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Experience of systems migration at the University of Botswana Library: a case study

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Abstract

Purpose – To share experiences of the University of Botswana Library (UBL) in migrating from the TINLIB to Innopac library automation systems.

Design/methodology/approach – Discusses various steps involved in system migration at UBL. Provides a historical background of UBL, the reasons for migration, selection of the system and implementation. Details training on the new system, with emphasis on cataloguing and acquisitions.

Findings – Emphasises the need to prepare ahead and plan well before the implementation of the system. Indicates data conversion steps used for both TINLIB and CDS/ISIS data and various problems encountered in translating non-MARC data into USMARC.

Research limitations/implications – The emphasis is on Technical Services leaving out circulation and periodicals modules.

Practical implications – Provides a case study for libraries to consider during the library automated system migration and training.

Originality/value – The paper is a case study of the UBL system migration, intended to help other libraries in planning the change.

Keywords Library management, Library systems, Botswana, Cataloguing, Data handling

Paper type Case study

1. Brief background to the University of Botswana Library

The University of Botswana Library (UBL) was established in 1971 and comprises the main campus library in Gaborone and three branch libraries. UBL serves a population of 12,000 + students and 1,000 + staff, and has a stock of over 300,000 volumes. The collection includes books, periodicals, microforms, electronic and multimedia resources.

In 1999 the Library was reorganised into the following three divisions:

- (1) Resource Management (RM);
- (2) Information and Research Services (IRS);
- (3) Customer and Extension Services (CES).

Each of the three divisions is headed by a deputy director who reports to the director. The RM division has two sections:

- (1) Automation – covering systems management and implementation;
- (2) Technical Services Section (TSS) – covering acquisitions, cataloguing and serials control activities.



UBL started computerisation in 1993 using the TINLIB system, originally developed by IME but since marketed by Electronic Online Systems (EOS) International (www.eosintl.com). UBL purchased six modules (Acquisitions, Cataloguing, Serials control, Circulation, OPAC and Reports) of the T-series of TINLIB and was one of the few libraries in the world using all the modules.

2. Reasons for migration to a new system

There were a number of reasons that forced UBL to consider migrating from TINLIB to another system. TINLIB had been used for five years when EOS International decided not to carry out any major upgrades to the T-series, and instead introduced the Q-series, which ran under an entirely new environment. After using TINLIB for five years the UBL staff and end users were generally not happy with the performance of the system. It was functional, but lacked innovation and efficiency as:

- it did not follow any existing standards like the USMARC format;
- it had not implemented Z39.50 protocols;
- the interface was not GUI-based;
- internet technologies were not implemented;
- support for multi-language scripts was minimal; and
- it did not cater for short loan and multi-branch environments.

Another major reason for concern in 1998-1999 was that EOS International could not provide any written guarantee that TINLIB would be Year 2000 (Y2K) compliant. Based on the decision of EOS International to change to a new system coupled with the numerous shortfalls of the system, the users of T-series had no alternative except either to migrate to the new Q-series or to review the current strengths and weaknesses of the T-series and make a decision to look for an entirely new system.

3. Choosing a new system

A Library Automation Software Search Committee consisting of six members was established at UBL in December 1998 to undertake an evaluation of the existing TINLIB system and point out the strengths and weaknesses in each of its six modules. The committee was also given the responsibility to search for a suitable alternative library management system. The committee then had to identify the requirements for a system to replace the existing one and prepare a document to invite library management system companies to tender for the supply of the new system. Following this the committee had to evaluate the bids and suggest a suitable system for UBL to procure. All the library staff were briefed on the need for a new system as part of the change management strategy.

After the tender was advertised, seven companies responded, but only two companies were short-listed based on fulfilment of all the conditions of the tender. The two companies, Innovative Interfaces (www.iii.com) and Ex Libris (www.exlibris.co.il), were invited to come and do on-site demonstrations of their respective systems, namely Innopac Millennium and Aleph, to staff at UBL. It was important to inform staff at every stage of the process since they were going to be the implementers of the system. Members of the committee also made a visit to the Republic of South Africa (RSA) to

look at libraries where the two short-listed software suppliers had implemented systems.

