Building a Digital Library at the University of Zimbabwe

INASP Research and Education Case Studies

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Building a Digital Library at the University of Zimbabwe

A Celebration of Team Work and Collaboration

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Foreword

Over the past few decades, university education has been transformed by investment in electronic infrastructure and connectivity, as well as from the attention paid to e-learning and related approaches as key tools to enhance the quality of higher education and make it more accessible. University libraries are an important part of this transformation. They acquire, organize and deliver digital information. They enable and promote its use. Libraries provide the bridge between digital content and the end-user. They provide pathways through the Internet jungle.

In many countries of the developing world, finance – or the lack of it – has prevented university libraries from developing a dynamic interaction with ICTs, building electronic information management systems and creating digital services for their users. The University of Zimbabwe is one of the exceptions. Its library was determined to stay on the cutting edge of 21st-century information provision and develop a digital library, despite the constraints experienced during a period of rapid national economic decline. This volume tells the story.

Various members of staff from the University of Zimbabwe library have each contributed a chapter describing the ways in which the library's digital future was built. Two chapters cover automation and the development of the OPAC, the basic building blocks of any digital library. The library then concentrated on the digitization of local information – theses, past examination papers and a repository of research papers and journal articles. The ultimate aim is for UZ academic output not only to be more accessible to the UZ community but also be available on the World Wide Web. In this way the university would not only be a consumer of the Internet but also input content to global information space.

It was considered that developments in digitization would be meaningless unless they were accompanied by vigorous information literacy education and training for faculty and students. Chapter Five describes how this was made formal and integrated into the curriculum of the university. The final two chapters discuss in depth the effect of digital content and services in two subject areas, health and law, as examples of what has also happened in other disciplines. The then Librarian of the University of Zimbabwe is the overall editor; she also contributes an initial overview and context.

Each chapter contains sections on lessons learnt, challenges faced and to be faced, and issues concerning sustainability. There is no doubt that the library has made enormous progress in a difficult economic climate. Its achievements in building and continuing to build a digital library are first-rate. It offers a quality service to users. It does not rest on its laurels but seeks new ways to utilize ICTs. Various factors can be identified as key to this success:

- Digitization was adopted as the library's own plan. It was not superimposed from outside on the library's activities. Once the vision was there, resources followed. But the initiative always was with the library. It determined the targets. The library team was united behind the plan.
- Winning the support and active involvement of the Vice-Chancellor's Office was crucial. This was especially important at a time when there were many demands on resources from within the university. The library always worked within, and was seen to be contributing to the success of, the university's strategic plan. The university proved willing to budget for maintenance costs, very important for sustainability.
- External partner support was also crucial, and the library received funding – human, financial and material – from many different organizations, both within and outside the country. The fact that the library had a plan, and that it was receiving strong support from the Vice-Chancellor's Office, made seeking and acquiring partners an easier task.
- Also important were partnerships within the university – for example, with the Computer Centre and faculty. Such collaboration was necessary to sustain the technical aspects of the library management system, to carry out the information literacy courses, and to populate the institutional repository.
- Finally, the library recognized that the training of library staff at all levels was essential, both to pass on the necessary skills and for team-building. In addition, it set up a dedicated IT Unit within the library.

INASP's decision to publish a series of case studies arose from its Programme for the Enhancement of Research Information (PERI). The latter was established during 1999/2000 to provide assistance to developing and transitional countries in information production, access and dissemination using ICTs. Its objectives include facilitating the acquisition of international information and knowledge, as well as training in the use of ICTs and improving the production and dissemination of national and regional research. In 2004 a review of PERI was undertaken to examine its relevance, usage, management, sharing and sustainability. One of its conclusions was that some of the challenges reported could be resolved by sharing and archiving case studies, best practice, ideas, etc., relevant to PERI activities.

This volume is the second of PERI's Research and Education Case Studies to be published. We hope that it will assist libraries in developing countries as they travel the road of building digital content and services.

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Abbreviations

AAAS	American Association for the Advancement of Science
AAU	Association of African Universities
CALII	Computer-Assisted Legal Instruction Course
CHS	College of Health Sciences
CHSL	College of Health Sciences Library
DATAD	Database of African Theses and Dissertations
eIFL	Electronic Information for Libraries
ETD	Electronic Theses and Dissertations database
ICT	Information and Communication Technologies
ILS	Information Literacy Skills
INASP	International Network for the Availability of Scientific Information
IR	Institutional Repository
ISBN	International Standard Book Number
ISSN	International Standard Serial Number
IT	Information Technology
LASC	Library Automation Steering Committee
LASP	Library Automation Strategic Plan
OCLC	Online Computer Library Center
OPAC	Online Public Access Catalogue
OSI	Open Society Initiative
PERI	Programme for the Enhancement of Research Information
SABINET	Southern African Bibliographic Information Network
SASLI	South African Site-Licensing Initiative
UZ	University of Zimbabwe
ZULC	Zimbabwe University Libraries Consortium

Chapter 1

Overview and Context of the Library's Digitization

Buhle Mbambo-Thata

The University of Zimbabwe's vision is 'to be a leading university in a peaceful and prosperous Zimbabwe', and its mission is 'enabling our clients and customers to make meaningful contributions to sustainable development in Zimbabwe'. The library fully embraced this vision and mission in its strategic planning and the implementation of that plan. It set itself to be the leading university library in a peaceful and prosperous Zimbabwe. Not only did the library seek to do this by virtue of its half century of age but through the high quality of its services to customers.

The library focused on implementing these critical areas in the *University of Zimbabwe Strategic Plan, 2002–2007*, that fell within its mandate. It specifically focused on the following strategic goals:

- produce graduates that are ICT literate
- create an environment supportive of graduate students
- create an environment conducive to learning

The library emphasized creating a service that was vibrant and responsive to the clients' needs. It sought an entry point of relevance to development in the university community. The university's strategic plan thus served as a good instrument to guide the library's intervention.

The University of Zimbabwe (UZ) Library has fully embraced the use of information and communication technologies (ICTs) as a vehicle for delivering both information and communication. The library's own strategic plan for 2002–2007 emphasized ICT usage in service delivery.

The library's vision was to create a digital library that complemented its half a million of book stock, and further to provide a seamless service that married the age-old pleasure of turning the pages of books with the modern means of accessing information by clicking a mouse or tapping a keyboard. This vision has guided us in finding partners and resources to finance it. Our success has been built on implementing this vision.

While this publication will focus on the digitization of the University of Zimbabwe Library, at this point I would like to pay tribute to the university

librarians who preceded this phase – Douglas Varley (1968–1979), Albert Harrison (1968–1979), and Stan Made (1979–2000). Their work in developing a well-organzied university library provided the solid foundation on which the current activities of digitization have been built.

In this book we also celebrate a digital library built on partnership. We strongly believe that the digital library we have built is sustainable because it is built on our plans. It is not superimposed on activities but it has been part of our strategic plan. Our partners have complemented these plans through resources – human, financial and material.

The university library consists of the Main Library and five branch libraries: the College of Health Sciences Library, the Law Library, the Map Library, the Veterinary Library and the Education Library. The Main Library contains 75 per cent of the total collection of nearly half a million books.

The Main Library building is designed to accommodate over 530,000 volumes and seat 1,000 readers. It includes a recently refurbished main hall, seven stack rooms, administrative offices, workshops, two large reading rooms, several subsidiary reading stack rooms, and a newspaper reading room.

With the exception of Special Collections there is open access to all parts of the library and its branches. The development of the library is related mainly to the provision of research and lending facilities for staff, students and the university community. The library is by far the largest academic library in Zimbabwe; its bibliographical, reference and information-retrieval services support research in the university and in the country at large. The library also operates an interlibrary-loan service to libraries throughout the country and abroad.

The funds for the library building, which bears comparison with any modern one of its size, were a gift of the British South Africa Company, the Anglo American Corporation and the Rhodesian Selection Trust, and came into use on 1 March 1960.[1] Much of the initial development of collections of books and periodicals and the purchase of library equipment was made possible by generous donations from the British Commonwealth Relations Office. Subsequent development has been financed from allocations made by the university. The library also acknowledges the many gifts that it has received from private sources.

In the main hall of the Main Library there is an enquiries desk with a Reader Services Librarian on duty throughout the day, to whom general enquiries relating to the use of the library are addressed. Reference services include: guidance in the use of the library, the provision of information, retrospective bibliographic

[1] Stan M. Made, *Library and Information Services in Zimbabwe* (Harare: College Press, 2000), 82.

searches, the compilation of lists of references, current awareness and associated services. Associated with the reference services are the recalls and interlibrary-loan facilities. A photocopying service is available on a commercial basis.

Branch Libraries

College of Health Sciences Library (CHSL)

The resources of the CHSL, formerly known as the Medical Library, support the work of medical practitioners and researchers throughout Zimbabwe. In 1983, the library was designated, in co-operation with the Ministry of Health, as the national focal point for health sciences information services for the country. Its stock includes monographs, periodicals and audiovisual programmes relating to teaching and research in the College of Health Sciences (formerly the School of Medicine) and to the wider needs of preventive medicine and community health.

There are reference, current-awareness, postal-loan and interlibrary-loan services; photocopying facilities are available. A quarterly update/digest of references and abstracts from medical journals, *Current Health Information in Zimbabwe*, was circulated free of charge to health professionals throughout Zimbabwe for some years, but is now no longer produced.

The library is housed in the College of Health Sciences at the north end of the Parirenyatwa Hospital complex and holds 48,000 volumes and 650 current periodicals. A sub-branch library at Mpilo Hospital in Bulawayo offers core collections of textbooks and journals for the use of medical and allied health professionals in the area, and provides access to the services of the CHSL in Harare.

Law Library

This branch is housed in the Faculty of Law building, and contains 15,500 volumes, including standard texts and specialized monographs of English, Roman-Dutch and other legal systems relevant to teaching and research at the university. There is also an extensive collection of the Law Reports of Zimbabwe and South Africa, of the neighbouring territories in Africa, and of the United Kingdom and certain Commonwealth countries; 197 periodicals are received currently. There are reference, SDI and current-awareness services, and loan and interlibrary-loan facilities. There is a photocopying machine for public use.

Map Library

Although this library is housed in the Geography building, its maps are available for the use of the university as a whole. It contains 11,000 sheets of many different types – topographical, geological, political, economic, ethnological,

historical – for reference only. There is also a collection of books on cartography. The latest issues of geography periodicals received by the Main Library are displayed here. There are also world, national and special atlases.

Veterinary Library

The Veterinary Library is the newest of the branch libraries. It was established in September 1986 and has continued to grow steadily since then. It is housed within the Faculty of Veterinary Science, and most of the collection covers books on veterinary medicine, general medicine and agriculture. It has a comprehensive collection of periodicals. The library also serves as a reference centre for all veterinarians and has a photocopying service.

Education Library

The Education Library is housed on the ground floor of the new Education wing. It consists mainly of sets of school textbooks and audiovisual materials. The latest issues of education journals received in the Main Library are displayed here. In order to support graduate education in 2004, the library was turned into a graduate library.

Building a Digital Library

Early developments

In the following chapters, colleagues will describe the automation and various digitization projects. In this chapter I will provide an overview of the developments in brief, giving a historical outline of how we got to where we are today.

Diana Rosenberg states that library automation is a critical component of building a digital library,[2] and UZ library was no exception. In 1983, the first feasibility study on library automation at the University of Zimbabwe was conducted, focusing on the automation of the card catalogue.[3] Correspondence in library files, however, indicates that discussion of feasibility dates back to December 1982. In those early days, partners were critical of the whole process of automation. The first study was done as part of a UNESCO-funded exchange of information within countries in the Southern African Documentation and Information System (SADIS). Travel for the Zimbabwe leg was funded by the British Council; the initial work was funded by UNESCO and the British Library.

[2] D. Rosenberg, *Towards the Digital Library: Findings of an Investigation to Establish the Current Status of University Libraries in Africa* (Oxford: INASP, 2005).

[3] Devi Pakkiri, 'Plans to computerise UZ library services: Prospects and problems', *Zimbabwe Librarian* (1988), 20(2): 62.

After the initial exploratory study in 1983, there was a gap in development until 1987. The University of Zimbabwe again sought UNESCO's assistance to bring an expert on library automation to University of Zimbabwe. The 1987 efforts included contact with OCLC, the Online Computer Library Center.[4] At that time a library automation group had been set up. There is no indication in the correspondence as to what transpired then. However, the minutes of the Library Automation Group, 1 October 1987, considered reports of various experts. Among these is one by Dr P. L. Noer, referred to in the 1983 correspondence. That meeting noted that no funds had been allocated for automating the library. By July 1988 a Library Computer Committee had been formed. It studied previous reports and indicated that they were inadequate. It resolved to seek external funding for library automation.

By 1990, the committee had become the Computer Committee, chaired by the Librarian, Mr Stan Made. In the same year, a staff member, Mrs J. Pwiti, who had served on the initial Library Automation Group in 1983, was tasked with conducting an internal feasibility study on library automation. The discussions and preparations intensified from then on.

In 1991 CDS-ISIS was introduced. CDS-ISIS is a UNESCO-distributed library database software package. CDS-ISIS provided for the creation of catalogues; it was not an integrated library system.[5] By 1995 work on Erudite, a library automation software package, was in full swing. The Library Automation Group was meeting monthly to discuss progress on automation. The lessons of this phase are discussed in detail in Chapters 2 and 3 of this book.

CD-ROM

The Medical Library, under the leadership of Helga Patrikios, spearheaded the introduction of CD-ROMs in the 1990s. CD-ROMs were also later embraced by the Main Library.[6] By 2000 a dedicated workstation had been set aside to provide access to CD-ROMs. In 2002 a server to hold several CD-ROM titles was purchased and made available for use by readers in the library.

[4] O. T. Mupawaenda, 'University of Zimbabwe Library Automation Project Proposal', 19 November 1987 (Harare: University of Zimbabwe Library). 'Founded in 1967, OCLC Online Computer Library Center is a nonprofit, membership, computer library service and research organization dedicated to the public purposes of furthering access to the world's information and reducing information costs.' <http://www.oclc.org/about/default.htm>.

[5] Enoch H. Chipunza, 'Report on the Joint IDRC and University of Zimbabwe Library Automation Course', *Zimbabwe Librarian* (1989), 21(2): 45–50.

[6] H. Patrikios, 'Medline online and information service on CD-ROM', *Central African Journal of Medicine* (1990), 36(6): 162–3.

E-journals

The initial introduction of e-journals was through the eIFL-funded EBSCOhost provided through OSI to Southern Africa from 1999–2001. The University of Zimbabwe also became a site for the African Virtual Library, which provided access to 2,000 online journals and e-books through NetLibrary.

Access to e-journals was increased through participation in the Programme for the Enhancement of Research Information (PERI) of the International Network for the Availability of Scientific Information (INASP), the Zimbabwe University Libraries Consortium (ZULC) joint purchase scheme, and participation in eIFL. Availability thus increased from access to a single e-resource, EBSCOhost, in 1999 to access to 19,500 online journals by 2006. Now the library has access to the following full-text e-journal publishers and aggregators:

EBSCOhost	Taylor and Francis
Emerald	Oxford University Press
Wiley	Cambridge University Press
Sage	BioOne
Gale Thompson	Institute of Physics

While initial access to these was through the PERI programme, by 2005 institutions in Zimbabwe were contributing 80 per cent of the cost. Access to Cambridge University Press, the Institute of Physics and BioOne was made possible to Zimbabwe courtesy of membership of eIFL.

The library on its own might not have been able to afford access to all these e-resources. It was facilitated by its being a constituent member of ZULC, through which university libraries in Zimbabwe share the cost of access to online journals, and UZ library now enjoys access to 19,500 online journals through ZULC.

However, we do not lose sight of the fact that, if it was not for the carefully negotiated licenses by both INASP and eIFL, the efforts of ZULC might not have added much. Both these organizations helped access nationwide licenses.

Local e-content

I have previously bemoaned how Africa had become a net consumer of the Internet.[7] UZ library put in place a mechanism to ensure that the University of Zimbabwe would not only be a consumer of the Internet but would also add content to global information space. It started by putting content on the intranet. In 2002, a database of examination papers was created, which was

[7] B. Mbambo, 'Information for women in development: The role of the information worker', in E. S. Mosley (ed.), *Women, Information and the Future* (Fort Atkinson: Highsmith Press, 1995), 40–5.

searchable from any PC on campus linked to the campus-wide network. This greatly increased access to past examination papers.

Also in 2002, the UZ library started participating in DATAD, the Database of African Theses and Dissertations of the Association of African Universities (AAU). Through this facility, titles, abstracts, and the names of authors and supervisors, were uploaded to a database that is searchable on the World Wide Web.

A natural growth of this was the development of a full-text e-theses database, the Electronic Theses and Dissertations database (ETD). This is searchable and accessible on the campus-wide network. At the time of writing (2006), the library is engaged in discussions with the university community on how to expand access to the e-theses by the wider community beyond the University of Zimbabwe. The latest development in increasing access to the content of locally published research is the Institutional Repository (IR), a digital repository of the output of University of Zimbabwe academics. Details of these creations appear in Chapter 4.

Subject-specific digital information

The digital library at UZ library is multidisciplinary. It would have been desirable to include chapters here on the digital content in each discipline. However, because similar principles apply to all disciplines, a sample has been selected from the two largest branch libraries – the College of Health Sciences Library and the Law Library.

In Chapter 7, Sibanda discusses the relationship between digital legal content and an information-skills course for first-year law students; Chikonzo outlines the developments of digital services to the medical community in Chapter 6. These two experiences help to outline the interaction of branch libraries with digital resources.

Costs

The Past Examination Papers Database is a home-grown solution that runs on an open-source operating system (Fedora Core 3), using an open-source scripting language (PHP) and an open-source database back-end (MySQL). The costs incurred in setting it up were the purchase of the server (which in our case was a Pentium 3 machine, with 256MB RAM and a 20GB hard drive) as well as the man hours spent in developing the application. The whole project was financed internally and no external support was sought from partners.

