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INFORMATION TECHNOLOGY : BLESSING OR CURSE?

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1. INTRODUCTION

In this presentation a brief discussion of the automation process of the library system at the University of Stellenbosch will be given, thus hopefully making a contribution to this conference's theme of: Technological University libraries in the '90's.

Stellenbosch, the oldest town in South Africa, was established in 1679 and is situated in the southern part of the country in a very scenic and beautiful environment. It is also the headquarters of the wine industry.

The University of Stellenbosch was established in 1866, first as a college, and became a university in 1918. There are 12 faculties, ranging from arts to engineering and including the only faculties of Forestry and Military Science in the country.

In 1992, 10 342 undergraduate students, and 3 997 graduate students were registered. Faculty members numbered 861 and there were 482 administrative staff members as well as 1 062 other staff on the university's payroll.

The library service is almost 100 years old and consists of a decentralized system with a

- central library
- 5 branch libraries
- 2 satellite libraries, and
- a number (\pm 8) of departmental collections.

The staff component

Total FTE staff

JS Gericke	91,875	
Music	6,25	
Theology	5,625	
Engineering	3	
Medicine	11,625	
Extra mural	0,625	
Business Graduate School	1	
Forestry	<u>1</u>	
	<u>121</u>	
Professional staff	46,375)	
Semi-professional	22,75)	69,125
Part-time staff	40	

The library collection consists of:

Books	562,348
Bound periodicals	270,244
Current periodicals	6,786
Micromedia and other types of material	30,996

The total budget for 1992 amounts to DM 6,5m (including staff expenditure).

The greatest problem is in maintaining the periodical subscriptions; price increases, inflation and the buying power of the local currency are the more important factors influencing the periodicals budget.

An interesting feature of the central library is that the complete building of $\pm 18\ 000\ m^2$ is underground! When a new building had to be built in 1981 it was decided to utilize the space underneath the university square because no other suitable building sites were available. The unsuitability of the Carnegie library building and

some other irreconcilable factors led to the postponement of the automation process until the new JS Gericke library building was completed in 1983.

The new building was planned with a view towards the implementation of information technology, eg.

- services from the ceiling, eg. electric cabling, data connections, telephone lines, etc.
- maximum utilization of space and incorporation of the information technology
- user friendly atmosphere and availability of equipment such as OPAC terminals, CD-ROM stations, etc.

2. SYSTEMS ANALYSIS, RFP AND EVALUATION

At the end of 1984 it was decided to start a full-scale investigation into the possibility of computerizing the Library's functions. A member of staff from the Administrative computing staff was seconded to the Library to lead the investigation.

1985 saw the start to a system's analysis covering all the functions of the Library Services. Each function, sub function and task was analyzed and documented and personnel from all the different departments were involved. This information served as a base for the Request for Proposal (RFP) as far as the functional specifications were concerned.

After the systems analysis was completed a set of specifications was drawn up. The library staff was responsible for the functional specifications and was assisted by staff from the Division of Information Technology as far as the technical specifications were concerned.

The RFP document covered generalities such as acceptance of tenders, incomplete tenders and format of tender. In a section on company and product profile, information was requested from the tenderer. The rest of the document covered hardware and software specifications. This document was completed in great detail and was of great help in the final evaluation.

An advertisement was placed in the media to inform vendors of the University's intention to computerize the library system. The response was so overwhelming that it was decided to send each vendor a questionnaire with a couple of key questions, eg. whether the system was SAMARC-based. Only those with a positive response were asked to tender.

The next step in the decision-making process was a paper evaluation of certain key areas whereby certain vendors were eliminated. Aspects that were evaluated at this point included the degree of integration of the package, whether all the modules were included and fully developed.

In the end two tenders remained and a thorough paper evaluation took place with the help of the library staff. The functional specifications were used to evaluate the two systems. Each specification was weighted and scored on a scale of 0 - 9. The next step was to calculate the final scores.

The two vendors were asked to demonstrate their systems on site for the final evaluation. Again the library staff was involved as well as staff from the Division of Information Technology. The same system of scoring was applied as with the paper evaluation and the two sets of results were compared.

After a final decision was taken it was time to draw up contracts to which both parties would agree. The University signed for a PRIME 450-II computer and the LIS (Library Information System) package. By June 1986 the cataloguing module was in operation and the card catalogue was closed down. The decision was taken to do a retrospective conversion of the card catalogue before implementing the circulation module.

The next modules to be implemented were acquisitions and serials in June 1987 and accounting in April 1988. The circulation module, including short loans, followed at the end of 1992.

All applicable modules were implemented at the branch libraries some time after implementation at the main library.

3. APPLICATION SOFTWARE

3.1 Introduction

The Library and Information System (LIS) package chosen was a local development based on an American package. It offered all the required functions and the profile of the supplier was also acceptable.