For instance, Gauteng and Environs Library Consortium (GAELIC) had purchased Innopac software in 1996 to provide a consortial based service to be used by a number of academic libraries (Edwards, 1998; INNOPAC Workgroup, 2003, www.gaelic.ac.za). Cape Libraries Cooperative (CALICO) (www.adamastor.ac.za/Academic/Calico/portal.htm) used the Aleph system. During the site visits the members of the committee interviewed a number of users, staff and system administrators of both systems. CALICO members were not very enthusiastic about the Aleph system because of project implementation delays and network connectivity problems. However, the members of GAELIC consortium were happy with the schedules and implementation progress. The need to implement the system at the UBL before the year 2000 and the general smooth implementation schedule of Innopac were some of the determining factors.

Innopac Millennium was eventually selected as the appropriate system for UBL. It had proved to be one of the reliable, Y2K compliant and integrated systems available to handle all the modules. The system also had the capability to hold catalogue records in USMARC format, as well as providing customers with a variety of self-service features.

UBL then formed an Innopac implementation team with six members, one each from TSS, CES and IRS with the rest from automation section of the library. Figure 1 shows a screen shot of the services offered from the web site of UBL in early 2005.

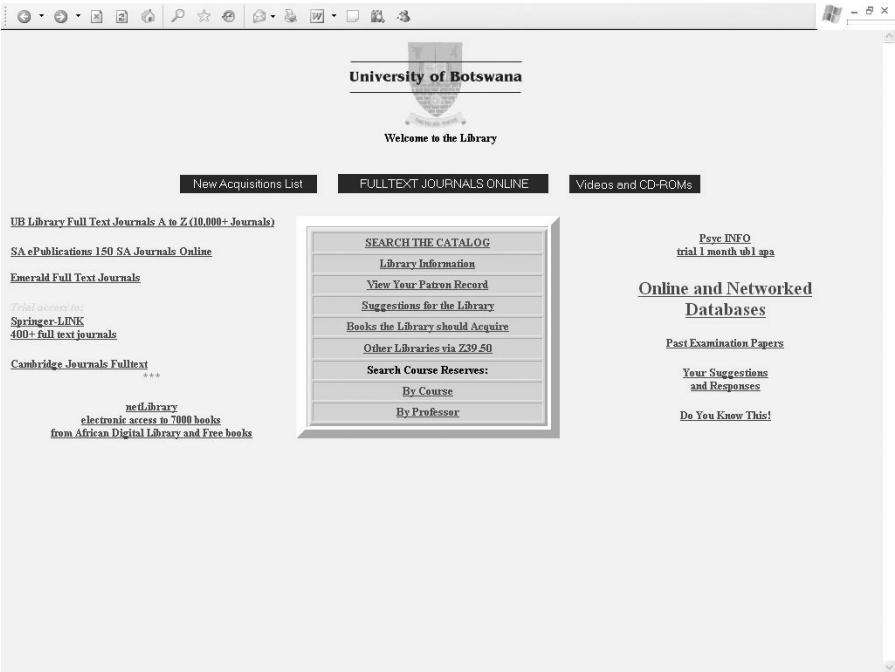


Figure 1.
Home page of UBL web
site

4. Implementation

4.1 Role of UBL INNOPAC implementation team

The aim of the team was to complete the implementation of the new system by January 2000 so as to have a system in place that was Y2K compliant at the turn of the millennium. In order to speed up the implementation programme, UBL was selected by Innovative Interfaces for a “fast-track implementation schedule”, which was the approach used by the company to allow libraries with Y2K problems to migrate to Innopac Millennium before the end of 1999.

Another challenge was to train staff and prepare them for the change from one system to another. Most of the staff were not familiar with the MARC format and so needed specific training in this. Also, Innopac requires the filling of large numbers of worksheets for the database profile and non-MARC fixed fields such as location codes, fund codes, item codes, patron types and loan rules, acquisitions options/fiscal profile and so on. This was all a mammoth task and a steep learning curve for the team and library staff. The team sought for assistance on the project from staff in the library of the University of South Africa (UNISA), another user of Innopac Millennium.