The Electronic Theses and Dissertations Database also uses an open-source application, one developed at Virginia Tech and maintained by a community of volunteers. As with the Past Examination Papers Database, the costs incurred in

setting it up were the server and the man hours spent in installing and customizing the application. No donor funds were used in setting up the database.

It is not possible to quantify all the costs and staff time that went into establishing the Institutional Repository. Some costs were embedded into staff work time. These included the cost of marketing, liaising, and familiarizing staff with the process. Because the university did not want to see this as an 'independent' project, from the beginning it was located as part of the work of delivering information within Special Collections. However, some costs could be quantified, particularly those for which we sought help from our partners to acquire services that were not available either within University of Zimbabwe or in Zimbabwe generally. eIFL provided initial assistance, whilst INASP helped with expanding the size and depth of the repository. Table I summarizes these costs.

Table I: Costs involved in establishing the Institutional Repository

Item	Cost	Source of funds
Server	US$10,000	eIFL
Scanner	US$200	
Training of two staff members in DSpace in South Africa	US$2,500	
Subtotal	US$12,750	
Six months' contract staff to enter data; visit to existing IR; liaison with LIS; marketing and publicity materials	£6,000	INASP

Long-term costs are being borne by the University of Zimbabwe. Although the software is free, the university has the responsibility for upgrades and server maintenance, as well as for migration of software. Populating the database has been incorporated into the activities of Special Collections. This is to ensure that IR ceases to be a project but is sustained as part of the process of information delivery of UZ library.

Strategic plan

As mentioned earlier, the library found a niche in the university's strategic planning document which stated that the University of Zimbabwe 'seeks to produce graduate students that are ICT literate'. The library latched on to this and participated by not only providing electronic content but also ensuring that students are trained in the use of electronic content.

In 2001, the library set about establishing its own strategic plan for 2002–2007. It set direction and broad objectives for the coming five years, and stated that its key result areas would be:

1) To provide an environment conducive to teaching, learning and research at the University of Zimbabwe.
2) To build and access relevant print and online resources to support teaching, learning and research.
3) To promote and facilitate the use of information services and resources through training of users.
4) To recruit, develop and sustain a highly skilled, motivated and committed staff, who will deliver excellent service.
5) To optimize resource sharing at local, regional and international level.
6) To generate income to support the library budget.
7) To market library resources and services.
8) To improve liaison with faculty to ensure that library collections and services meet changing needs and priorities.

The strategic plan was to be the guiding instrument for each section of the library to inform annual work plans and resource allocation. The plan clearly stated in Objective 1 the library's desire to be modern and provide a cutting-edge service. The creation of digital libraries, and providing users with the skills to use them, were central to this.

From then on, the library sought partners, strategic alliances and funding to meet these broad objectives. We are grateful to our partners who assisted us in the building of the digital library:

- The AAU facilitated membership to the Database of African Theses and Dissertations
- eIFL funded the initial access to full-text e-journals through EBSCOHost, which was later extended to other resources such as Cambridge University Press and BioOne. eIFL further funded the library's initial work on the Institutional Repository, including training and equipment.
- INASP, through the various components of PERI, enabled access to e-journals, trained staff in the use of ICT in libraries, and provided a network of like-minded institutions which were doing similar work. Later, INASP also provided added funding to support the growth of the IR.
- Sida-SAREC funded the initial investment in automation.
- The University of Zimbabwe (in particular, the Vice-Chancellor's Office) committed itself by funding the development of electronic examination papers and the full text e-theses database, as well as the continued service of Innovative Millennium, the library management system.

The implementation of the plan has continued to grow against the backdrop of a declining economy and increased competition for scarce resources. However, we have been fortunate that we have had partners who have supported us in fulfilling our plan.

One of the greatest assets to the implementation of any strategic plan is people. The team in the library solidly believed that 'where there is no vision, the people perish': we had a vision clearly laid out in our strategic plan. Furthermore, we had support from the university's Vice-Chancellor, who trusted us and supported the implementation of our strategic plan.

Information literacy skills

Chapter 5 on information literacy skills (ILS) by Gurira and Muganhiri outlines the implementation process of this programme. The library included ILS in its strategic plan to provide an integrated and assessed user-education programme. It was envisaged that a formal programme would be more beneficial to students than the hitherto informal training in user education.

The library, being a non-teaching department, identified a strategic partner in the Communication Skills Centre of the university. Information literacy would be taught as one of the essential skills for university education. A formal programme started in the academic year 2004/05, during which all first-years received ILS training, including access, retrieval, evaluation and management of electronic information. To us, the ILS programme was a critical bridge between the digital content and the end user. Users had to be trained in the use of e-resources in order to make effective use of the content in lifelong learning. More critically, there was a need to enable users to create a link between electronic information and print information.

The ILS programme was funded fully by the University of Zimbabwe. We had tried in vain to seek partners and establish link programmes with other universities that offered more advanced information literacy programmes without much success. One hopes at a later date it will be possible to establish such links.

Lessons Learnt

Vision

It is critical to have a vision – 'start with the end in mind', as the saying goes. Once we had a vision of where we wanted the library to go, we could then work on the means of getting there. If we had looked at the means first, we would have been paralysed by lack of capacity. Our vision kept us on course.

Resources will follow the vision

Once we had a vision, we could go to partners and seek assistance. We learnt that a well-articulated vision statement and a plan of action attract support.

Strategic partners

Without the assistance of our strategic partners we would not have managed. We are grateful for the support of Sida-SAREC, Anglo American Corporation, the British Council, UNESCO, eIFL, INASP, VLIR, Rowland Foundation, National Library of Medicine, CDC and the Beit Trust, who assisted us to build the digital library at the University of Zimbabwe. The closest partner in all this was the University of Zimbabwe Vice-Chancellor's office, which has solidly supported the library's efforts.

University management support

It was critical that the library worked in tandem with other developments in the university. The library's efforts were thus based on the key deliverables of the university's strategic plan. We were cognizant that if we were fulfilling the university's mission we would have the support of the Vice-Chancellor's office.

Team work

Within the library we built a team that was committed to the vision. Each section's team worked to fulfil the mandate of its section in particular and that of the library in general. The commitment of the library team made the creation of the digital library possible.

National collaboration

The advent of the Zimbabwe University Libraries Consortium helped to achieve our goals of increasing digital content. Through collaboration in ZULC between 2002 and 2005, the library participated in a scheme that shared the cost of access to e-journals; the University of Zimbabwe could not have met the cost by itself. Participation in ZULC made it possible to obtain access to 19,500 online journals by 2006.

Conclusion

In 2005 the University of Zimbabwe celebrated its Golden Jubilee. For those of us in the library this publication sets the tone for the next fifty years of service to the university. It is felt that sharing our story will be an encouragement to others. The creation of the digital library at UZ happened in a season of decline in the economy. The fact that it has happened is a celebration of vision and determination. We are grateful to the partners that have remained to support us during these challenging times.

Chapter 2

The Automation of University of Zimbabwe Library

Jabes M. Mamvoto

The stories of the automation of various university libraries have been written in recent years all over the world, as scholars take stock of their intellectual heritage and try to situate higher education in the context of knowledge production. Librarians in developed countries boast a growing historiography. However, according to Shillinglaw, academic libraries in developing countries have received less historical attention in relation to technological innovation and computerization.[1] Therefore this chapter tries to fill a gap in the history of university library automation in developing countries.

The history of the automation of the University of Zimbabwe Library started in the 1980s. From then, librarians at the university witnessed a gradual transition from the conventional or traditional library, which had only the most rudimentary form of mechanization, to the current fully integrated, networked electronic library. The late 1980s were also characterized by a growing awareness at UZ library of the importance of ICTs. Initially, this came as a result of reports on the overseas experience of librarians who went on professional visits, or who had worked in the United States, Europe and elsewhere, and this led to conditions appropriate for the initiation of similar automation processes.

The development in the 1980s of the CD-ROM as a compact, cheap and robust method of mass data storage revolutionized the way in which databases were distributed and accessed. The American Association for the Advancement of Science (AAAS) undertook three-year pilot projects that provided seven African universities with CD-ROM databases in the sciences and social sciences as well as document-delivery assistance; UZ library participated in this pilot project, which was a major success. In the pilot project, the Ford Foundation supported the library with computer equipment, while Sida–SAREC paid for all CD-ROM subscriptions to *Arts and Humanities Index*, *Chemistry Citation Index*, *Science Citation Index* and *Social Science Citation Index*. The UZ library launched the

[1] N. Shillinglaw, 'Design for a new library – the UNISA library in UNISA's 130th year: Dealing with distance education in the electronic era', *Mousaion* (2003), 21(2): 41–6.

project in 1994 when AAAS held a three-day workshop in the library. The library publicized CD-ROM in a variety of ways, including demonstrations, meetings with faculties, posters, etc.

The Automation Project at UZL

Automation proper – meaning 'the acquisition, organization and circulation by electronic means of library materials, accomplished by use of a specialized library management system or software' – started in 1996 when a grant of US$1,300,000 was received from Anglo American Corporation in Zimbabwe towards the library automation project. Anglo American supported the library upon the realization that the spectacular growth of the Internet and continuing massive reduction in the cost of digital storage and information retrieval would tremendously benefit academics' research outputs, and learning and teaching processes. The grant was to provide equipment to set up Internet services and procure a library information system and related equipment.

The Erudite Library System

With this grant, UZ library purchased the Erudite library information system and a connection to the Internet. Soon after the signing of the license agreement and the installation of Erudite, major challenges, particularly in regard to technical issues, surfaced. These arose because:

- No proper feasibility study had been carried out before its selection and implementation.
- University management and the majority of the library staff were not involved in the selection of the system.
- There was limited knowledge of the system and its value to the user community.
- The detail of the licence had not been well negotiated by either party.
- Back-up and technical-support services from the vendor became unsustainable.

Furthermore, no meaningful training was provided, making it difficult for library staff to grasp the fundamental issues of the system.

By 1999 the pilot automation project had been discontinued. Love *et al.* suggest that information systems selection and evaluation should combine both a goal-based and qualitative approach.[2] At UZ library, the initial automation process, system selection and implementation did not adhere to stringent

[2] P. Love, A. Ghoneim and Z. Irani, 'Information technology education: Verifying indirect costs using the structured case method', *Journal of Enterprise Information Systems* (2004), 17(4): 312–25.

selection and evaluation procedures. This may have led to the difficulties in implementing it.

Feasibility Study for Library Automation

In 1999 the university engaged Sida–SAREC consultants to carry out a feasibility study on library automation. The two consultants produced a far-reaching report with practical recommendations on library automation, which included:

- developing an infrastructure for communicating with all participants in the planning process;
- defining the problem to be addressed through automation;
- needs assessment;
- determination of staffing needs and financial resources;
- project budget preparation;
- assistance with technical aspects of planning that go beyond the library's staff experience or expertise.

Library Automation Steering Committee (LASC)

In 2000 LASC was formed, chaired by a Pro-Vice-Chancellor, with a mandate to oversee the planning, selection and implementation of the library information system and other automation projects. The committee met once or more every month, depending on the urgency of the business, to review the overall progress of the project, to approve development plans and programmes, and to discuss administrative issues related to the acquisition of software, hardware and other supplies. It was the aim of the university administration and library management to select and acquire the most suitable or appropriate information system in the circumstances. The successful implementation of the system and its subsequent progress are due to the active and effective role played by the university's top management, library management and staff, the Computer Centre staff and other key stakeholders.

Library Automation Strategic Plan (LASP) Committee

The function of the LASP Committee – unlike LASC, which had an administrative role – was to implement the automation of the library, including testing, implementing, modifying and problem-solving. The team was headed by the library's IT manager, who reported directly to the Librarian and subsequently to LASC meetings.

The Library Automation Strategic Plan became a guiding instrument during the planning and implementation phases. In LASP it was broadly agreed that automation should always be used as a means to achieve better overall service to patrons. The plan had the following components, among others:

- setting up project implementation structures and the recruitment of staff for the information technology division;
- hardware acquisition and installation;
- acquisition, installation and implementation of the library information system and application software;
- staff training;
- monitoring and evaluation.

Collaboration between the Library and Computer Centre

The library and the Computer Centre staff collaborated throughout the library automation process. A unit of the Computer Centre, the Library Information Technology Unit, was established and located in the library. The UZ library and the Computer Centre have maintained an excellent relationship that has contributed to the smooth implementation and successful running of the library automation project.

Steps in Selecting an Integrated Library System

In 2000 LASC began to look for a library system that would have the features for integration, MARC compatibility and network capability. The following specific steps were followed in selecting a library system:

1) Identifying and analysing technological needs that met with the library objectives. All library stakeholders were involved at this stage. It was agreed that selection of a library system must not be left solely to computer technology specialists with no library training. Consultation embraced the whole user community, led by the library.
2) Determining the resources available within the library or the organization, including human resources, financial resources and existing infrastructures.
3) Examining in detail different types of software for automating libraries, including in-house systems, commercial and open-source software.
4) Finding out about the library information system developers, whether an institution, a reputable company or individuals.
5) Developing criteria for evaluation based on needs assessment.
6) Finding out how frequently the system has been revised or updated since its first launch.
7) Ascertaining the availability of training and guidance during and after installation.
8) Ascertaining the support capability of the vendor.
9) Requesting the vendor for a demonstration and presentation.
10) Visiting other libraries that use the same library information system.

11) Determining and comparing the initial and total costs of each library system.
12) Selecting and acquiring the appropriate software for the library.

Selecting a Vendor

Although a number of systems were investigated and analysed, in 2000 the Innovative Interfaces Millennium system was deemed to be the most suitable for the university library because it provided for the computerization of library functions of acquisition, cataloguing, classification, OPAC and others.[3] The system was also found to be compatible with several national bibliographic communication formats. Other features that attracted UZ library to choose the Millennium system were:

- Clear vendor proposals.
- Excellent vendor demonstration and presentation of the system.
- Vendor credibility, regional and international experience.
- Customer support and back-up service, as experienced in other institutions where the system was installed.
- Research and development capability to upgrade and update the system.
- The high quality of the Online Public Access Catalogue (OPAC) and other system modules.
- The adaptability and flexibility of the system to keep up with rapidly changing technology and to smooth its successful implementation in the region and the world at large.

Contract with the Vendor

Negotiation and drafting of the contract with the vendor took place in 2000. It was lengthy and cumbersome to make sure that the university got the best out of the contract. It involved legal counsel, the university administration and library personnel in drafting and evaluating a contract. The parties also compared lists of necessary contract elements in the actual contract. Innovative was to formalize pricing and payment schedules, warranties and a maintenance obligation. The contract also took into account safeguards conformance to legal requirements necessitated by the university administration through its lawyers.

Implementing the Library System

The Innovative Millennium system was installed and implemented in 2001, and the library gradually started to convert its manual catalogue to an electronic

[3] Millennium is also sometimes referred to as Innopac, the name used for the first library management system developed by Innovative Interfaces, see < http://www.iii.com/about/25.shtml>.

one. Other modules followed, such as the OPAC, the circulation module, the acquisition module and the serials check-in. This phased approach ensured maximum use of manpower and a systematic implementation and testing of the various modules.

This was an exciting period for the whole academic community. The phase involved:

- Customizing the Millennium system to the library's policies.
- Installation of hardware and software and the acquisition of the necessary supplies and peripherals.
- Loading the SABINET bibliographic database.[4]
- Training staff, realigning workflow and space.
- Evaluation.
- Acceptance of the system.

Once the system was accepted and implemented, retrospective conversion of records started. The bibliographic division prepared a plan for the exercise, which was to be implemented immediately. The retrospective conversion project was expected to be completed in three years but, owing to several factors, particularly financial and manpower constraints, it extended beyond the stipulated period, although it was about 95 per cent complete.

Challenges

The library automation project experienced a number of challenges in relation to user expectation and user attitudes.

Expectations of users

During and after automation, library users were gripped with a crisis of expectations. The library automation system promised to bring huge benefits to the academic community. The challenge was equally on the library to deliver tangible benefits to the teaching, learning and research processes of the academic community. Students and the academic staff expected the new library system to deliver rich scholarly electronic resources quickly to their desktop. The library measured up to the users' expectations by successfully sourcing assistance to subscribe to hundreds of electronic journals and other databases.

The benefits that accrued from the introduction of the library system cannot be measured solely by the number of online resources available to the library user but by the use made of them and the satisfaction of the user. More and more students are now using online journals and other databases. In 2005, 14,000 students used the Internet on a monthly basis, giving a total annual figure of

[4] See Chapter 3.

174,000 users. The OPAC, the circulation system and other online resources have hugely facilitated user satisfaction; library patrons no longer have to go laboriously through the card catalogue. By continuously adding value to the products it provides, UZ library clearly demonstrates that it intends to satisfy the users' expectations. For example, through automation, the library has created a number of online databases, such as the Electronic Theses and Dissertations (ETD), the Institutional Repository and the Past Examination Papers database, to name just a few.[5]

User attitudes

As indicated above, the introduction of the new automated system raised anticipation, and sometimes anxiety, among library users. The older generation of academics felt challenged by the new system because learning to use ICT resources was a new phenomenon. The main challenge for the library was to change the mindset of users through concerted and co-ordinated training. First, the deans of faculties and other senior academics were introduced to the new system through workshops and meetings. Information literacy skills training, through which ICT-related skills were introduced to all first-year students and subsequently to postgraduate students, assisted other academics to see the value of the new automated system and the use of e-resources.

Lessons Learnt

A number of lessons were learnt during the planning and implementation of the library's automation project.

Involvement of top administrators

A project as strategically important as this needs the leadership of the top management of the university. The Vice-Chancellor and his senior administrators were actively involved in the planning and implementation of the library information system project. In addition, all other stakeholders, including deans of faculties and chairpersons of departments, were involved.

