Alexandria software. Resource persons were the Systems Librarian and his IT team. The Cataloguing Department had its own training in the cataloguing module before this scheduled training.

### **Networking the Library Catalogue**

The electronic era has posed a challenge to the use of the manual library catalogue which hitherto housed the records of all the holdings of the (traditional) library. The manual catalogue has virtually become an obsolete tool. This is largely because library users are no longer limited by the catalogue to access only materials in the library. They rather have access to the whole wealth of knowledge through other catalogues online, electronic databases and search engines like the Google and Yahoo. This buttresses the point made by Epstein (1998) that “once computerized, the record serves the entire library - circulation, acquisitions, collection development, and interlibrary loan - and is no longer the sole purview of the cataloguing department”.

It has, therefore, become imperative for libraries not only to automate their catalogues but also go further to network them. When catalogues are networked, they can be part of OPACs that are gateways to what institutions have, and which other researchers can tap into anywhere, anytime via the World Wide Web.

Thus the Main KNUST Library catalogue is online since October 2009 and has a link at the University’s website (<http://libcat.knust.edu.gh>). This means the library’s catalogue database now has a wider access than it used to be.

### **Challenges**

The Library faced a number challenges in the course of the automation process. Approved funds for the project were not released on time for prompt execution of the project. Moreover, the contractor had similar contractual engagements elsewhere and therefore did not concentrate fully on this project. There was also a problem of delay in the supply of equipment including computers and accessories. The contractor as at 24<sup>th</sup> February 2010 is



yet to supply two servers and eight computers to the Library for the project. The presence of the students also became an obstacle to the successful execution of the project for which reason some parts of the project, for instance network cabling, had to be done during the vacation period. This same problem affected the speedy execution of the project on the part of library staff, who had to wait for students to be on recess before books on the shelves could be processed.

### **Conclusion**

The paper highlighted a procedure any academic library that intends to undertake library automation needs to consider. Among the things to consider are: funding, choice of software, selection of vendors and award of contract, training of staff, and challenges to be expected.

In spite of the challenges that the KNUST Library faced, the automated catalogue system is online and accessible anywhere via the Internet. However, the Colleges are yet to have their catalogues incorporated. It is believed that the catalogues of the Colleges would be connected to the system by August 2010.

Avram (1990) had it right when he summed it all up by intimating that it has become clear that for all libraries, and especially for large academic and research libraries, the integration of all records in a single catalogue is the only efficient means to satisfy the needs of both technical services and reference staff. For most large libraries, any activities that lie outside the automated procedures and depend on manual catalogues or other files are becoming more and more difficult and expensive to maintain. Complete automation and subsequent networking of catalogues have become not so much as an ideal as a necessity.

### **Recommendations**

Libraries intending to undertake any automation exercise must first of all plan and budget for it. This is key to achieving success in the exercise.

If a library wants to make a modest beginning, CDS/ISIS is worth considering as it involves minimum investment in both hardware and software. Once a database with bibliographic details is developed, the same data can be used for circulation activities. Here the selection of future software becomes crucial because CDS/ISIS can efficiently handle only the cataloguing system. It must, however, be noted that in formatting the CDS/ISIS, the fields selected should match the MARC fields. This will ensure easy migration to any other software in future.

Having gone through the procedure and the analysis for automation, the KNUST experience should become an example for other academic and research libraries in Africa and especially Ghana.

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