4.2 Database conversion

It was necessary to transfer records from TINLIB, a non-MARC system, into the Innopac MARC format. Specifications were drawn up to map TINLIB data into USMARC tags, sub-fields and appropriate indicators. The USMARC information from the Library of Congress (LC) MARC web site and cataloger's reference shelf, from The Library Company (www.itsmarc.com/crs/crs0000.htm), proved invaluable in understanding the MARC structure. Pages from MARC 21 Concise Format for Bibliographic Data on the LC MARC standards web site, www.loc.gov/marc/bibliographic/ecbdhome.html, were also downloaded and made available locally for quick and easy access by the team.

The conversion specifications were submitted to two firms for cost estimates for carrying out the data conversion. In the event, the costs were exorbitant and time to convert data was much longer than expected, so a decision was made to carry out the conversion within UBL.

UBL has been a member of Sabinet online, a company providing electronic information services, including bibliographic records in MARC format, to organisations in Southern Africa (www.sabinet.co.za) for some years. UBL had used various software tools (such as `marcmakr.exe` and `marcbkr.exe`) from the LC to reprocess problem records downloaded from Sabinet for inclusion into TINLIB. Records were then exported from TINLIB, using dBase IV software, to produce lists of newly acquired materials. For the conversion of records from TINLIB to Innopac, dBase IV programs were written to load segments of data into database fields based on MARC tags and some subfields. The information from the intermediate databases was then output into a text file following the specifications on LC `marcmakr.exe` program. Preliminary work showed that more programs would be needed to reprocess the TINLIB export data in order to ensure that each line of data was not more than 240 characters in length. A PC-DOS executable C program, which splits lines longer than 240 characters into shorter lines and repeats the first 15 characters as a marker for easier identification when processing, was developed and used.

There were five basic types of data that needed to be processed:

- (1) monographs;
- (2) serials;
- (3) subject authority;
- (4) data held in CDS/ISIS; and
- (5) patron data.

TINLIB was used to generate export files for the first three data types. The data were extracted based on the catalogue date, i.e. when the record was first input into the TINLIB system, and loaded on a year-by-year catalogue date basis. When creating the output text files, a number of additional processes were performed on the data. For example, the non-filling characters indicators for the 245 tag were created, e.g. indicator 2 for A, 3 for An, and 4 for The. Splitting of titles into main title and subtitle with \$b subfield marker; dates in personal name tags were given the \$d subfield marker; the 008 tag was created to include illustration types, nature of contents, language; and subject subheading was given \$x subfield markers for 650 tags.

A further requirement for data conversion was related to the catalogue records, produced using CDS/ISIS, from the National Institute for Development Research Documentation (NIR) library which had merged with the UBL during 1998-1999. As the emphasis was more on documentation the resources included single articles, chapters from books, conferences, thesis, reports and other grey literature sometimes with lengthy abstracts. The data were exported in UNIMARC format, but it needed to be formatted using USMARC tags. However, further processing also needed to be done by a dBase IV program to modify the record leader and create field 008, to change indicators, and to remove unneeded sub-field markers. Before submitting the output to dBase IV, the CDS/ISIS output required to have carriage returns and \$ signs removed (this was done for this project by epad) and to have the records put into a text format by marchbkr.exe. Because of the size of records and complexity of the monograph, serial and CDS/ISIS data, a preliminary dBase IV program was used to put field information into two data files, one containing basic bibliographic and item information, and the other containing notes or abstracts. A second dBase IV program provided the final output into a text file for processing by marcmaKr.exe. The subject authority records required only one program to directly create an output file from the TINLIB export information. Similarly patron data also required one dBase program.

The final process was to convert the text output files into USMARC format using marcmaKr.exe. For this project, the output files were placed in an FTP site accessible by Innovative staff for remote downloading. The records were then reviewed by the UBL team doing the conversion and downloaded into the Innopac System. Once data loading was successful, it was tested for accuracy, consistency and retrievability. To complete the project a "gap tape" was also created to capture activities during the database creation, training and use of the new system, this was loaded at a later date. All these programs and processes were developed in-house by two staff members of the automation team who were also part of the implementation team.