Partnership between the library and the Computer Centre

From the failure of the Erudite project, the UZ library learnt that, in order for a library information system project to succeed, strong collaboration between the various university information units, and particularly with the Computer Centre, had to be forged. The partnership between the library and the Computer Centre led to the creation of the Library Information Technology Unit. Right

[5] See Chapter 4.

from the initial stages of the library information system project, the Computer Centre provided strong support. It was also pleasing to note that the university administration encouraged joint committees for the planning and implementation of the library information system. The Computer Centre also provided ICT expertise and resources, including installing the library information system on its server. Furthermore, the Computer Centre provided assistance in the selection of equipment and networking of the entire library, as well as ensuring that ICT standards were adhered to.

Clear objectives

It was critical to invest time in setting objectives at the earliest stage of the project, and in putting a well-structured Library Automation Strategic Plan together. The LASC team set its objectives and could therefore deal with challenges. There was consensus among the team of where it was and where it wanted to be.

Identifying the needs of stakeholders

Right from the initial planning stages, the needs of all stakeholders were taken into account, and the involvement of a cross-section of the academic community was considered of prime importance.

Project commitment

It was learnt that the automation project needed to be managed by people who could spend 100 per cent of their time focused on the project. A project this strategically important needs an absolute focus. Staff were thus dedicated to the implementation of the project.

Staff

A critical factor in the planning and implementation of the project was the availability of staff with the required ICT and related skills. A lesson had been learnt that the library could not operate a massive automation project without a dedicated ICT unit based in the library itself. This decision led to the establishment of this unit and the employment of an ICT manager, an assistant and support staff to manage the automation project.

Training

Training was given top priority right from the beginning of the automation project. Rigorous in-house and formal ICT and related library information systems training was done regularly to develop the capacity of library staff to manage the ICT facilities, resources and services. To date, all the staff

except junior staff are computer literate at various levels, and others have been trained in different aspects of ICT applications, ranging from data entry and e-mail communication to troubleshooting, Web-page development and system administration. Training continues up to this day in various aspects of ICT and library automation.

Sustainability

A major aspect of the implementation and management of a library automation project is its sustainability. It was important for UZ library to include strategies about sustainability in its strategic plan. One of the challenges in automation projects is dealing with the contradictory anticipations of donors and the beneficiary communities. No assistance programmes will continue indefinitely. When donors start a project, they usually have an exit strategy; they assume that local organizations must find a way to sustain the project. However, most institutions cannot sustain the projects, partly because of lack of funds, human capital or conflicting project priorities. The university itself must have the capacity to sustain its ICT infrastructure, equipment and software. The campus-wide network must be maintained and upgraded on a regular basis, otherwise the library automation project runs the risk of not being sustained in the longer term. The technical sustainability of the Innovative Millennium system now lies with the Computer Centre, which is also responsible for annual licences. The university budgets annually for the licence fees and pays them.

Conclusion

Much of the progress achieved during the course of the University of Zimbabwe Library's automation project was due to the active participation of top university management in overseeing the planning, selection and implementation of the library information system, as well as the involvement of key stakeholders, including the library and the Computer Centre. After the failure of the first project, the university management put in place measures to ensure that all the necessary steps were followed up to the signing of the licence agreement. The feasibility study carried out in 1999 initiated by the university administration provided clear guidelines on how to approach library automation. The phases that followed the planning, selection and implementation of the library Information system ensured the successful progress of the automation project.

Library automation activities have expanded significantly during the past five years to include a number of in-house online databases. Training of library staff as well as users in the use and retrieval of information resources has been a key feature in UZ library's strategic plan and various subsequent action plans.

Chapter 3

From Card Catalogue to OPAC

J. C. Mbirizah and Y. Chimuka

The card catalogue has traditionally been by far the most important tool available to UZ library for retrieving print and non-print materials, serving as its main index to the contents of its collection by indicating what material the library holds and where it may be found. The card catalogue was a familiar sight to library users for many decades, and had an alphabetical file of authors, titles and subjects of the library materials until 2001. It was a central register of bibliographic items found in the university library system that was spread over several physical locations.

There were the following types of catalogue:

1) An author/title catalogue, sorted alphabetically according to the author's names and titles of the entries (see Figs. 1 and 2).
2) A subject catalogue, sorted according to a systematic subdivision of subjects (Library of Congress) with cross-references to broader terms, narrower terms and/or related terms. By searching under the narrowest term that encompasses a topic, cross-references would help lead one to the correct heading (see Fig. 3).
3) A classified catalogue, sorted according to the classification (class) number (see Fig. 4).
4) A periodicals catalogue, sorted alphabetically by title.
5) A shelf list, with the entries sorted in the same order as the items were shelved. The shelf list was a catalogue for internal use, generally available only to the librarians. It consisted of one entry for every item in the collection and was arranged in a sequence which followed the order of the books on the shelves. In other words, the shelf list was the inventory catalogue, which formed part of the basis for the work that was needed for retrospective conversion.

The four figures referred to above provide a flavour of the large number of ways in which the card catalogue might be searched. Users needed to become adept at using various search systems and to develop an intuition about the possible approaches to locating library materials.

Although it was an essential tool, the card catalogue, like most of its kind, did have its limitations. Firstly, its major disadvantage was its inability to indicate

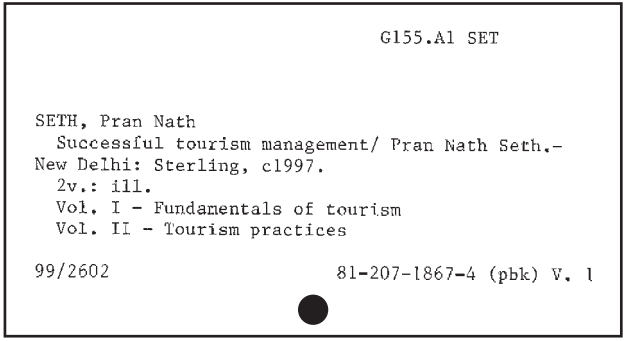

Fig. 1 An author catalogue card

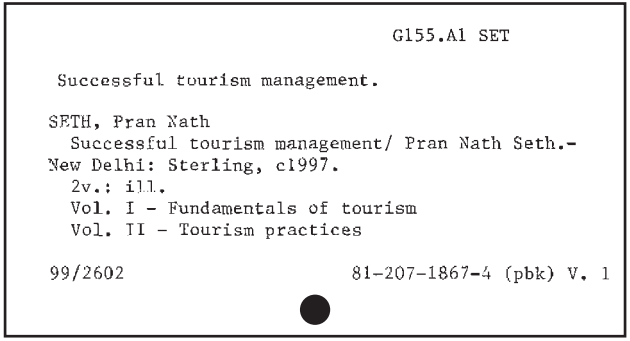

Fig. 2 A title catalogue card

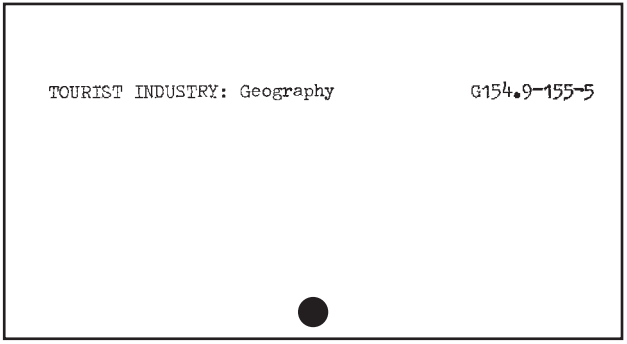

Fig. 3 A subject catalogue card

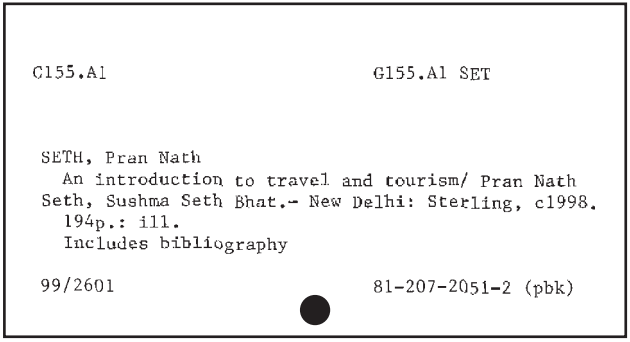

Fig. 4 A classified catalogue card

the location of a particular item found. If an item was in the Main Library, where there are several floors, it was necessary to consult the library layout plan or consult the librarians in order to find where the item was located.

Secondly, with high staff turnover and new recruits with little or no experience of the Anglo-American Filing Rules, filing errors and inconsistencies were making it more and more difficult for users to find what they were looking for. The resultant misfiling meant that the card catalogues were no longer up to date, and some books would go to the shelves without their correct location being reflected in the catalogue. Over time, the catalogue cabinets became very full, making it difficult not only to file the cards but also to search the catalogue.

Thirdly, the cards began to wear out and were easily torn, as well as becoming dirty from constant usage. Fourthly, the manufacturer of the catalogue cabinets had stopped producing them, which meant that a reduced number of catalogue cards had to be produced owing to space constraints. The card catalogue had a main author card, which would then have several 'tracings' (additional cards for the same item), so each item would generally have a title card, a class card, a subject card, and possibly 'added entry' cards if an item had more than one author, or if other cross-references were necessary.

Fifthly, the card catalogue could not show the status of the book, i.e. whether it was available on the shelf or out on loan. After locating an item in the card catalogue, patrons would proceed to the shelves, only to be disappointed because it had been taken out on loan.

The card catalogue did, however, provide full bibliographic information on the library's materials. In addition, it provided cross-references that made it particularly useful if one had incomplete or doubtful information. For example, the card catalogue had cross-references linking

- pseudonyms to real names
- current titles of journals to previous titles
- separate titles in a series to the series title
- second and other authors to the first author
- new geographic names to old names

Initial Experiences with Automation

Many university libraries started thinking about automation in the late 1970s and for UZ library the thought was mooted in the late 1980s and into the 1990s. Since the 1970s library automation has seen many technical advances, ranging from the days of punched cards and batch processing to host-based online systems through to networking and client–server systems.

According to Stephen Mutula, library automation went through three phases:

- The first phase was experimental and was characterized largely by systems developed in-house.
- The second phase was when off-the-shelf, turnkey systems were introduced.
- The third phase started in the 1980s and saw the emergence of off-the-shelf, integrated systems that offered circulation, acquisitions, serials control, cataloguing and online public access, with all modules sharing a common database.[1]

UZ library was not untouched by these technical advances, but at first it was not easy for the library to automate because of inadequate resources, both human and material; it therefore had to go through the trials and tribulations of automation. The university library had the desire to improve the quality of service to its patrons and also to access other international databases via the Internet. It then became necessary for the library to stop just thinking about automation and start working towards it. As mentioned in the previous chapter, a donation in 1996 from Anglo American Corporation kick-started the process, and was used to purchase:

- the equipment to set up Internet services at the university;
- the Erudite Library Information System;
- some servers, workstations and other supporting equipment to run the Erudite system.

At this time UZ library staff had very little or limited knowledge of library information systems. Without doing feasibility studies of the library information systems that already existed, the library simply went for Erudite. The system worked briefly, but then started giving problems. The OPAC worked for only two weeks before the system was discontinued because of unforeseen technical problems experienced during the implementation period, as outlined in Chapter 2.

In this information-technology era, libraries are being called upon to provide more relevant, up-to-date and timely information to a wide range of users and to offer a variety of information resources in a variety of formats. UZ library was not immune to these demands. With the failure of the initial automation exercise and the inadequacy of the card catalogue, the library had to find an alternative.

In 2000 the Library Automation Steering Committee (LASC) was put in place, which had representatives from the library, the Computer Centre and the university administration. LASC was tasked to come up with an outline

[1] S. Mutula, 'IT diffusion in sub-Saharan Africa: Implications for developing and managing digital libraries, *New Library World* (2004), 105(1202/1203): 281–9.

of the university library's automation requirements before purchasing a new library information system. A thorough job was done this time around. Various systems were compared until it was decided to purchase Innovative Interfaces Millennium (Innopac), which was launched in 2001. Innovative Interfaces provided thorough training of the library staff in the use of the different modules, including cataloguing and OPAC.

Ideally the data should have been imported from the previous system to Millennium, but this was not possible owing to technical incompatibilities with the Erudite system. However, the library had, over the years, been sending its bibliographic records to SABINET, the Southern African Bibliographic Information Network in South Africa, who compiled a Union Catalogue of Southern African Libraries.[2] SABINET was requested to upload all records from the data it had received from UZ library. When this was done, a database of records was created and loaded on to Millennium. This, along with the shelf list mentioned above, was then used as a basis for retrospective conversion.

Implementation

Before embarking on retrospective conversion, the workload, resources and financial considerations had to be put into perspective. A working party, the Retrospective Conversion Committee, was set up, comprising senior members of the cataloguing staff and a representative of the library IT staff. The mandate of the committee was to investigate and monitor the retrospective conversion project process. The head of bibliographic services, responsible for retrospective conversion, produced a reference manual with short descriptions of all commands, parameters, data elements, definitions and error messages. The manual also included a step-by-step guide of how a particular application ran and a detailed description of how each task was performed. Training sessions were carried out for data capturers. The data capturers were trained to concentrate on key elements that needed to be present within the record as follows:

- Create bibliographic record.
- Create item record.
- Create access points (author, title, subject headings, ISBN, and class number).
- Enter location codes for library site.
- Enter item type.
- Enter holdings data for the title (number of copies per title).
- Enter cataloguer's code (to allow the quality controller to know who created the record).

[2] See <http://www.sabinet.co.za>.

A pilot operation was carried out in the Reserve section.[3] The main aim was to identify any teething problems, as well as to take stock and see whether the system satisfied the original requirements. When this pilot operation proved satisfactory, retrospective conversion was rolled out section by section.

Before it got into full gear, some details had to be taken into account to ensure the smooth running of the project. Firstly, the workload had to be established by using the statistics that had been generated by using the shelf list, which was the library's inventory of its collection. Although this might not have given the exact number of bibliographic records, it was deemed a more or less accurate estimate of the workload to be handled. This figure was put at 500,000 bibliographic records. Once the number of records had been established, the next step was to determine the average time that a record would take to process. Several elements influenced the time taken:

- the completeness of description;
- the standardization of the catalogue entries;
- the reliability of converted data (i.e. how much checking would be involved);
- the possibility of importing records from other sources.

Secondly, the retrospective conversion project depended on the resources – the human and material requirements – that could be devoted to achieving the final aim. The project needed to have a time-frame, and, in order to come up with one, the total workload and the time taken to process one record were used to calculate a target that a staff member had to achieve.

Thirdly, a retrospective conversion method had to be chosen from various approaches available:

- Data input by service bureaux or retrospective-conversion vendors.
- Importing records from external databases.
- In-house conversion using existing staff.
- Using contract staff devoted solely to retrospective conversion.

With these options at their disposal, the library's management decided to employ a combination. The records uploaded from SABINET formed the core database on which the library's electronic catalogue was built. This was then uploaded into Millennium and used as the basis for retrospective conversion. The cataloguers, drawn from existing staff and contract workers, edited the records to suit local practice. The cataloguers imported records that were not on the SABINET file from remote databases of thirteen universities in the United States via the Z39.50 protocol and then edited them. A team of quality

[3] The Reserve comprises items in high demand and restricted for use in the library or for overnight/short loan.

controllers were put in place to check on the completeness of description, the standardization of the catalogue entries and reliability of converted records, to co-ordinate indexing, to ensure that the subjects assigned were compatible with Library of Congress subject headings, and to check the assignment of class numbers. The cataloguers also ensured that each item was allocated a barcode and 'date due' slips which would be needed at the circulation stages.

Making the OPAC module live was imperative. Owing to mounting excitement from the patrons, management and the library staff, it was agreed that the circulation and OPAC modules should become live concurrently. This was done to familiarize patrons with the new technological developments in the library. UZ library started retrospective conversion of the Reserve material and the Main Library's Reserve was the first to use the circulation module. The rest of the library soon followed.

Ideally 80 per cent of the data should be online in the Millennium system for the OPAC to become live, but UZ library started circulation before 80 per cent was achieved. It was therefore critical to speed up the retrospective conversion of existing stock, and to speed up the processing of new materials. This required manpower set aside for this purpose, and to that end, contract workers were hired to concentrate on retrospective conversion. At the same time, the two modules needed to become live. The library decided to start circulating material 'on the fly' those items which users needed to borrow but had not gone through the retro-conversion process, and therefore were not in the system. To enable their check out, staff at the issue desk would create a short bibliographic record with author, title and class number, and affix a barcode.[4] On their return these items would then be sent for retrospective conversion. This allowed those books that were on demand to be processed first to allow proper circulation afterwards.

This process had its advantages and disadvantages. It was a learning process for the library staff. Circulating 'on the fly' allowed patrons to borrow online. It also became a mechanism for identifying popular and heavily used books and processing these first. At the same time circulating 'on the fly' had its disadvantages. It 'cluttered' the OPAC by creating several bibliographic records for the same title. It lacked uniformity on the creation of data entry. Sometimes there would be some spelling mistakes, and a patron searching the OPAC might fail to locate an item; or, because of the duplicate records, an item might be indicated as being available when it was out on loan.

Despite the teething problems, the implementation of both the OPAC and circulation modules revolutionized the client–catalogue interface (Figs. 5a and 5b).

[4] The barcode is used simply for loan purposes and comprises a running number that links an item to its bibliographic record on the OPAC.