Since 1986 there were changes in the companies that acted as suppliers of the application software but in the three instances when changes did take place, it was to the advantage of the Library. Functional enhancements to the package are constantly taking place and the name has been changed to the Erudite system.

3.2 ERUDITE application software

The ERUDITE library application software consists basically of seven modules, namely Cataloguing, Acquisitions, Accounting, Serials administration, Circulation, OPAC (On-line Public Access) and Correspondence modules. ERUDITE supports a fully integrated on-line database, and can even support multiple databases for different applications. Although ERUDITE was developed in INFORMATION under the PICK operating system, it also runs on various UNIX-computers. INFORMATION, or the UNIX equivalent, PI-OPEN is a fourth generation database environment.

No information or effort is duplicated and information about any item is available to the library personnel and users from the time that an order is placed right through to the stage when the item is issued to a user. ERUDITE can operate in a multiple branch environment and all the bibliographic and holdings information of the various branches are contained in one database accessible to all branches.

ERUDITE is a menu-driven and highly parameterised system to cater for institution-specific needs.

Following is a brief description of the functionalities of the various modules.

3.2.1 Acquisitions

When a request to purchase a book is received, holdings for all branches can be checked by making use of the same software as OPAC, but immediately from the acquisitions menu. In placing the order all vendor related information as well as departmental budgets and current rate of exchange are automatically retrieved from the accounting module when typing the required codes. Multiple copies, as well as sets can be ordered on one order and costs can even be shared between different departmental budgets. Receiving and payment of partial orders are also handled successfully. On receiving an item on order, the book or other material is issued with a barcode.

3.2.2 Accounting

The Accounting module consists of a full debtors, creditors and general ledger system linking tightly with the acquisition and serials modules. It handles departmental budgets for books, serials and continuations, provides for allocation of overhead costs, such as VAT, importation and handling costs with effect to both the departmental budgets as well as the individual price of each item. Apart from address and other relevant information, the default foreign currency is also stored on each vendor's record. The effect of the fluctuation in the rate of exchange for foreign currencies is also catered for, from ordering to actual payment stage. It also supports deposit accounts and bulk prepayments of serials.

3.2.3 Cataloguing

The same preliminary catalogued record created by the acquisitions department is upgraded and/or updated when the item is fully catalogued and classified in this module. Authority files exist for authors, series, subjects and publishers, and therefore there are no duplicate entries of these when cataloguing. Facilities for authority control are vital to the success of this module. The preliminary item record created by the acquisitions department is also upgraded to contain all relevant holding information. SAMARC is supported, AMARC format close to UNIMARC.

3.2.4 Serials Administration

Apart from ordering and cataloguing the serial, all other serial administration is catered for in this module pertaining to the various issues, such as predicting dates of receipt, receiving, routing, binding, claiming, as well as flagging it as e.g. missing. Information on the status of any issue of a serial is also directly available to the user via OPAC. Information on payments made, in the accounting module, is available directly from the serials module including date of payment, cheque or draft number, and vendor information. Subscriptions to titles, package-plans as well as memberships are catered for and links are built from package-plans to the individual titles. Merging, splitting and changing of titles are provided for.

3.2.5 Circulation

This module caters for the registration of patrons, issuing, returning and placing of holds on books. Information on the patron's current and past record is available to library personnel. Reminders for late books or recalls of books on hold for other patrons, are done automatically. Administrative blocks (message on books placed on hold for a patron, lost property, etc.) as well as financial blocks (fines, lost books, etc.) can be placed on a patron's records.

A complete submodule exists for the handling of a reserved collection of short loans. Books may be issued or booked on an hourly or daily base.

For issuing, the books are identified by the barcode inside the book, whereas patrons are identified by the magnetic strip on their student or personnel cards. Access to patrons' records can also be obtained via their names.

3.2.6 OPAC

Access can be obtained by any user or library staff member using any of the following access points: author, title, subject, series, publisher, classification number, international standard booknumber as well as any keyword built from the above access points or a combination thereof. Searches range from those that can be conducted in a very simple manner to advanced boolean logic searches. Search strategies can also be stored and re-executed at a later stage to see what new material is available. Browsing through the authority files and redirection of searches because of information in authority files are also supported.

Information about any material in any of the branches can be obtained from ordering to circulation stage. A user can also search on his/her own patron number to see the list of items out as well as due date for items issued to him/her.

3.2.7 Correspondence

Apart from various reports, statistics, and management information supplied within each module, a general correspondence module exists whereby you can extract a collection of vendors or patrons that you would like to send a letter to. The body of the letter can be set up by the library personnel and bibliographic information relevant to the letter can also be extracted.