4.3 General staff training

All members of UBL staff were briefed on the system change and the reasons for the change were fully explained. Initially members of the team were trained by the Innovative consultant in all the modules of Innopac. Training on searching the database, and on the circulation and cataloguing modules took place before the end of 1999, and training on other modules (acquisitions, serials, interlibrary loans (ILL) and materials booking) was done in the first quarter of 2000. Each member of the team represented his or her section and was expected to cascade the training to members in their respective sections. A training room, with all facilities, was set up for use by 12 people. The consultant spent about five days in each training visit, which included software set-up using the filled in worksheets and training. Each time, immediately after the departure of the consultant, both the Automation section and the TSS continued the training for the rest of the staff. There was rigorous training for a week in a classroom environment on live data followed by at least three weeks hands-on training at individual work places under supervision of the trainers.

4.4 Cataloguing training

UBL took advantage of the USMARC bibliographic training run by the State Library in South Africa in order to train its cataloguers in the use of MARC. Six librarians/cataloguers were registered for online training in USMARC in June 1999. This proved to be a challenge to the librarians as they were all new to the MARC format. This training was cascaded to the cataloguing assistants in the TSS and was a prerequisite to training for the Innopac cataloguing module.

The cataloguing assistants were trained first to access and search the local database, Medupe, before accessing, searching, and importing bibliographic records through the Z39.50 protocol. Imported records were then edited to add local information such as location and country in the fixed field of the bibliographic record. With regard to the variable fields in the bibliographic record, tag 092 (call number), and 946 (cataloguers' initials) were added. In addition, the cataloguing assistants were trained to edit tag 250 (edition) and 300 (collation), in case the material being edited was a different edition. In the fixed field of the item record, they added number of copies, status, OPAC message, item location, Icode 2 (indicating year of editing a record), and Itype (indicating item type). Further, in the variable field of the item record, they added the barcode number, call number, and volume if available. Figure 2 shows an example of a catalogue record with its MARC fields.

```
001    UB93031939
008    930622s1986      a      bi    001 0 eng unam a
020    0135497833|cDollar29.95
082 00  658
092 0    658 STO
100 1    Stoner, James Arthur Finch, |d1935-
245 10  Management/|cJames A.F. Stoner, Charles Wankel
250      3rd ed.
260      Englewood Cliffs, N.J., :|bPrentice Hall,|cc1986
300      xxii, 714 p. :|bill. ;|c24 cm.
504      Includes bibliographies and indexes.
650 1    Management
700 1    Wankel, Charles
946      |dMM|eCNM
```

Figure 2.
An example of a catalogue
record showing MARC
fields

SABINET was expected to train UBL staff in searching for bibliographic records on its SABINET Online Integrated Cataloguing (SACat) and export the records to the Medupe UBL local database. UBL staff also needed to be trained in searching for bibliographic records on OCLC's WorldCat using CatMe and export records to SACat and then download to the UBL system. Unfortunately, the initial arrangements to have staff trained by Sabinet were unsuccessful. As a result, UBL imported records directly from OCLC to Medupe until the end of July 2001. Presently, the communication problems between UBL and SABINET have been resolved and staff are using SACat to its full potential. The cataloguing staff were also trained in creating lists of documents they have processed and sending the call numbers to a spine label printer, which uses a war-FTPD server programme. The labels are printed on a special printer using Basic program, which read the file sent by FTP processes.

4.5 Acquisitions training

Members of the Acquisitions team were trained in the first quarter of 2000 in ordering and receiving sub-systems in Innopac's acquisition module. Their training focused on manual keying of orders into the system, as well as on electronic methods for sending the orders, receiving and online invoicing of items, as well as claiming, cancelling and updating orders in the system. No order data was imported from the old system into the new. This non-availability of order data created stumbling blocks in the smooth flow of training and procedures to be followed. It impaired the learning skills and as such the learning curve was very steep. The acquisitions staff needed to be trained in creating orders, printing purchase orders, receiving and invoicing the books all in one process, one after the other.

The implementation of Innopac coincided with the tendering process for book suppliers for the 2000-2002 fiscal year. This created a further challenge, in that staff had to be trained first in using the new system for items supplied following orders placed before January 2000, and then retrained for items supplied from the new suppliers. Some, but not all, of UBL's suppliers supported Book Industry Standards and Communications (BISAC) which meant that new orders could be electronically transmitted from Innopac to the suppliers. However, sometimes the orders failed to reach the suppliers. An arrangement was made with suppliers to implement automatic acknowledgements of receipt of the electronic orders, in order to avoid the mishaps of non-transmission. Where suppliers could not receive orders in BISAC format their orders were created in the system and e-mailed to the TSS Coordinator to forward to the respective supplier.