Fig. 5a. The OPAC interface

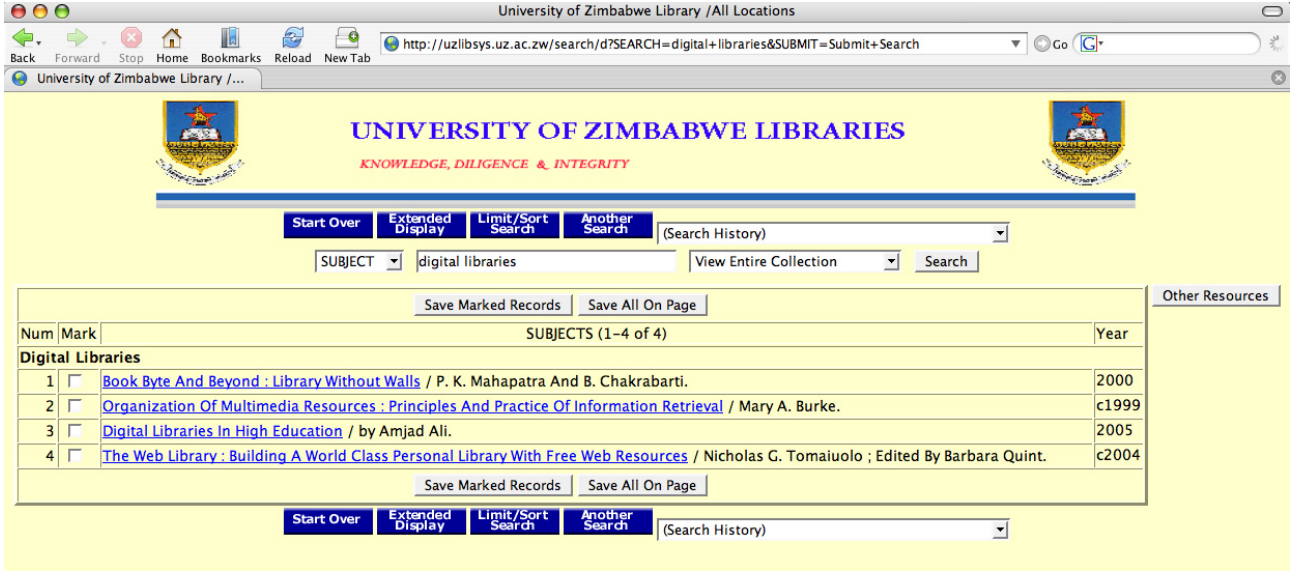

Fig. 5b. The results of a search on the OPAC

It gave patrons wider search options – such as viewing their own records, reserving materials, searching by ISSN/ISBN or keyword – and they could make suggestions for book purchases online.

The OPAC was received with mixed feelings. Patrons who were not computer literate did not welcome the change, while those who were did so with much excitement. They needed training in the use of the OPAC. The library staff had to train those who had difficulties in using it, while also marketing these latest developments to the faculties. Subject librarians were tasked to market the OPAC, as well train faculty to use the OPAC.

For some time it became necessary to use both the card catalogue and the OPAC because not all materials appeared in the OPAC. The card catalogue remains available to clients who would still like to consult it for one reason or another. It was last updated in 2002.

Patrons accessed the server-based OPAC from four workstations in the library. With the introduction of the Web OPAC, patrons can now access it from anywhere: they do not have to come to the library except to borrow the materials they have located. The Web OPAC does not have any limit on the numbers of users at any given time, which allows more users to access it simultaneously.

Training patrons in the use of the OPAC is a continuous process. However, OPAC training is incorporated in the information literacy skills training programme for all first-year students.[5] Training is also provided for incoming postgraduates and new lecturers.

The library has now installed WebBridge and Metafind to enable patrons to search on multiple databases at the same time and from outside the campus.[6] The patron off-campus is able to search the OPAC as well as access electronic resources like e-journals.

Lessons Learnt

- Implementation of the initial library information system in 1996 was a learning process for the library staff. After that initial experience, the need for a feasibility study before the implementation and installation of a library system was realized.

[5] See Chapter 5.

[6] These are part of Innovative Interfaces MAP (Millennium Access Plus), made up of three modules: WebBridge, MetaFind, and Web Access Management. WebBridge offers a 'smart linking capability, enabling libraries to link information resources together when appropriate'. MetaFind is a 'universal search interface that allows access to multiple resources with a single search, returning all results in a consistent interface'. Web Access Management is 'a remote-patron authentication tool that links patrons anywhere in the world directly to external Web servers and databases'. <http://www.iii.com/mill/digital.shtml>.

- Furthermore, it was learnt that, before selection and purchase of a library system, it was important to consult widely with stakeholders and to ensure full participation of key stakeholders.
- For the OPAC to function properly, over 80 per cent of the collection needed to have been catalogued. The University of Zimbabwe library went live before 80 per cent was catalogued and this caused problems at circulation stage.
- Training library staff in basic computer and keyboard skills before the implementation of the system was paramount. This reduced human error in the manual entry of records.
- It became imperative for the library to use both the OPAC and the card catalogue simultaneously. Some information was not readily available on the OPAC but would be available in the card catalogue.
- It was also learnt that good cataloguing and quality control was necessary for a quality OPAC.
- It was learnt that cataloguing details needed to be fully established during the ordering stages, as this would shorten the throughput time, i.e. the time it takes to process an item before it reaches the shelf.

Challenges

- While the use of contract staff was essential for data entry, financial constraints rendered it difficult to engage contract staff to speed up the retrospective cataloguing. The library had to resort to vacation projects for retrospective conversion of Main Library materials, and the branch libraries had to use their own staff for retrospective cataloguing of their materials. This slowed the process of entering data into the cataloguing module.
- When the contract staff were finally hired they needed to be trained in using the Library of Congress classification scheme. It took them a while before they could master it and this slowed down the work output.[7]
- Some records in the OPAC that had been downloaded from SABINET showed that items were available when in fact they had been lost, removed from stock because they were out of date or had been replaced by later editions, or had gone for repair. When this was discovered it meant that in some instances the physical copies had to be retrieved from the shelves to verify their availability.

[7] Contract staff were graduates of the Library and Information Science diploma course at the local Harare Polytechnic and employed at the level of Senior Library Assistant. However, they had learnt the Dewey Decimal Classification scheme, not the Library of Congress system.

- It became difficult to do retrospective cataloguing when patrons wanted to borrow materials at the same time.
- Because retrospective cataloguing took place at various locations, records with multiple locations were not uniform because different people processed the items. The same title might have different class numbers or subject headings, and it took a lot of time to correct these mistakes, and sometimes they could not be easily identified and rectified.
- Another challenge was that, as a result of human error, when records were created in the acquisitions module for ordering purposes, they might be reflected in the OPAC as being available, not on order, and in some instances an order was cancelled but the item continued to be reflected in the OPAC as being available.
- The OPAC needed to be updated frequently to reflect the correct information about each item in the library; for instance, material lost or gone for repair should be reflected in the OPAC.

Sustainability

As has been mentioned before, it is important for any library to keep in mind the needs of its users. An up-to-date OPAC is essential to allow the patrons to access the information in the library. UZ library has ensured that the OPAC is not affected by the continual power cuts that occur in Zimbabwe by connecting PCs to a generator, thus allowing patrons to access the OPAC all the time. The university has committed itself to ensuring that the licence fees for the OPAC are paid to guarantee that it can be continuously updated.

Conclusion

Automating the cataloguing operations has made materials accessible to the library's patrons more rapidly and more reliably than before. The automated catalogue has required the user to become an interactive partner. It has managed to alleviate the shortcomings of the manually maintained card catalogue. The OPAC allows library patrons to search the catalogue database in order to see if the library holds a particular work, to be informed of its location and, if the catalogue system is linked to the circulation system, to be told whether or not the item is currently on loan, a feature that the card catalogue was not able to do. Information retrieval in the University of Zimbabwe library has been revolutionized by the OPAC.

Chapter 4

Digitizing Local Collections

Sipiwe Tevera and Elizabeth Mlambo

The thrust of University of Zimbabwe's five-year strategic plan included emphasis on ICT competences. The implementation of the campus-wide computer network project presented an opportunity for the University of Zimbabwe to take a distinct lead in producing graduates who are competent in ICT. Every student who graduates from UZ has to pass at least one compulsory course in ICT, irrespective of the discipline being studied. For those of us in the library, this provided an opportunity to participate in creating ICT-literate graduates familiar with digital content.

UZ library embarked on building local databases to enhance access to local information and grey literature. Furthermore, the unavailability of foreign currency to subscribe to foreign journals rendered local content published outside the country inaccessible. A related factor was the increased intake of students, who by 2004 numbered 12,000, thus increasing competition for print copies. A mechanism for enhancing multiple access had to be developed. The library saw a need to make local research more accessible to students, researchers and scholars through the creation of an Institutional Repository and digital collections of UZ's research and publishing output.

The University of Zimbabwe noted that other universities in the global village were embarking on building digital collections of theses and dissertations. When the AAU approached UZ to participate in the Database of African Theses and Dissertations (DATAD) project, the university readily accepted, seeing it as an opportunity to better manage its vast collections of theses and dissertations. Other partners who were interested in working with the library in building its digital collections included Electronic Information for Libraries (eIFL), the International Network for the Availability of Scientific Publications (INASP) and the African Virtual University.

This chapter describes how UZ library built four digital collections: DATAD, the Past Examination Papers database, the Electronic Theses and Dissertations (ETD) database, and the Institutional Repository (IR). It also highlights the challenges and lessons learnt in their implementation.

Database of African Theses and Dissertations (DATAD)

The idea of building a database of theses and dissertations submitted to universities in Africa was introduced to the University of Zimbabwe in 2000 by a representative of the AAU who had been assigned to carry out a feasibility study for the DATAD project. Discussions with UZ centered on the importance and benefits of DATAD to African universities. The main objective of the DATAD project is to provide information about African theses and dissertations. Materu-Behitsa, the AAU's representative, pointed out that DATAD would

- contribute towards the creation of an environment conducive for research and publication in African universities as a whole;
- create capacity in African universities for the collection, management and dissemination of theses and dissertations electronically;
- provide visibility and improve accessibility to the work of African scholars both within and outside the continent;
- facilitate the development of relevant copyright procedures and regulations that would promote the protection of the intellectual property rights of African researchers;
- provide support for other AAU programmes that aim at capacity-building in the area of research, promotion of co-operation among member universities, and networking of institutions having access to a central source of information.

UZ took up the challenge to be among the pioneering institutions to participate in the project. Procite and OmniPage software have been used to develop DATAD.[1] As one of the DATAD participating institutions, the university got these software packages, together with equipment, from the AAU.

Some of the pioneering institutions for the DATAD project were: Addis Ababa University, Makerere University, the University of Ghana, the University of Dar es Salaam, Université Cheikh Anta Diop, Eduardo Mondlane University, Yaoundé University, CODESRIA, Ain Shams University, Kenyatta University, and the University of Zimbabwe.

Implementation of DATAD

After the university agreed to participate in the DATAD pilot project in 2000, a management team made up of representatives from the academic registry, deans of faculties, postgraduate students, the library's IT unit and the library was formed.

[1] Procite is a software tool for publishing and managing bibliographies: <http://www.procite.com>. OmniPage is Optical Character Recognition (OCR) software and was used to convert the text of the title pages and abstracts into an editable electronic form: <http://www.nuance.com/omnipage>.

The Librarian strategically included faculty members on the management team to help guide and support the project working team and to ensure acceptance of the project in their faculties. The Librarian was the overall leader of the project, while the head of Special Collections, where the theses are housed, was appointed the local DATAD co-ordinator. A working team was formed that comprised six library staff members who had participated in the initial training by AAU/DATAD team.

At the beginning of 2002 a series of meetings were held by the project management team. A number of questions were raised in these meetings. These included:

- Who owned the copyright in the theses?
- Who would benefit from the proceeds generated from accessing DATAD?
- Would participating institutions be in a position to control and monitor the number of hits on their records, and would there be a charge per hit?
- Would the University of Zimbabwe need to hire extra staff for the project?

All these questions came up during discussions on the Memorandum of Understanding. The management team was concerned about the implications and interpretations issuing from the Memorandum of Understanding. Members were informed that proceeds generated from accessing DATAD and the sale of CDs would further DATAD activities. UZ would also earn US$2.00 for every record entered. While the management team was having its meetings, the working team was also holding its own series of meetings to map out the course of the project. The issues that came out of the working team pertained to copyright, theses formats, and the theses submission process.

Work on data entry began in January 2002, after staff had received training from the AAU/ DATAD project team. In order to ensure the smooth implementation of the database, members in the working team were assigned tasks as follows:

- Special Collections staff were responsible for thesis collection, movement and quality control.
- The Cataloguing department was responsible for quality control.
- Library IT unit staff were responsible for scanning abstracts, database merging/copying, CD burning and technical issues.
- Students were hired for data entry and scanning of abstracts.

With the working team in place, data entry began at the beginning of 2002. By the end of May 2002, 550 records had been created, and by January 2003, 1,040 records (metadata and abstracts) had been submitted to DATAD

headquarters in Accra, Ghana. While data entry was being done, the copyright issue was being discussed with the University's legal authorities, as there was need for a clear copyright statement for theses produced by the students.

The University Librarian, in consultation with the university lawyer and the project teams, came up with a copyright statement for the theses. The statement reads: 'The University of Zimbabwe relies on guidelines in the Copyright Act (*Chapter 26:01*) of 1981 which stipulates that copyright vests in the author of the work and therefore copyright for theses and dissertations belongs to students.'[2]

Another policy issue that came up during data entry was that there seemed to be a lack of standard guidelines and formats for the thesis writing and submission procedure. Various faculties had their own guidelines. Some departments were submitting theses directly to the library, while others submitted them to the Academic Registrar's office, which then sent them to the library. The library proposed that a thesis submission policy be drafted and implemented, as methods of submission were not standard across the university.

DATAD was successfully implemented at UZ. By 2006 it held 1,374 records; 800 more records from all ten faculties still need to be input. UZ continues to contribute towards DATAD.[3]

Past Examination Papers Database

In-house software was used to build the database of past examination papers. The library was eager to have this collection readily accessible over the long term to a large number of students at the same time. Print copies of past examination papers were becoming increasingly expensive to maintain, as bound copies needed repair every semester because of the wear and tear caused by heavy usage. The library was also running out of space to house additional bound volumes.

Work on uploading past examination papers began in 2002. Faculty librarians were tasked with the responsibility of collecting soft (electronic) copies of examination papers written in their respective faculties. The information technology division provided training in how to upload them using in-house software specifically designed for that purpose. A number of faculties submitted past examination papers, which are now available to the university community on the intranet. Figure 1a illustrates the home page for the past examination papers, and Figure 1b the results of a search.

[2] The Copyright Act of 1981 was later repealed by the Copyright and Neighbouring Rights Act [*Chapter 26:05*], which came into force on 10 September 2004, but the provisions relating to this are much the same.

[3] It is searchable at <http://www.aau.org/datad/database>.

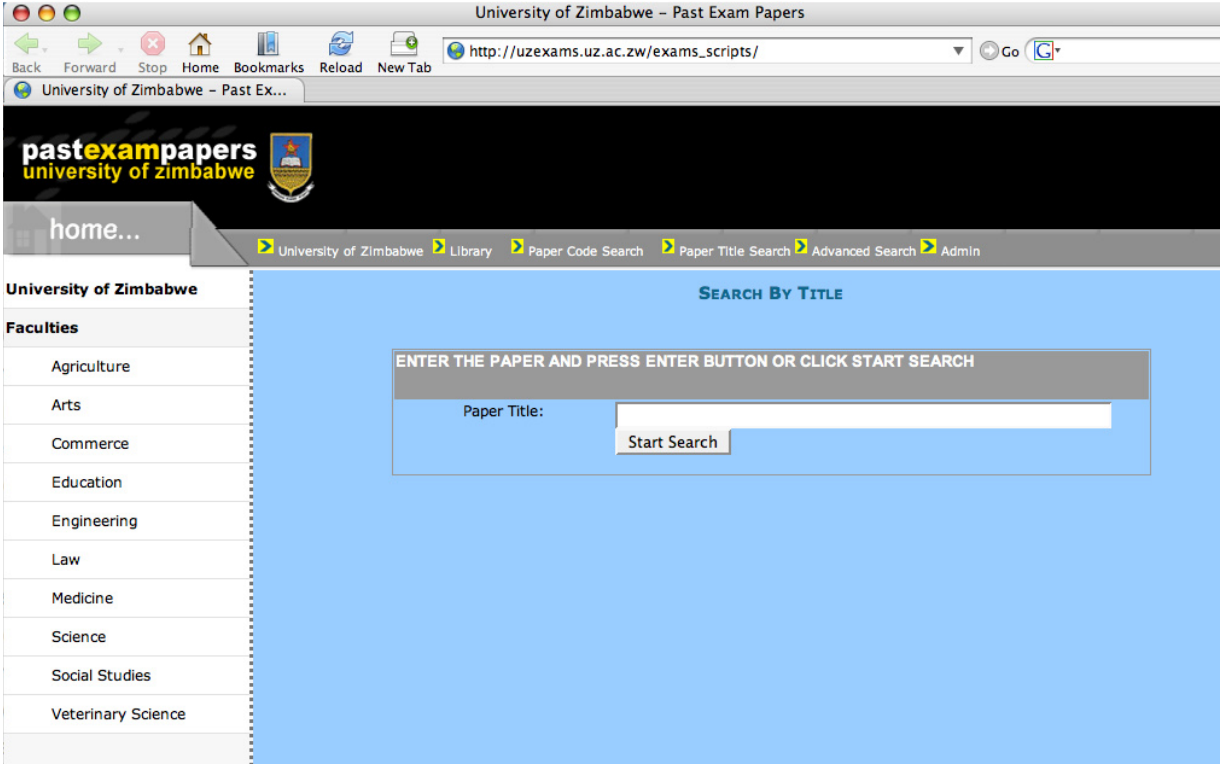

Fig. 1a Home page of the past examination papers on the intranet

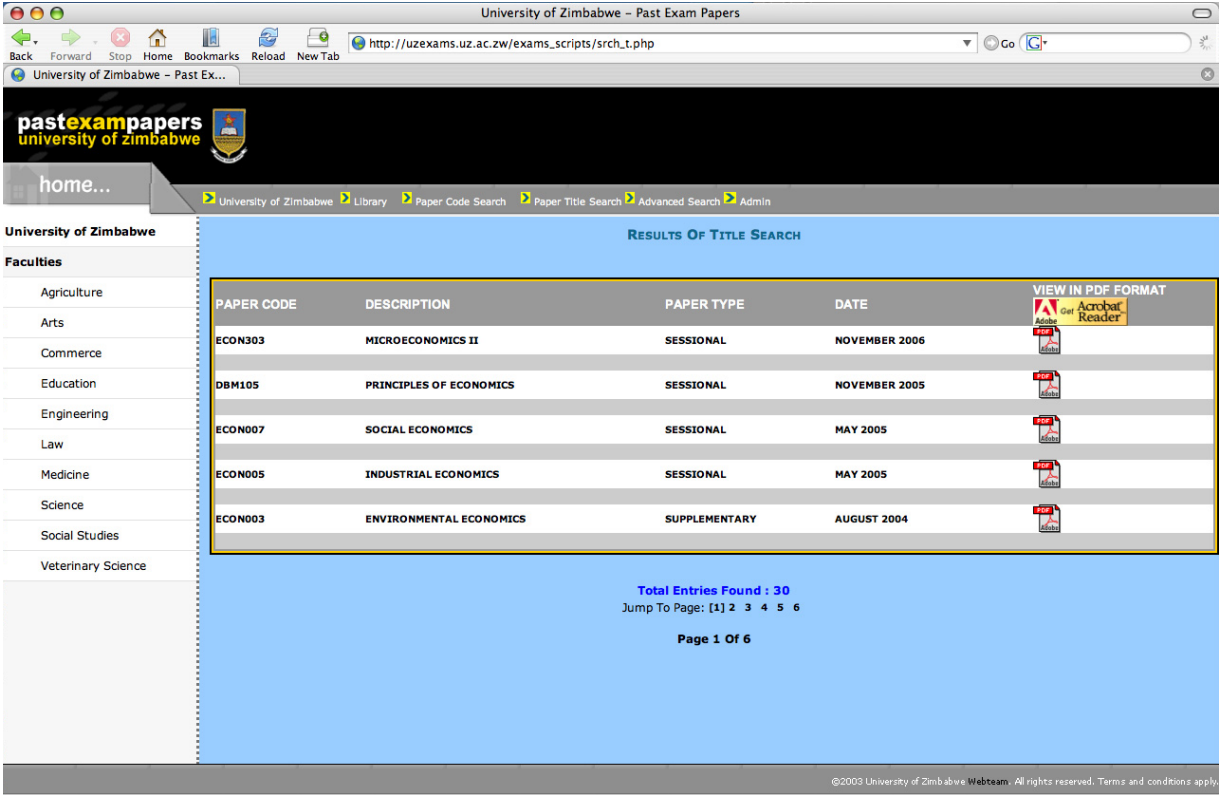

Fig. 1b The results of a search for “economics”.

Since the development of this database, the following benefits have been realized for the library and its patrons:

- Easier access to the collection by library patrons.
- No physical boundary: students can access past examination papers remotely via the Web access management tool on the intranet.
- Availability: students can access past examination papers twenty-four hours a day, seven days a week.
- Information retrieval: there are various search options that can now be used by patrons, i.e. paper code, paper title, and faculty.
- Several students can now access examination papers at the same time.
- Digitizing the collection has also enabled library staff to manage the collection better.
- No physical space is required.

Electronic Theses and Dissertations (ETD) Database

After building the DATAD database, which provided only metadata and an abstract, the UZ library's third database of full-text electronic theses and dissertations (ETDs) was developed using the ETD database (ETD-db) open-source software.[4] The database is an extension of the DATAD initiative and is available on the intranet (see Figs. 2a and 2b). Building the ETD database became imperative, as the university staff and students became interested in having access to full-text theses twenty-four hours a day. The library and academic staff wanted graduate research results to be rapidly disseminated, and to have improved access.

When the academic board approved the creation of the ETD database, the academic registry introduced a new format for submission. The requirement now is for students to submit electronic copies of their theses, together with print copies, to the examinations office. The examinations office sends the electronic copy to the library, where staff in the Special Collections division convert them to PDF and upload them on to the ETD server. The Adobe Acrobat document security feature is used to encrypt the theses so that no changes can be made to the files.

The Institutional Repository

The idea to set up an Institutional Repository at the University of Zimbabwe came about in 2004. The Librarian, an advocate of open access and always committed to furthering the open-access movement, felt that the only way that the university could participate in the movement was through the creation of

[4] See <http://scholar.lib.vt.edu/ETD-db>.

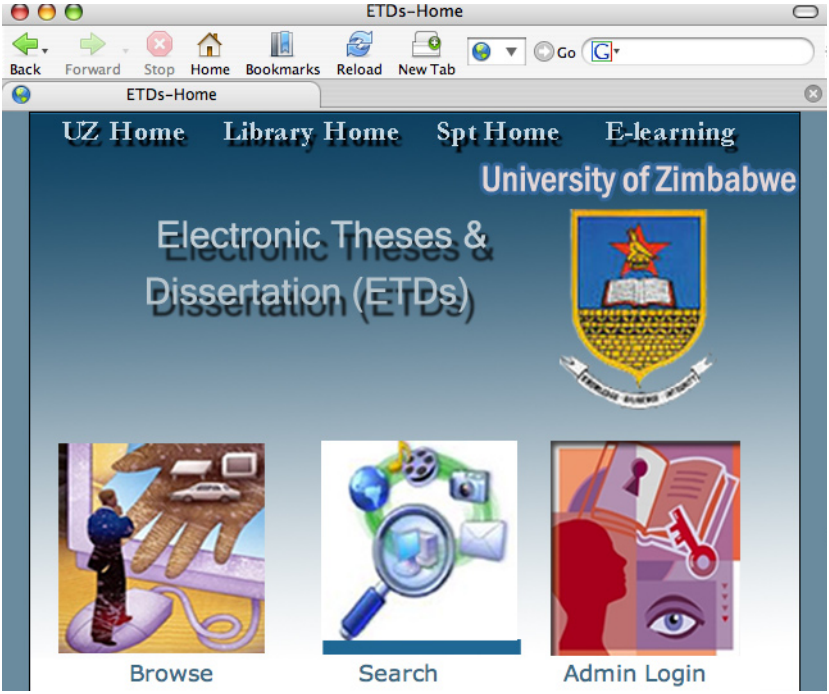

Fig. 2a. Home page of the ETD database on the intranet

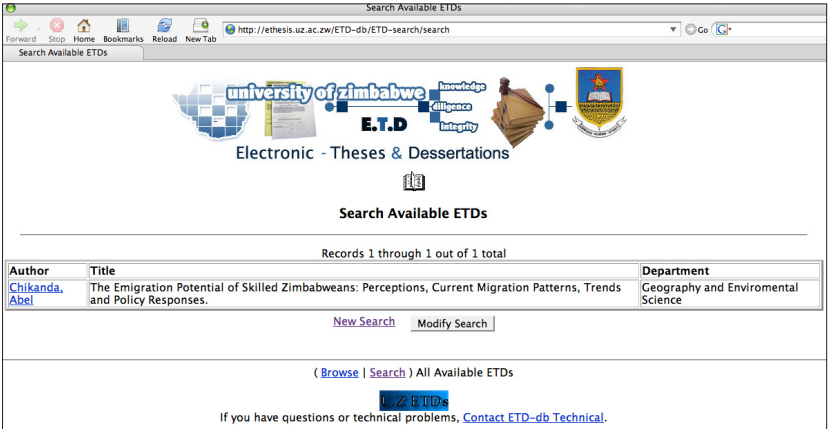

Fig. 2b. The results of a search of the ETD database

an Institutional Repository. Through discussion with colleagues in the field of librarianship, and from her readings, there was an indication that users in Africa were always downloading information from the Internet and that very little was being uploaded. Also there was an indication that an Institutional Repository would enhance the visibility and impact of the university's research output, enhance students' access to information produced at the university, and enhance the sharing and networking of UZ scholars with other scholars in the global learning and research community.

With willing partners in eIFL and OSI, UZ library embarked upon setting up an Institutional Repository. The idea was approved by the Senate library committee (which constitutes academics and librarians as well as researchers), the academic committee, the administrators committee, and finally by Senate itself.

Work on building the repository began in June 2005 with the objectives of

- comprehensively collecting articles and research output of UZ scholars and researchers;
- digitizing the scholarly output of UZ researchers and scholars;
- disseminating these products and publications widely;
- preserving the products of UZ scholars.

Right from the outset, a project working team, comprising six librarians and one IT specialist, was established. The library's experience with the DATAD project had revealed clearly that team-building was crucial for a project such as this one. The Special Collections librarian was tasked to co-ordinate the project. One of the major tasks of this team was to sensitize the university community to the importance of making their research output available on open access.

Armed with funding from eIFL, in May 2005 two project working team members, the IR project co-ordinator and the library IT resource person, attended a South African Site Licensing Initiative (SASLI) training workshop in South Africa. At this workshop they received training in the implementation of IRs and in the use of DSpace software,[5] from an organizational as well as from a technical perspective. On their return from South Africa, the two staff members arranged two training workshops in June 2005, one for project working team members and the other for faculty librarians. Staff members who attended the workshops were trained in the implementation of IRs using DSpace and training materials obtained from the SASLI workshop. The two workshops were held at the university library and funded from the library budget.

DSpace was naturally selected as the software to be used to set up the Institutional Repository since it was well established and the library staff had received training in its use (see Figs. 3a and 3b).

[5] See <http://www.dspace.org>.

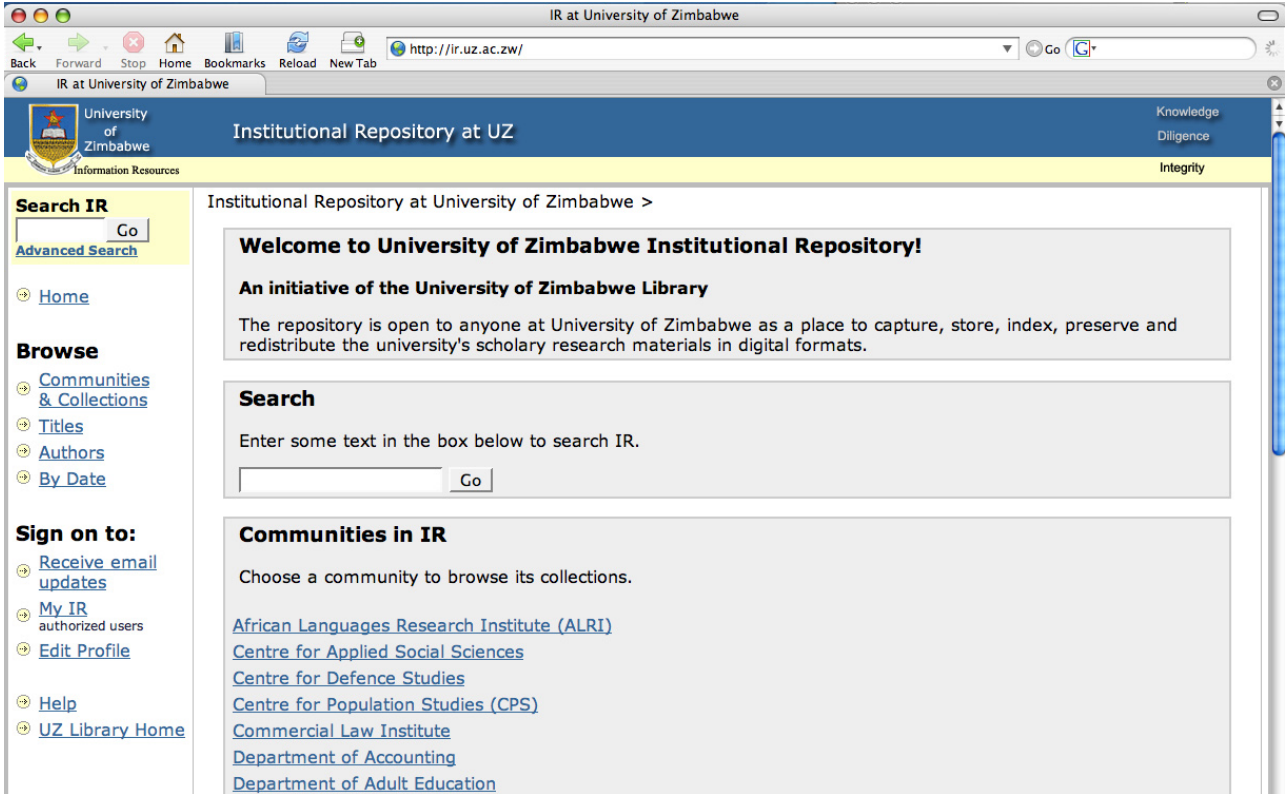

Fig. 3a. Home page of the UZ Institutional Repository

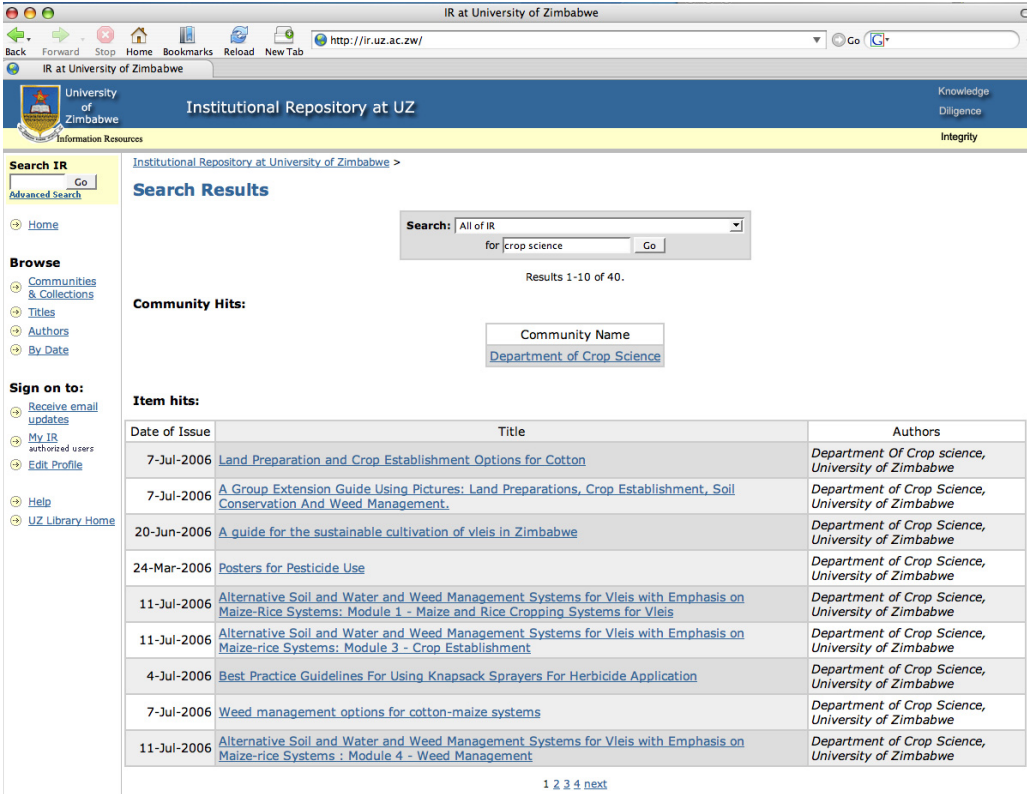

Fig. 3b. Results of a search of the UZ Institutional Repository

The building of initial subject areas began in 2005. The first subject areas to be set up were:

- the Department of Geography and Environmental Studies
- the Department of African Languages and Literature
- the African Languages Research Institute (ALRI)
- the Institute of Development Studies
- the Library

First to contribute content for the initial deposits was one of the Pro-Vice-Chancellors, followed by academic staff from the Department of Geography and Environmental Science. Printed copies were scanned and saved as PDFs, and electronic copies converted to PDF versions, the security feature again being used to prevent changes to the documents. The library working team used these subject areas and the names of staff that had put initial content in the repository to publicize the project, and their names were mentioned in presentations that the working team gave at academic board meetings. The content deposited in the repository included:

- journal articles
- conference papers
- conference proceedings
- research reports
- seminar papers
- newspaper/magazine articles
- books
- departmental technical reports/working papers

Work on the repository started without any funds. The library subsequently received financial support from eIFL for training and equipment, while INASP provided funding for expanding the size and depth of the repository, for the recruitment of staff, marketing and the development of publicity materials.

Promotion of the Project

The Institutional Repository working team realized from the start that it needed the support of academic staff and key administrators to make the project a success. The idea was to market the project to deans of faculties, directors of institutes, leading members of faculty. It was the team's hope that their endorsement of the project would promote credibility.

The team publicized the project by word of mouth to individuals whom they persuaded to submit their publications. The working team gave presentations on the importance of submitting scholarly research output on open access, first to deans, then follow-up presentations were made at faculty board meetings where all faculty members were present. Here the team was seeking faculty

endorsement of the project. The team also approached, on an individual basis, those academic staff members who the team members knew would be interested in submitting articles to the repository. This approach helped the team to get the first articles that were uploaded into the repository.

The importance of submitting their work into the repository was pointed out to academic staff members who attended the board meetings and those that were directly approached by the IR working team. Of concern to academics was the issue of copyright and whether their publishers allowed their articles to be deposited in the repository. Therefore the team always carried a copy of the SHERPA document, a useful resource for information about publishers' copyright policies that was developed by the Rights Metadata for Open Archiving (ROMEO),[6] each time they made presentations to potential contributors.

Lessons Learnt

The lessons learnt by UZ library while building the online databases are probably not different from those learnt by other libraries:

- Getting faculty support and approval for projects such as these is critical, as their success depends on faculty contributions and use.
- Getting financial support is crucial, as funds are required for equipment, training and marketing activities for the projects.
- Training was critical to ensure continuity of the project, and to get every staff member excited about the projects.
- It was vital to establish strategic partners who could answer any queries the working team had.
- Team-building was essential for all the projects to succeed.
- Marketing is critical for any project embarked upon.

Challenges

The challenges faced by the library during the implementation of DATAD, ETDs and the Institutional Repository were:

- The lack of a clearly documented set policy on copyright; there was no document that clearly stated who held the copyright in theses.
- There was no clearly stated theses submission policy, as every department seemed to follow different channels and some theses lacked abstracts.
- Copyright became a major issue with academic staff during the implementation of the Institutional Repository. Academics were not aware whether their copyright agreements with publishers allowed them to deposit content in the UZ repository.