Owing to several staff transfers to other sections of the library and also since other staff members were on study leave, there was much training and retraining of staff in these processes.

4.6 Management information reports

The Innopac system is able to generate statistics such as orders to date, received orders, outstanding orders, orders by faculty and by selector, expenditure, catalogued materials by date, by year and by cataloguer. Generation of statistics has made it easier to manage funds and monitor commitments and expenditure, unlike in TINLIB where the calculations were done manually. It is also now possible to give feedback to TSS staff about their work since it is possible to create a list of their individual output.

5. Success in implementation of the system

The in-house programmers had a clear understanding of the existing data in the TINLIB system and Innovative assigned some of its experienced staff, who had worked on a range of implementation projects, to assist the programmers. As a result, the conversion of data at UBL was timely, smooth and the review and loading processes were fast and accurate. Special effort was made not to lose any information available in the TINLIB records. For example, field 946 for the cataloguer's initials and date, local subject group codes in field 653, location in field 940, long abstracts (sometimes more than one) in field 520, analytical entries from CDS/ISIS with linking in field 773, and bibliographic resource (where the bibliographic record appeared in printed format) in field 510 were captured.

Fortunately the data entry into the Innopac system was fast in comparison to TINLIB. Thus in spite of losing time in the training, staff could keep up with the workload. There was sufficient control on the location of the books, which were processed for the branch libraries. The Innopac database was current and easily searchable under various fields. Staff could use the system easily for analytical entries done in the Botswana Documentation and Special Collection (BDSC). It was possible to provide hotlinks to the internet resources using field 856. Similarly, some e-books from netLibrary have also been included in the database. Following appropriate training, TSS staffs were able to cope with the changes in using a MARC-based system with a GUI interface.

6. Problems encountered in the implementation process

Despite the successes that were achieved in the process of migrating from one system to another, there were a few problems encountered by TSS. UBL could not contribute bibliographic records to the SACat for more than a year. The Guicat software needed to be installed on each workstation separately, while templates needed to be created on each workstation. In the process of upgrades, replacements, changes and crashes of the workstations, staff lost their templates and statistical data. Occasionally the records were locked and Guicat failed, thus needing reinstallation of the software. The procedures changed a couple of times because of the non-availability of access to SACat.

With regard to the ordering process, the order records, as well as loan data from TINLIB were not imported into the Innopac system. However, the data converted used its own numbering format for 001 field, but could not use OCLC accession numbers. Item records for multi-volume monographs with more than 15 volumes were not accommodated. There was some confusion with ISSN numbers for serials. Presently, there is no software to load the invoice data into the system, which is used for financial functions at the University of Botswana. This often results in the library's financial records of expenditure figures never tallying with the Financial Services department figures for various reasons, for example, some invoices had not been entered in the system when the report was made.

The acquisitions interface is still character based. There is always a need to create a review file for processing orders. TSS acquisitions staff occasionally found duplicate orders at the vendor's site, in spite of a code used for printing. Printing the orders is cumbersome and requires specialised stationery since UBL adopted an e-mail approach for orders. The cancellations were much more difficult and needed only to be printed on the specified stationery. Deleting orders required creation of lists.

7. Conclusion and recommendations

The migration from the TINLIB system to the Innopac system and its implementation was quite fast and timely. By the end of 1999 two modules, cataloguing and circulation, were already up and running. Patron records had already been loaded and customers could borrow materials through the new system. However, the learning curve was quite steep for most of the staff. Fortunately, UBL staff had been psychologically prepared for the change. The system migration was compounded by the uncertainty of whether the library database in TINLIB would crash by the beginning of 2000. Too many changes such as system change, tender process, USMARC, SABINET and OCLC all kept the staff and trainers busy for the whole period. In future there is need to plan long before the system needs to be changed so that staff do not work under such pressure during the migration to a new system. According to Hamilton (1995) systems migration is a massive project that requires extensive planning, careful scheduling, and having local technical expertise. Hamilton identifies a number of factors that have to be taken into consideration when implementing systems migration and these include site preparation, data preparation for transfer from the old to the new system, outlining the schedule of work and estimating downtime, training of staff, and working closely with the systems vendor for some time.

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