[6] See <http://www.sherpa.ac.uk/romeo.php>.

- There was a delay in obtaining permission from publishers to archive articles by UZ staff that had appeared in their journals.
- Content collection had its own challenges, the biggest one being that most of the content offered by academic staff was in print format, and a lot of time was spent on digitizing the material.

Sustainability and the Way Forward

The sustainability of the digital projects in the UZ library is very important and will depend entirely on the availability of funds and the marketing of the facilities that have now been established to the university community. Ensuring the long-term success of the Institutional Repository at UZ will depend on the amount of content available and the use that is made of that content. The marketing strategies that the working team have put in place have encouraged academics to submit content to the repository. The library staff, and the academics who have contributed content, expect it to be available long after the current project is complete. Plans are under way to launch the Institutional Repository project at the end of 2007, and it is anticipated that its success at the University of Zimbabwe will help other institutions in Zimbabwe build their own institutional repositories.

Chapter 5

Information Literacy Skills and Digital Collections

Josephine F. Gurira and Primrose Muganhiri

This chapter sets out to discuss the role that information literacy skills (ILS) play in building a digital library at the University of Zimbabwe. We believe that information literacy is paramount in any university education. The term university education, in itself, means that we must comply with universally accepted standards of competence for our university graduates, and the UZ library has followed the Association of College and Research Libraries (ACRL) standards for information literacy.[1]

There is a new movement of educational reform that gets a big boost when ICTs are put to use. To quote Carol Twigg, 'technology can help colleges make teaching more effective and cheaper, but only if professors are willing to completely rethink the way courses are delivered'.[2]

'Information literacy is no longer just a library issue. It is the critical campus-wide issue for the 21st century, of keen importance to all educational stakeholders, including faculty, librarians, and administrators'.[3] A related factor at UZ was the new thrust on the ICT competence of all graduates in the university's 2003–2007 strategic plan, which the library took seriously. The country as a whole was following an ICT agenda put in place by the Ministry of Science and Technology Development. In implementing information literacy skills, the library sought to have ILS embedded into the curriculum as one of the key skills that students need for learning in higher education.

Information literacy is feature of recent innovations in education. Not engaging in vigorous ILS teaching would render the developments in digitization meaningless to patrons. At UZ library we endeavoured to support students' success by ensuring educated access to the electronic resources available to

[1] See <http://www.ala.org/ala/acrl/acrlstandards/informationliteracycompetency.htm>.

[2] Carol Twigg, 'League for innovation in the community college's conference on information', *Chronicle of Higher Education*, 8 Nov. 2004.

[3] Ilene F. Rockman, 'Integrating information literacy into the learning outcomes of academic disciplines: A critical 21st century issue', *College and Research Libraries News* (2003), 64(9), 612.

them. With its information literacy skills training programme, the library set out to demonstrate the new information infrastructure and re-establish the library's role as a teaching and learning centre.

From 2002 the library increased the number of electronic databases it offered to five. In order to maximize their use, it became essential to make maximum effort to teach the effective use of digital technologies to students, faculty and administration; it was critical to match increased access with new skills in users. This went a long way towards ensuring that the resources sourced were accessed and fully utilized by the university community.

Teaching of Information Literacy Skills

The library's initiative in teaching information literacy skills at UZ was in compliance with the above-mentioned statement in the strategic plan, and had among its goals to

- enable patrons to use the OPAC effectively;
- train all first-year students in information literacy skills, which include access, retrieval, evaluation and synthesis of information;
- introduce all users to the online resources available in the library, such as e-journals, e-theses and examination papers.

Prior to the introduction of information literacy skills as a component of the Communication Skills course in 2004 (see below), some form of user education was being taught in the university. However, this was done on an ad hoc basis, with librarians having no power to bring the students together for the formal teaching of information literacy skills. Only when an occasional individual lecturer valued library instruction on the effective use of information for the students he/she was teaching would the time be provided for library information retrieval classes within the time slots for that discipline. Under the previous informal arrangement, some Communication Skills Centre lecturers would occasionally work with librarians and collaborate in getting some library instruction for their classes. Many did not bring their students to the library and did not think it necessary.

The integration of ILS into the curriculum was formalized as a result of the work of the university librarian, who started discussions with the staff in the Communication Skills Centre, where all first-year students were required to take a semester of communication skills. She used this strategic alliance to put ILS on the UZ instructional agenda.

To facilitate the collaboration, a logistics committee involving two librarians and two lecturers was instituted to steer the integration of information literacy skills into the communication skills curriculum. The Computer Centre was asked to join the logistics committee, as it was agreed that students arrive with

very little knowledge about the use of computers. The administration showed strong support for the joint library/communication skills proposal and received the proposals of the logistics committee positively.

To equip librarians with teaching skills, meetings and workshops were held to prepare them to teach information literacy skills efficiently. A syllabus was put together with the content for the ILS classes. The process was the teaching of information skills using an incremental learning approach, starting with basic library familiarization tours for all first-year students. This was called ILS 1. This would progress to ILS 2, where classroom sessions progressed in teaching students

- primary, secondary and tertiary sources of information;
- literature searching in different formats;
- information searching skills using the OPAC;
- use of the Internet and the search engines;
- subject-specific electronic databases;
- use of e-journals and e-books;
- evaluation of information and information sources.

There were hands-on exercise sessions and practical searches of electronic databases, as well as in-class tests and an end-of-term examination.

These units were assessed by librarians and sent to the Communication Skills Centre in the Faculty of Arts, where the mark counted for 30% of the final grade in the Communications Skills course. Students were taught and assessed in

- their ability to use the library collection from the online catalogue;
- identifying their information needs;
- using an informed strategy for finding information sources on a given research topic;
- how to do a critical analysis of the information sources;
- proper evaluation of the authenticity of the sources;
- correct citation of the sources used;
- acknowledging sources used.

The teaching of advanced ILS for higher-degree students was also put in place. This has been prioritized as the major ILS activity in the second semester. The subject librarians, in collaboration with the faculty they serve, taught advanced information-retrieval skills and electronic information resources in the relevant disciplines to upper class and postgraduate students. The curriculum takes off from basic information literacy skills to incorporate goals and objectives associated with more specific needs for term papers and thesis research. The module covers:

- Introduction to topic analysis using the OPAC.
- Understanding and refining the topic, search term refinement.

- Basic structure of databases.
- Subject-specific databases: for example, the library's Database of Theses and Dissertations (DATAD) on the library's intranet.
- The Internet and various search engines.
- The digital library: that is, e-books, e-journals, e-theses.
- E-communication (using the local area network).
- Evaluation and critical examination of information found.
- Building a bibliography and proper citation according to the discipline: for example, American Psychology Association (APA), Modern Languages Association (MLA), Harvard and Chicago styles.
- Acknowledging quoted materials and watching for plagiarism.
- Copyright and intellectual property issues.

The librarians offered research assistance individually to graduate students at different stages of their theses, according to their needs. Some made arrangements for weekend or evening sessions to accommodate students who were at work during the day.

The teaching staff were provided with current awareness on relevant databases for their teaching and research purposes. An introduction to the Internet and database-searching skills was offered to faculty and staff.

Lessons Learnt

- It has become evident that the effort to digitize the library must be accompanied by vigorous information literacy skills education. This should not be only for the students but also for the teaching staff and even for the administration. As digitization is new in the developing world, it is an uphill struggle to get all the players to change from using the traditional methods of teaching, learning and research to those required for electronic information retrieval and interactive digital communication.
- In launching the incorporation of information literacy into the communication skills curriculum, the library was committed to maximizing the benefits of ICTs in order to see patrons making maximum use of the resources which it had sourced and were available not in print but in electronic format. The end result was that vast numbers of students would have access to information databases, e-books and e-journals, in spite of the shortage of new books and periodicals owing to economic constraints. So it was agreed that a tripartite grouping of librarians, discipline experts and computer specialists was an essential component for the information literacy programme.
- Another lesson learnt was that when students were introduced to the

Internet they went for it like a television set and wanted to look at all kinds of things for entertainment and not use it for scholarly purposes. There was a need to collaborate further with all the teaching staff to challenge students to search for information in their respective disciplines and to hand it in for grading. Students would appreciate what library information literacy stood for if teachers required the students to do searches in the relevant databases in relation to courses being taught.

- We learnt that the academic curricula at all levels should include an information literacy skills component. It was evident that more and more electronic resources were solicited by students when they were given no alternative but to search for information using search engines, databases and open-access documents in their disciplines, evaluate them critically, and integrate them in their research papers.
- The lecturers challenged the students by giving them specific exercises to require them to search and evaluate electronic information – for example, to write bibliographies using URLs and to justify why they selected a particular Web page, showing the correct way to cite Web pages. This left the students with permanent knowledge about the use of the digital resources.
- Finally, we learnt that students' learning could be either supported by collaborators or constrained by competitors. So the collaborative teaching by librarians and Communication Skills lecturers together with the Computer Centre staff was well received by students and the academic community. The graded ILS course gave formal recognition to information literacy skills. At the end of the semester, the first-year students were helping second- and third-year students to access the online catalogue resources on the library's intranet and on the Internet.[4] The librarians and lecturers found common ground in assisting students in their overall information skills. Attendance at each others' class sessions alerted librarians and Communication Skills lecturers to the areas to watch for in correcting students, e.g. students' written work put together with correct citations.

Challenges

The need for librarians, faculty and IT specialists to join in a healthy dialogue cannot be over-emphasised for effective teaching, learning and research using ICTs. It is a great challenge, as there is need for greater co-operation in order

[4] The second- and third-year students had not had an opportunity to be taught the ILS course, as it had not yet been formalized.

for the students to take what they have learnt in the information literacy class into the classroom and beyond their university days.

There is need to strengthen communication and collaboration between teaching staff, researchers, students and administrative staff, business, government and the entire educational community. The whole academic community needs to take on a leadership role in the effective use of information resources and the dissemination of knowledge to facilitate and contribute to the lifelong learning of students, staff and researchers.

Greater emphasis has to be placed on continuous education for academic librarians in order for them to continue to sharpen their delivery of ILS training and advocacy.

There is need for a change in attitudes so as to move away from traditional methods of teaching and learning, both on the part of the students and, mainly, on the part of academics.

In addition there is the issue of the status of academic librarians, which needs to be boosted for the pivotal role they play and which is not often recognized by the administration or academics. Bechtel sums it up well:

> in higher educational institutions faculty have been suspicious of librarians' credentials and functions, viewing them as technical and therefore clerical. Additionally, and unfortunately, in most academic institutions there are only three personnel categories: administrative, faculty, and clerical. Given this limited choice of location in the academic hierarchy, librarians have no clear and appropriate place. In some institutions librarians are included in the administration and in some they have faculty status.[5]

There is also a need for campus-wide planning for laboratories that are well equipped, and for classroom space for teaching in an environment that is conducive. In view of the expected increase in demand for ILS, this is a big challenge.

It is still a challenge for librarians to balance in their collections the print and electronic resource needs of their clientele. 'As the demand for scholarly resources increases so does the challenge for truly integrating print and electronic formats'.[6] UZ library is fully aware of this and has continued to teach information literacy in all media.

There is also a challenge in bringing all teaching staff on board in the

[5] J. M. Bechtel, 'Academic professional status: An alternative for librarians', *Journal of Academic Librarianship* (1985), 11(5): 289.

[6] M. A. Thomas, 'Redefining library space: Managing the co-existence of books, computers and readers', *Journal of Academic Librarianship* (2000), 26(6): 412.

use of electronic teaching resources and interactive digital teaching activities. Demystifying the computer, making database searching fun, and demonstrating the value added to research, teaching and learning will go a long way towards involving all stakeholders.

The challenge of connectivity is a national issue, as electricity cuts happen frequently. The amount of bandwidth needs to be increased as more students are introduced to electronic information retrieval. The university is already addressing this issue.

Sustainability

The sustainability of ILS training is most assured by its timeliness and its relevance to the requirements not only of the university's strategic thrust for ICT competencies but also those of the Ministry of Science and Technology in the use of ICTs for national development. In addition business and industry are requiring ICT competencies for job opportunities. Students are now aware of the importance of information literacy skills in their education and afterwards in their future careers.

The librarians' role in imparting information literacy skills is being sustained by training workshops, such as the INASP-sponsored training of trainers which is designed to cascade the competence to teach electronic information retrieval in universities in developing countries such as ours. INASP, under its PERI programme, has enhanced the sustainability of the ILS programme through building the capacity of librarians to use ICTs for the provision of information to their communities.

The digitization of local research into an Institutional Repository at UZ will make more sustainable the partnership between researchers and librarians and spread the knowledge base of students and scholars both locally and internationally. More staff will want to follow up their articles that are now in digital format, and also send their students to read them online.

A budget should be provided for supporting and sustaining ILS training. This will ensure the maintenance of good standards of ILS instructional methods using state-of-the-art multimedia classrooms.

The Way Forward

As there is no going back to the old or traditional ways of teaching, learning and research, universities – indeed, national education ministries – have to be lobbied to support the digitization efforts: funding for digitizing will have to be prioritized. The need for having and sustaining a university-wide, long-range plan for the digitization programme is being focused on these days. There will have to be an aggressive fund-raising thrust to match the rising

costs of computers, their upkeep, software and maintenance. Funds will also be needed for subscriptions to non-free electronic resources from the North. Holding workshops and conferences that sensitize the nation on open access and building a knowledge society (like that mounted by ZULC in April 2006) will go along way towards developing an understanding of, and the need for, information literacy in a knowledge society.

Librarians bring expertise in print and electronic information to the faculty, and can help integrate electronic information into teaching. Librarians have experience in working with technology and can help faculty develop new skills in these areas. Ultimately, librarians can partner with faculty to teach students the information literacy skills necessary for them to become lifelong learners and be productive in the next century.

In the current situation, it is no longer sufficient to educate the university community in how to use the library. Because of the proliferation of digitized information, students and researchers must know not only how to access this information but also how to evaluate it in the most effective way. In addition, the university community must be able to identify their information needs, understand the kind of information resources that are likely to meet these needs, and understand how to handle this information. This implies that students must be taught how to use the library and how to become information literate simultaneously.

Librarians have the job of working with faculty in the teaching centres, such as our University Teaching and Learning Centre, and of collaborating in online interactive teaching with members of the teaching staff. Also, as the learning environment becomes more flexible and global in future, simulated learning will be available globally and greater access to it will become a given. Interactive learning and teaching, with participants anywhere in the world using the latest technology, will become a regular occurrence. People will need to acquire appropriate and sophisticated learning and information skills to be successful. Information literacy may change to information fluency and include computing, technical, media, information, evaluation, organisational, and problem-solving skills. Faculty, librarians and technology experts should start now to work in teams to set up appropriate learning and teaching environments and to become able facilitators in the learning and teaching process.

The present educational environment offers many opportunities for librarians to achieve partnerships with faculty and to integrate information literacy into the curriculum. Librarians have unique qualifications to bring to the table in these discussions, particularly regarding student competencies for the information age. Librarians are also skilled in helping faculty learn the use of the Web and how to integrate electronic information into their teaching and research. At the same

time librarians can be instrumental in helping faculty gain specific electronic information skills and in assessing students' competencies in proper citing, respect for intellectual property and following copyright protocols.

Finally, both librarians and faculty can collaborate in pursuing campus-wide, synchronized digital instruction for the full benefit of the teaching, learning and research of this institution. The Computer Centre's involvement in training teaching staff in the use of Claroline software will go a long way in localizing the digitization thrust on the UZ campus.[7] The kind of outcomes we are looking for are those of turning out a student population that is computer literate, information literate and communication skills literate.

Conclusion

UZ library's determination to build a digital library in spite of the present economic constraints can only be said to be miraculous. The library has stayed on the cutting edge of 21st-century information provision by teaching digitized information retrieval and tapping open-access resources. UZ students can match students in the First World in carrying out research using print, digital and multimedia resources. The collaborative approach to information literacy training with first-year students at UZ can match that carried out at leading institutions in countries in Europe and North America. A recent visit to academic libraries in the United States by one of the authors of this chapter revealed that, although UZ library cannot match the vast resources in these libraries in terms of computer hardware and software, e-resources and budgets, UZ students who have been trained information literacy would fit in very well. They would be able to search the online information resources and to understand the complex nature of information in any environment.

[7] Claroline is an Open Source eLearning and eWorking platform allowing organizations to build effective online courses and to manage learning and collaborative activities on the Web. <http://www.claroline.net>.

Chapter 6

Digital Health Sciences Information

Agnes Chikonzo

The University of Zimbabwe College of Health Sciences Library (formerly known as the University of Zimbabwe Medical Library) was established in 1963 to serve staff and students of the then Godfrey Huggins School of Medicine. The College of Health Sciences Library (CHSL) is a branch of the University of Zimbabwe library. Unlike other UZ branch libraries, CHSL is situated six kilometres from the University of Zimbabwe campus, in the Parirenyatwa Hospital complex, on the same campus as the other departments of the College of Health Sciences (CHS). CHSL is historically, and by designation in 1983, the country's national focal point for health information, which means that it has an obligation to disseminate health information to registered health professionals registered with CHSL and to provincial hospitals in Zimbabwe. It is the only comprehensive source of biomedical and health information in Zimbabwe.

CHS has twenty-four departments offering nine undergraduate programmes and twenty-one postgraduate courses. The enrolment as of March 2006 was 1,320 undergraduate and 240 postgraduate students. There are 138 academic staff, 9 senior non-academic staff, 52 junior non-academic staff, 80 technical staff and 42 secretarial staff.

CHSL's vision is to be 'the leading provider of health information in the region' and its mission is to 'effectively and efficiently support the teaching, learning and research functions of the College of Health Sciences, by providing ready access to relevant sources of appropriate and current information'.

Collection and Users

The collection in CHSL comprises books, both print and electronic, journals, both print and online, CD-ROMs, theses and dissertations and video tapes. The loan period varies from one day for Reserve books, three days for books on short-term loan and two weeks for ordinary books. Theses and dissertations as well as video tapes are not allowed to be taken out of the library.

The following categories of users may be registered for access to the library's resources as borrowers or readers:

- Academic and non-academic staff of the College of Health Sciences.
- University of Zimbabwe students and staff from other departments.

- Registered members of the Health Professions Council of Zimbabwe.

Approved readers and borrowers, other than UZ staff and students, have to pay registration fees. These fees are reviewed regularly. Daily passes for users who do not want to become members are chargeable. Entry of users to the library is carefully controlled. Membership identity cards must be shown on entry at all times.

Services

The CHSL reference service provides assistance in finding and using printed and electronic materials for medicine, pharmacy and the biomedical sciences. The reference librarian assists users in locating sources of information, selecting and using resources for reports, assignments and research, and learning to use library and information resources. Librarians at the reference desk also provide individual assistance to staff and students who want more detailed knowledge of information resources in a subject area.

There are eighteen computers with Internet access in the reading room for the use of students and one machine that is dedicated to CD-ROM searches. There are also eleven computers, also connected to the Internet, for use by CHS staff.

An outreach service aims at providing health professionals, wherever they are located in Zimbabwe, with information. Outreach services available are:

- Literature searches on any biomedical subject of interest.
- Verification of references and other bibliographic services.
- Electronic-mail services to institutions and individuals worldwide.
- Provision of photocopies of journal articles on request.

Information Literacy Skills (ILS) Training

While CHSL continues to enhance the quality of research and learning support through stock renewal, it also seeks to enhance the ability of users to access print materials and particularly electronic resources. As a result, ILS training was introduced to CHSL users in 2003. Through this component, students are taught information storage and retrieval and keyboarding skills. ILS training is a collaboration between the Communication Skills Centre, the library and the Computer Centre (as described in Chapter 5). The collaborative effort of the three units gives first-year students the skills that enable them to retrieve, evaluate, use and store information.

CHSL staff are responsible for imparting information literacy skills to library users to enable them to become independent lifelong learners. Users are now in a position to select, search and evaluate information sources effectively. In 2003, 240 medical students were equipped with information literacy skills that

enable them to use information for learning. It must be noted, however, that ILS training is a continuous process. The duration and levels of training vary, depending on the needs of different groups, and CHSL staff tailor their ILS products to each of these groups.

The Early Digital Library

Digital health information came to the Medical Library when the CD-ROM MEDLINE service was introduced in 1989. MEDLINE, the computerized version of the printed *Index Medicus*, then indexed over six and a half million articles from 3,400 biomedical journals dating back to 1966. The abstracts of these citations could be simultaneously retrieved and printed out from a second disc running on a second disc drive/player.

The CD-ROM MEDLINE service revolutionized the pattern of library use in the Medical Library. The service was welcomed by the library users because it offered an ideal information technology for Africa. Rosenberg, writing about MEDLINE in the University of Zimbabwe Medical Library, described the service as follows:

> It is now not only used for access to journals but also for general browsing. A member of the academic staff said that she used it for patient care, management, teaching and research. A postgraduate student said she used it for general reviews of a subject as well as for specific subject searches. Many found that they did not need to go further than the abstract; this provided enough information. A survey carried out in 1995 found that 64% of users found abstracts useful, 20% found they usually provided all the required information and 53% said they sometimes provided all the required information.[1]

The MEDLINE CD-ROM databases proved to be user-friendly, and as a result library users, library staff, physicians, researchers and health professionals found that they were able to get good search results after very little training. By 1990, the Medical Library had two CD-ROM drives; the library was determined to acquire more PCs, and by 1997 they had twenty-seven.

Electronic mail was offered in 1992 with the introduction of HealthNet, and it was used mainly to make and receive requests and to transmit MEDLINE searches to users within Zimbabwe. The ease of access to international medical literature through CD-ROM and e-mail caused a rocketing rate of interlibrary loans.

[1] D. Rosenberg, *University Libraries in Africa: A Review of Their Current State and Future Potential* (London: International African Institute, 3 vols., 1997), 3: 338.

By 2001 the following CD-ROM databases were available in the Library:

- *Africa Health Anthology, 1976–2001*: A collection of twelve bibliographic databases containing 490,000 references relating to African health issues.
- *AIDSearch, 1980–2000*: Made up of three files, AIDSDRUGS, AIDSTRIALS and AIDSLINE, this database offered nearly 200,000 records on acquired immunodeficiency syndrome and related topics. References are derived from key files, abstracts of meetings, international conferences and symposia on AIDS.
- *Best Evidence, 1991–2001*: This included contents of the *American College of Physicians Journal Club* and *Evidence-Based Medicine*. Critical reviews of the contents of 90+ journals on internal medicine and other specialities. Citations and abstracts from 4,300 main medical journals.
- *Cinahl, 1996–2001*: Citations and abstracts from 1,200 English-language journals. Covers nursing and allied health disciplines.
- *Cochrane Library of Systematic Reviews*: The best single source of reliable evidence about the effects of health care. It also includes abstracts of reviews of effectiveness, controlled trials register, etc. The figures and graphs in *Cochrane Reviews* display the Peto odds ratio and the weighted mean difference by default.
- *Medline, 1966–2001*: The United States National Library of Medicine's database of the world's biomedical journal literature.
- *Popline, 2000*: A wide range of sources providing citations and abstracts on reproductive health and demographic topics.
- *PsycLIT, 1974–1997*: Produced by the American Psychological Association, it contains the best world's serial literature in psychology and related disciplines, covering over 13,000 journals. It also contains summaries of English-language chapters and books in psychology and related disciplines.
- *Rehabilitation and Physical Medicine, 1984–1994*: Citations and abstracts from sources specializing in all aspects of rehabilitation.

Digital Indigenous Health Information

Current Health Information Zimbabwe (CHIZ)

As already stated, the Medical Library became the national focal point for the provision of health information in 1983, and was mandated to disseminate health information to health professionals throughout Zimbabwe. To fulfil that mandate, in 1987 the Medical Library started producing *Current Health Information Zimbabwe* (*CHIZ*), an in-house quarterly bulletin in which articles downloaded

from relevant abstracts in MEDLINE were listed. Users were requested to contact the library if *CHIZ* was not available at their workplace. *CHIZ* was mailed to users and, to receive it, were simply asked to submit their name, designation and address to the library and they were added to the mailing list. Photocopies of the abstracted articles were made available on request.

The bulletin was very successful.[2] It enhanced the recognition of the Medical Library's services in the eyes of the Ministry of Health, the government of Zimbabwe and the World Health Organization.

Utano

The University of Zimbabwe Medical Library further digitized health information and, in 1993, the first volume of *Utano,* a bibliography of local unpublished health literature, was produced, covering the period 1985–1992. It was initially sponsored by the IDRC. The University of Zimbabwe Medical Library placed a lot of emphasis on promoting local and African literature.[3] The library contributed the Zimbabwe entries in the *Utano* bibliography (also a database) to the *African Index Medicus*.

Digital Health Information Document Delivery

Digital document delivery has been used as an effective method of disseminating digital health information at CHSL. In 2002 the Multilateral Initiative on Malaria (MIM) document-delivery project was started between the National Library of Medicine (NLM), the MIMcom (Communications Working Group of MIM) and CHSL to provide information on malaria. Nine countries – Cameroon, Ghana, Kenya, Malawi, Nigeria, Tanzania, Uganda, Zambia and Zimbabwe – were involved in the project.

NLM heads up MIMcom for the United States, and the NLM works with other partners who helped fund the telecommunications set-up (the satellite and other forms of telecommunication) at malaria research sites in Africa.[4] This enables the research sites to have e-mail and Internet access. One of the main requests from the research centres was that they have access to journal articles. NLM then set up a pilot project to provide document delivery on malaria-related research to these research centres. CHSL was chosen to become a DOCLINE library providing document delivery to the MIM research sites.[5] The main reason that Zimbabwe was chosen was because at that time CHSL had current subscriptions to over 200 journal titles and long runs from previous years.

[2] Ibid.

[3] Ibid.

[4] See <http://www.nlm.nih.gov/mimcom/mimcomhome.html>.

[5] DOCLINE is the National Library of Medicine's automated interlibrary loan request routing and referral system. See <http://www.nlm.nih.gov/docline>.

Requests were made through the MIMcom site and these were then e-mailed to CHSL, which filled the requests of other MIM libraries from its own collection first and sent orders to NLM only for those items that were not available in the library's collections.

Current Digital Health Information

HealthNet

In Zimbabwe different forms of ICTs have been used to disseminate digital health information related to a variety of health issues. HealthNet was introduced in the Medical Library in 1992.[6] In Zimbabwe, SatelLife's HealthNet network had a significant impact on institutional and national development in the health sector. The HealthNet node in Harare provides low cost e-mail and health information services to the health community. Raw data is sent electronically from the districts to the provincial centres for analysis and compilation into summaries and charts, forwarded to the Health Ministry, and then resent to the districts via HealthNet.

Ministry of Health officials use HealthNet to collect and disseminate weekly surveillance reports on epidemiology and disease control to health centres around the country. Ministry personnel also use HealthNet for many other professional purposes, including ordering drugs from central stores and distributing assignments to students on field attachments. In addition, other health professionals – including users in all major city health departments, blood transfusion services and several laboratories – use HealthNet on a regular basis. Several of these work in the rural areas, and, for them, HealthNet is their only viable e-mail connection.

CHSL uses HealthNet e-mail to disseminate digital health information on various health issues to provincial hospitals. In turn, health personnel in provincial hospitals also send their information requests to the outreach librarian. Responses to those requests are also sent through the HealthNet e-mail. The library also uses the Healthnet e-mail in a discussion group on malaria. To enhance access to malaria updates, these are posted for the benefit of medical students and staff on the notice board.

PERI

University libraries in developing countries are also benefiting from PERI, a programme of INASP, which provides information delivery over the Internet.[7]

[6] See <http://www.healthnet.org>.

[7] See <http://www.inasp.info/peri>.

Through PERI, donors have paid subscriptions on behalf of libraries in Africa to access Web-based journals.[8] PERI was introduced at CHSL in 2002. Through PERI's collection of health journals, CHSL is able to access a vast quantity of information on almost all health issues, including HIV/AIDS. This information is made available to researchers, students, staff and health practitioners in different parts of the country and can also be repackaged to benefit rural folk. There is also a facility for document delivery, and users have access to full-text journal articles.

As already stated, CHSL has been training library users in accessing digital health information through the information literacy skills training programme, so that searching for information on the Internet is well within their capabilities.

HINARI

In 2000, the Health InterNetwork for the Availability of Research Initiative (HINARI), a project of the World Health Organization (WHO), was launched by the Secretary-General of the United Nations. It is supported by major publishers of health literature. HINARI was created to bridge the digital divide in health, ensuring that the relevant technologies to deliver it are widely available and effectively used by health personnel, which includes professionals, researchers, scientists and policy-makers. HINARI has brought together public and private partners under the principle of ensuring equitable access to health information. The core elements of the project are content, Internet connectivity and capacity-building.

HINARI enables developing countries to gain access to one of the largest collections of biomedical and health literature. Over 3,280 journal titles are now available to health institutions in 113 developing countries, benefiting many thousands of health workers and researchers, and, in turn, contributing to improved world health.

When HINARI was introduced, CHSL welcomed this move and immediately registered for the service. It is able to access the HINARI database and make available information that was not previously available to its library users, including those in provincial hospitals throughout Zimbabwe. The interlibrary-loans librarian checks whether articles requested by library users are available on HINARI, and, if so, advises the requester, provided that the requester has access to HINARI. If not, the outreach librarian accesses the article and sends it through electronic mail to the user or the relevant library.

[8] S. Mutula, 'IT diffusion in sub-Saharan Africa: Implications for developing and managing digital libraries', *New Library World* (2004), 105(7/8): 281–9.

PubMed

PubMed is the Internet version of MEDLINE. PubMed is a service of the US National Library of Medicine that includes over 16 million citations, from MEDLINE and other life sciences journals, for biomedical articles dating back to the 1950s. PubMed includes links to full-text articles and other related resources.[9]

Within PubMed, the Loansome document-ordering system allows users to order full-text copies of articles from a medical library (local fees and delivery methods may vary).[10] Users must register to use this service. To order documents using PubMed, users perform a search and select the desired citations. When they have finished marking their selections they can order the articles. The full text of articles from some journals is available via a link to the publisher's Web site, from the PubMed abstract or citation display.

PubMed has proved to be a very useful database for health professionals in Zimbabwe for accessing digital health information.

FreeForAll

In August 2005, FreeForAll document delivery was introduced in developing countries. FreeForAll is an international collaboration of libraries whose mission is to provide underserved nations with health science journal articles for free.[11] CHSL has registered for this service and is able to get online, full-text journal articles not available in the library free of charge.

Lessons Learnt

It is possible to build a digital library on a shoestring budget and the CHSL is a good example. The MEDLINE CD-ROM database and computer equipment was donated by the Carnegie Corporation, with further assistance for three years from the IDRC. The publication of the *CHIZ* bulletin was initially funded by a grant from the J. F. Kapnek Charitable Trust and MEDLINE services were supported by the WHO. The *Utano* database was initially sponsored by the IDRC, which wished to assist in the development of access to locally published literature. CHSL is a typical example of a library that has been able to digitize with no budget and managed to provide excellent services to staff, students and health professionals in Zimbabwe by establishing partnerships with organizations willing to support it.

[9] See <http://www.pubmedcentral.nih.gov>.
[10] See <http://www.nlm.nih.gov/loansomedoc/loansome_home.html>.
[11] See <http://www.geocities.com/wfb_2/freeforall.html>.

Challenges

CHSL has met with challenges in the provision of digital health information, which include the following:

- Limited computer equipment to expand access to digital information.
- Limited bandwidth, which results in slow download times.
- Diminishing budgets.

These challenges have, however, not stopped the library from harnessing ICTs in the provision of digital health information. CHSL is making do with what is available at the moment, while finding ways and means of improving the dissemination of digital health information. These efforts may be small but they play a vital role before sufficient resources are in place.

Strategies for Sustainability

CHSL needs to ensure that users continue to have access to digital health information. The following should be addressed:

- Continuation of partner support, especially from organizations such as WHO and Unesco, which are concerned mainly with health issues in developing countries.
- Continuation of membership of the Zimbabwe University Libraries Consortium so that the library is able to negotiate for electronic resources through the group and get value for money.
- Building projects into the long-term budget.

The Way Forward

Below are some recommendations for CHSL on how some of these challenges can be met:

- Develop a well-planned approach to digital library issues to capture funding from either internal or external sources.
- Ensure that trained staff are available to maintain the network if the connections go down, as this is critical in the adoption of a digital library.
- Develop good strategies for advancing digital libraries and ensure that politicians and funders fully share these strategies.
- Establish co-operation and links with external partners and international organizations interested in funding digital libraries.
- Seek to establish links with other medical universities outside Zimbabwe and share resources.

Conclusion

Access to digital health information has enabled the CHSL to fulfil its mission. Library users have access to vast collections of online health information, and this benefits not only the library users but also the whole of Zimbabwe. It is therefore important that everything is done that can be done to continue to provide access to digital health information.

Chapter 7

Computer-Assisted Legal Information Instruction

Mondli Sibanda

The University of Zimbabwe (UZ) Law Library, established in 1964 as a collection of the Main Library, is now a branch of the university library. The Law Library has three floors, on which primary, secondary, periodical and extra-legal resources, totalling an estimated 70,000 volumes, are accommodated. It has its own branch, the Women's Law Information Centre Library, in a major teaching institute, the Southern African and Eastern Women's Law Centre.

Many legal workers, individual consumers, students, faculty staff and corporate bodies, make significant use of legal information. The library has been able to service most of the needs of these users. In addition to this nation-wide responsibility, the library serves six departments of the Faculty of Law: Commercial Law, Public Law, Procedural Law, Private Law, Women's Law, and Human Rights. Most departments offer mainly undergraduate courses.

The focus of this chapter is the introduction of the computer-assisted legal instruction course (CALII), and the experience of the library in teaching legal-information skills to the undergraduate student.

ICT Experiences

In the past, computer training in the Law Library was haphazard, uncoordinated, and often meant off-site training in online database use. More recently, the Law Library has found itself in charge of computer laboratories, where online searching is taught along with the use of applications such as database-management systems, spreadsheets and word-processing, all under the Introduction to Computers module taught to law students.

Initially, Introduction to Computers at the law school was resisted both by students and by faculty staff members. The library staff worked tirelessly to convince faculty to appreciate changing times. Senior members of the faculty argued about the role of the secretaries, saying, 'Aren't they paid to type?' They perceived the use of computers as merely for word-processing.

Aware that information in electronic form was becoming more common in the legal environment, the law librarians quickly realized that they had an

important role in overseeing the integration of these technologies. They held talks and seminars with faculty stakeholders. The key message in our vigorous campaign to get information literacy skills (ILS) introduced alongside the teaching of law subjects was guided by the basic fact that the future is not about knowing things, because computers can and will store information for us. Therefore all that students needed to have and know were the skills to retrieve and handle information. We emphasized that this was the new way of handling information and knowledge in legal, as well as in all other, disciplines.

When we thought we had convinced ourselves that we had found a way of achieving the objective of introducing information literacy skills, there was the related problem of teaching students the actual course. Most students knew little about computers. Some of them felt threatened by them and did not like them, and were therefore resentful about having to do the course. This indeed posed a challenge for the law librarians as we thought we had jumped over all the hurdles of introducing this subject in the Faculty of Law. Yet throughout their lives, these students, whatever career they might take up from time to time, would have to live with and use computers. It was essential that law courses should have at least some kind of course in computer awareness, which would include a simple technical introduction, some hands-on experience, some knowledge of what computers can and cannot do, an introduction to information systems, the social, economic and political features of the telematics revolution. Vigorous promotion of the ILS training course as a viable product then ensued.

Part of the impetus for computerization came from the availability online of Butterworths, Jutastat and the *South African Law Reports*, and the knowledge of other online legal database services such as Lexis and West Law.[1] In our approach, we emphasized that the use of computer services differs from the use of traditional law libraries in that it does not depend directly on the knowledge of either the physical arrangement or the conceptual organization of the legal material contained in the database. Thus, users of legal database services would be able to pursue creative research strategies, free from the constraints imposed by conventional methods of physically finding printed legal materials. The students were told that the value of a database service was profound, as it combined contents and search capabilities, which together determine the scope for retrieving usable information.

Added to this were our findings from Harare law firms, who were competing for computer-literate law graduates in order to rationalize their operations in an

[1] Butterworths and LexisNexis are accessible from <http://www.butterworths.com>, Jutastat and the *South African Law Reprts* from <http://www.jutastat.com>, and West Law is at <http://www.westlaw.com>.

effort to maintain or extend their market. It was therefore imperative that UZ law students were information literate.

ILS Training Course Experiences and the Introduction of CALII

In 1999 a library instruction course in the use of e-resources began at the Law Library after the generous donation of five computers by the British Council office in Zimbabwe. The course started with the introduction of Butterworths products. The initial stages of the instructional programme began with the development of a brief instructional brochure and the requirement that all first-time users needed to read it before being allowed access to use computers online. The brochure covered basics such as what an online database included, how to formulate searches, and the use of Boolean operators. Examples given in the brochure were clear, and users were urged to develop keywords and a simplified strategy before reporting to the training area for their search. This was the task of the librarian on duty at reference.

The other librarian, who worked in the computer area, monitored the searches, logging on and off the system, keeping records and advising patrons on searches. It quickly became apparent that patrons were not using the technology to their best advantage. While the systems were billed as user-friendly, many patrons did not understand the strategies of searching, including the use of the Boolean operators and appropriate keywords. While they did achieve a large number of hits, and were impressed by this large number, they failed to realize that the incidence of such high numbers meant that they had not qualified their search structures to retrieve truly pertinent citations. The librarian found that patrons were impressed by the technology itself and the speed of retrieval but failed to realize that the true value of the system went beyond speed. The patrons were unaware that it allowed them to refine their searches far better than they could in a paper search.

The library progressed to providing information from the Internet, through a mediated search. The librarian, as a trained search analyst, conducted the search and provided patrons with a bibliography of citations on their subject. Such database searches did not even require the library user to be present, but we preferred the user to be there while the search was conducted and to peruse the results online. At this stage we did not teach the patrons much, if anything at all, although we went through fairly lengthy explanations as to what a database was, searching fundamentals on the Net, what one could and could not do in a given search, giving a factual description of what we were doing in accessing this type of information.

As the number of available databases and terminals increased, it became apparent that whoever was monitoring the search area simply could not train each

individual. Time alone was an inhibiting factor, and the constraints of staffing did not allow placing additional individuals in the searching area.

With the increasing use of this programme, and the subsequent increase of the available number of personal computers with different products to search on and different search strategies to use, it became apparent that we could not produce a single brochure that would cover all necessities for online legal research. We had to devise a mechanism for coping with the increasing demand. We assigned ourselves areas of expertise and taught those areas in which we each were strong. However, it became evident that this unstructured, individual student approach was not going to be an effective mechanism for reaching most students.

On a related note, the popularity of this service grew among students and faculty. It became apparent that there was a need to have additional means of teaching end-users how to retrieve information from the World Wide Web. It was becoming unrealistic for brochures to be developed. The sheer numbers prohibited many users from using a brochure prior to their searches and lessons. The law librarians, in collaboration with other subject librarians, therefore explored alternative instructional methods. This led to the computer-assisted legal instruction course.

The Computer-Assisted Legal Instruction Course

Known as ILS in the rest of the university library, at the Law Library it is referred to as CALII. It promotes 'the ability of learners to access, use and evaluate information in order to enhance their learning, solve problems and generate new knowledge'.[2] Thus computer-assisted legal information literacy really just means information literacy using computers in the legal field.

According to Laverty, the information literate is the person who not only possesses the skills of locating information but also understands how information is organized, therefore being able to make use of the different formats in which information comes.[3] This individual is versatile in the use of the information and hence relies on various methods to access the information. These methods and tools also bring out the best results if appropriately used. In other words, the search strategy must be well formulated for the best results. In summary,

[2] Amanda Barratt, 'Legal Information Literacy Training: New Challenges for Law Librarians'. Paper presented at the Congress of the Society of Law Teachers of Southern Africa, Rhodes University, Grahamstown, 21–24 January 2002.

[3] C. Laverty, 'Information Literacy', 1997. Retrieved 2 December 2003, from <http://stauffer.queensu.ca/inforef/tutorials/rbl/infolit/htm>.

Laverty asserts that information literacy is aimed at equipping students with the skills to

- recognize an information need;
- design a research strategy that identifies the steps necessary to secure needed information;
- evaluate information and determine its relevance in relation to a given information need;
- use computerized information tools to locate information;
- summarize and analyse essential information from pertinent resources.

UZ has identified the computer-assisted legal information instruction programme as a key outcome of its strategic plan; this includes law degrees. Thus the law faculty and library are obliged to ensure that law students are information literate for independent study in their field and acquire the appropriate skills.

The main aim of CALII is to make students aware of the wide availability of information related to their academic work. The law librarians therefore equip students with skills in how to access, search, browse and use information effectively in their work. These imparted skills, if mastered, can also be successfully used in the work environment.

Models of Teaching Information Skills

As Barratt argues, the 'imbricated model' is the most sophisticated of the models of teaching information skills.[4] The idea is not to have an elaborate, independent course in library research tools, but rather to piggyback on real, substantive law courses and weave in the research skills. This is an artificial exercise sometimes. For example, first-years could be set a family law assignment which is set up in such a way that it will not be possible to complete it without using library tools such as law reports, indexes, Jutastat, etc. – i.e. the essay is designed in such a way that it is impossible to pass by using only prescribed cases and textbooks.

Barratt also observes that there is need to consider which library resources one wants to introduce the students to at various stages of the LLB curriculum and then invent projects so that students need to master these tools to complete their essay for contract law, company law, etc. Over the years, artificially manufactured situations are created that require students to use the full range of library resources. At the Law Library, however, the focus was on teaching essential information skills to first-years.

Appendix 1 outlines the CALII course as it was introduced at the Faculty of Law in 2000. The model adopted is one that teaches a semi-independent course

[4] Barratt, 'Legal Information Literacy Training'.

that introduces students to a set of skills. For us at UZ, a key outcome of a legal education should be that law graduates leave university and go out into the legal workforce with the research skills required for legal practice. Furthermore, Harare law firms were of the feeling that law graduates do not have sufficient computer research skills, and they thus requested that the Communication Skills course, a non-core subject taught to law students, be replaced by CALII.[5]

When CALII eventually took off in 2002, a combination of factors contributed to its success. The 2002 first-year law student intake increased owing to relocations from the Great Zimbabwe University. From the usual intake of 100 students per annum, there was an additional 350, to make a total of 450 students. Government support for the increased student intake meant that the library could be further resourced. The computer laboratory got an additional twenty computers to make a total of thirty. This development made it easier for students to conduct computer hands-on CALII lessons.

Students were divided into groups of twenty-five (the holding capacity of the computer training laboratory) and were taught at the two computer laboratories: the Women's Law and the Law Library labs. This meant that fifty students were being taught for one hour per day over nine sessions in the first year. Though this proved a cumbersome experience, the course was held according to schedule within a period of eight weeks. There was enthusiasm among students, an increase in the number of students taking the course, and little absenteeism was witnessed. Since then, CALII has constantly been growing, improving and refining from year to year.

The first-year groups that receive CALII courses in the first semester are fresh intakes from high school and a repeat group. Because of these varying groups of students, the syllabus and the teaching approach have to be tailor-made for each defined group. More recently the emergence of postgraduate labour law students has meant that a skills-assessment questionnaire is necessary to determine the level of computing skills. At one stage this questionnaire revealed that 60 per cent of the senior students had never used a computer before. The challenge in this case was that topics such as electronic resources and databases had to be rescheduled for a later period.

CALII lessons are spread over six weeks of teaching, a week for test and revision, and a final week reserved for the examination. A variety of teaching approaches are adopted depending on the topic. As can be seen from Appendix 1, the first module apprises students of the various legal materials available and

[5] R. Matsikidze, 'Current Labour Law Developments in Zimbabwe: The Essence of ICT for Labour Lawyers in the Wake of the Globalization of Labour Law'. Paper presented at the Kempton Makamure Labour Law Lecture Series, 24 January 2003, University of Zimbabwe, Harare.

the citations used to locate these materials. As the modules progress, the shift is from print to electronic resources. However, due emphasis is placed on the former and their relation to the latter. Law librarians have to wheel print materials (both primary and secondary) into the training room and review them while each student is being given the opportunity to touch, have a closer look and appreciate them. An explanation of each print resource is made. This lesson culminates in the class being divided into two groups, one that searches for the class number in the card or online catalogue, the other being tasked to locate and retrieve the actual materials from the library shelves outside the training room. This works well as an effective method for making the students appreciate the various tools and strategies for locating materials.

As can be seen from the syllabus in Appendix 1, all the other modules that follow are Web-based tutorials, starting from Searching OPAC and Electronic Resources right up to Evaluating Websites and Citation Styles.

Challenges

Conditions dictated by the present economic climate, on the one hand, and the speed of technological change as well as changing patron expectations, on the other, are challenges that demand a new approach to strategies and tactics to information technology service provision. With limited monetary and human resources, the University of Zimbabwe Law Library has managed to continue providing the services and materials offered in the past as well as new services, albeit with difficulty. Below is a list of challenges experienced during the implementation of CALII.

Finance

- Economic sustainability is crucial in acquiring, managing and monitoring information technology, as consistent financial resources are required. A number of computers and ICT resources initially planned for in relation to the law student population have not been purchased because budgets have been inadequate.
- Maintaining collections of such resources as databases requires not only a sustained but also an increasing financial commitment. Promoting and sustaining available facilities to ensure optimal use also requires constant funding.
- The decline in funding has resulted in the Law Library not being appropriately stocked with the necessary cutting-edge IT equipment that makes co-ordination of CALII manageable.

Increased Student Population

- For some time now the University of Zimbabwe has been faced with perennial increases in student enrolment. The result is a direct increase in the demand for services, which have not grown simultaneously.

Shortage of Hardware

- Problematic also is the shortage of hardware and software. Furthermore, connectivity problems arising from very low bandwidth make accessing the Internet sometimes very painfully slow. A related problem is that the server will not connect, or is down now and again, affecting the students' use of electronic resources.

All these are interdependent because the lack of financial resources affects the ability to purchase or upgrade hardware, and staff shortages reduce the time the librarians have to learn how to use technologies and teach it well.

Lessons Learnt and the Way Forward

The advent of new technologies has changed the traditional role of librarians as the purveyors of access to information at the Law Library. It is vital that we, as law librarians, develop the means to train our patrons to make full use of these new services. Since we took up the challenge of teaching we have realized that:

- We must be adaptable to the situation and be aware that we are, still, guiding our users to their information needs. Training for us has become more important than ever.
- Training end-users requires flexibility. No one training plan appears to be the final answer. If you rely upon a one-to-one situation based upon your workstation area you will soon realize that there is simply not enough time to teach refinements of database searching.
- Group sessions allow more time, enable an instructor to reach a larger audience, and permit some hands-on practice prior to a patron actually performing a search.
- With the provision of adequate computers for classes, one does not require special projection equipment and a compatible, portable computer in order to be effective. Instead, you must have clear, concise written notes to support whatever oral presentation/teaching method you are using.

The increased use of these services has meant that the library staff need to develop a variety of teaching methods to train end-users for online searching. The components of poor searches that were noted with the introduction of end-user searching on our online systems are still around. They have been multiplied as access to this type of service has increased.

With the arrival of CALII, the attainment of long-awaited equipment in the form of personal computers for teaching, a heavy-duty printer, and other information technologies is slowly becoming a reality. With these, the law librarians are able to go into the classroom and teach information skills. The librarians have learnt how to teach and how to fit teaching methods to the needs of the audience.

Infiltration of technology into the lives of most individual patrons has also resulted in change in their expectations. The availability of information in electronic form has increased the pressure on our service points to provide support and training for these electronic products. Equally the IT departments of the university libraries are constantly pressured to upgrade hardware and software to stay abreast of what users expect to satisfy the technological demands of electronic products. Patrons now expect more CALII lessons to be taught in order to equip them with new ways of finding online information.

Conclusion

Over the few years since CALII was introduced, the development of this course continues to have a big impact in the faculty. As new information technologies evolve and changes take place in the Internet and the World Wide Web, librarians are required to take the lead in teaching what the Internet and Web are useful for and what they are not. The demise of card catalogues, the introduction of online catalogues, the existence of electronic versions of reference sources that used to exist only in paper continue to necessitate alterations in information-seeking behaviour. Advocating proper citation and discouraging plagiarism also mean that instructional librarians are, in fact, functioning as tools of the faculty lecturing staff.

More importantly the attitude of law students and lecturing staff towards the course continues to improve. The law librarians are ready to take the challenges brought about by information changes for the better execution of CALII. The current Law Library thinking is set for a purely virtual instruction with Claroline powered by TSIME (Toward Student–Centered Interactive Multimedia Education).[6] This would enhance the professionalism of the law librarian at the Law Library and make him or her more effective in organizing and conducting classroom instruction.

[6] See <http://elearning.uz.ac.zw>.

Appendix 1: Syllabus of CALII

Preamble

The motivation for information literacy skills is based on the realization that academic libraries are central and critical to the instructional and scholarly life of the universities they serve. These are integral parts of teaching, learning and research. The University of Zimbabwe is accepting the challenge of graduating students with information and communication technology competencies. It has therefore designed instructional modules to be taught to students during their academic career. It recognizes that all learners need training in information and communication technology in order to fully utilize available information resources.

Information Communication Technologies have changed the way in which we communicate. Whilst books and journals remain important, CD-ROM, e-mail and the Internet are supplementing and even replacing some forms of print material.[1] Due to these developments the following questions arise. What new skills and techniques are needed to search, find and navigate this information? How can these electronic resources be evaluated? What kind of training is needed?

Aims

The main aim of the information literacy program carried out in the form of library tutorials at University of Zimbabwe Law Library is to make students aware of the wide availability of information related to their academic work.

Objectives

By the end of the course students will be able to:

- Understand how information is organized in the Law Library.
- Understand the Law Library System, its purpose and philosophy.
- Recognize when they need information.
- Find the correct information.
- Evaluate the information found.
- Understand the legal implications when using information.
- Communicate the information effectively.[2]

[1] INASP, [Handout]. Workshop on Electronic Journals and Electronic Resources Management, University of Zimbabwe Library, 9–13 September 2002.

[2] J. Lockhart, and A. Coetzee 'What will you learn?', 2001. <http://lib.uct.ac.za/infolit/pre1.html>. [Accessed 6 March 2006]

Introduction

The Law library tutorials will be given in one semester of the academic year. Two (or more) librarians will each take one group of students in given days and time slots for a tutorial to ensure that all students learn the same materials. While information in the law library is in various formats, information literacy skills program endeavors to expose students to all forms of information resources available regardless of format. As enunciated in the preamble the course is heavily weighted on Computer Assisted Learning approach.[3]

Module 1: Introduction and Print Resources (summarized)

- Searching the Card Catalogue
- Locating Books through Call numbers
- Arrangement of Printed Materials in the Law Library

1. *Primary Materials*
   - Law Reports
   - Statute Law
   - Subsidiary Legislation
2. *Secondary materials*
   - Textbooks
   - Reference Materials
   - Journals
   - In house Materials
   - Dissertations and theses

Module 2: Searching OPAC and Electronic Resources (summarized)

- Searching Library Catalogue Online
- Electronic Resources
- Butterworths Law Database

Module 3: Advanced Concepts of the Internet

- Introduction

Review of Internet basics

- Aspects of the Internet
  WWW
- Anatomy of a URL
  FTP
- E-mail

[3] All accompanying materials can be found on e-learning platform <http://elearning.uz.ac.zw/ILSLLB101>.

- Student web based email
- Composing mail
- Managing Folders

- Browsers & The Web – Toolbar
- Internet Jargon and other concepts
  Browser, bookmark, bandwidth, download, directories, gateway, gopher, homepage, hypertext, login, navigating, network, Search engines, service providers, bounce, surf, Webmaster/Webmistress, Website CD-Rom, CPU crash, e-book, e-commerce, hacker Home page, etc…
- Legal applications of the Internet. (Making Law available online)
  - Making law available online. Law reports and statutes online

  For example,
  - Constitutional Court of South Africa Decisions
    <http://www.concourt.gov.za>
    <http://www.wordlii.org/za/cases/ZACC>
  - Zimbabwe
    <http://www.zim.gov.zw> (very few acts though)
  - Constitutions online
  - Constitutions Finder <http://confinder.richmond.edu>
  - International and regional courts, commissions and Tribunals.
    <http://www.worldcourts.com>

Module 4. Advanced Information Retrieval

Search Engines

- Various Search Engines
- Legal search Engines (definition of terms, Law Search Engines)
- Meta search Engines

Search Strategy and Boolean Logic

- Search Tips & Techniques
- Planning a search Strategy
- Logical Operators – Boolean algebra/Boolean logic
  AND, OR and NOT
- Common Search Errors
- Saving searches – Bookmarking, sending by E-mail, Printing and Saving concepts (HTML Files, Plain Text ASCII Files and Cut-and-paste)

Information Gateways

- Definition of terms, Law Related Information gateways)
- Subject Information Gateways

Module 5. Evaluating Websites and Citation Styles

Evaluating Websites

- When to use the Internet/When not to use the Internet
- Questioning the quality of Internet Information
- Evaluating Information Sources
- Evaluation of Electronic sources, authority, design, etc

Citation Styles

Revision and exercises

Reading list

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