Local development such as reports or other subsystems, like a personnel system, can be done very easily by using the INFORM/PERFORM facility of INFORMATION and can be included as a submenu on each module without the user noticing it to be separate from ERUDITE.

4. **HARDWARE**

The hardware growth path started with a PRIME 450-II running under a proprietary operating system called PRIMOS. This system had 4 megabytes of system memory, 2 x 315 MB internal disks and could support 64 users.

The next hardware platform was a PRIME 6350. Again it ran under the proprietary operating system, PRIMOS. This system had 32 MB of internal memory and had 3 x 773 MB internal disks and could support 128 users.

The 6350 was followed up with an open systems platform from the same company. The system was a PRIME EXL 7360 running UNIX. It had 64 MB internal memory and 2 x 1 Mega Byte disks and was supposed to support 128 concurrent users. (Could not go beyond 95 users.)

Shortly afterwards the 7360 was replaced by a HP 9000/8675 running HP-UNIX. This system had 196 MB of internal memory and 2 x 1,3 GB internal disks and was also supposed to support 128 concurrent users. (Cannot go beyond 118 users with current configuration).

5. **CAMPUS NETWORK (SUNET)**

Sunet - Stellenbosch University Network

The campus network consists of clusters of local area networks linked to an ethernet backbone allowing access to various central computer facilities. Sunet also facilitates the direct communication between users of the campus network and gives the user community access to various national and international networks.

The campus can be seen as a central campus situated in a close geographical area in Stellenbosch as well as satellite campuses distributed over a wider geographical area of roughly 50 kms. The Medical School at Tygerberg, the Business Graduate School in Bellville and the Extra-mural campus are roughly 50 kilometers away from Stellenbosch but are relatively close to each other.

The campus network consists of various segments that cater for specific needs.

- Administration segment - Admin
- DEC VAX VMS segment - Academic
- HP UNIX LIBRARY segment - Academic
- DG AVIION UNIX segment - Academic
- Engineering segment - Academic
- Debit card and access segment
- Novell server segment
- Tygerberg segment
- Business Graduate School segment

The computer systems of the University of Stellenbosch consists of the following:

- Academic computing (VMS)
- Academic computing (UNIX)
- Administrative Information Systems
- MCC Supar (Transputers)
- Faculty user area
- Communication
- Library Information Systems
- Student user areas
- Servers
- Print servers
- PC-Workstations

The systems available on SUNET are the following:

1. Central computer facilities
 - Administrative system
 - Academic VMS applications
 - Library systems

2. Distributed information systems

- Electronic mail
- National and international connections
- Campus information system

3. Student Quota system

- Meals system
- Photostat system
- Cash register system
- Washing machine system
- Tumble Dryers system
- Laser printer quota system
- Access control at student hostels and buildings

The SUNET "window" can be viewed as a standard menu which is available from any networked PC on campus. It gives the user access to any one of the following facilities:

- Word processing programs
- Spreadsheets
- Graphics programs
- Database programs
- Programming languages
- Operating system (DOS/NOVELL)
- Central computers
- File transfer between PC and VAX
- Electronic Mail
- Class roster
- Campus information service

- Library facilities which include
 - + Current Contents
 - + Business Periodicals Index
 - + Eric - Education
 - + JUTASTAT - Court Reports
 - + Index to South African Periodicals

6. OTHER INFORMATION TECHNOLOGY APPLICATIONS

6.1 Introduction

The Gericke library was designed in such a way that information technology could be easily implemented. Since the automation process started in 1986, the planning, development and implementation of other Information technology applications were handled as a parallel process. The library's policy in this regard was to offer the users a sophisticated service through the implementation and availability of information technology, so as to assist them in their learning, teaching and research efforts.

Another significant development that strengthened the library's efforts to implement information technology, was the establishment in 1986 of a Division for Information Technology on campus. There is close cooperation between the Library Services and this Division.

6.2 Access to overseas information suppliers

For many years a service is offered to post graduate students and faculty by giving them access to sources like

- Dialog
- Data Star
- Wilsonline
- CAB, etc.

Access to these services is free and the subject librarians are the contact points for users who want to obtain information through these sources.

6.3 **CD-ROM applications and E-journals**

The number of CD-ROM databases is still growing and certain CD-ROM applications are available through the campus network whilst access to some others is in the library through stand-alone workstations. These facilities are heavily used. The library is at present evaluating some electronic journals but is still at the beginning of this process.

6.4 **E-mail**

A comprehensive e-mail function is available, for campus use as well as for national and international communication. E-mail communication with certain vendors in Europe and the USA is also possible.

6.5 **Access control system**

Every student and staff member has an identification card bearing a magnetic strip as well as the owner's photo. This card is used for various purposes, eg.

- access to the library and other buildings
- making of photocopies
- reserving meals in hostels
- access to designated computer areas for word processing etc
- access to the vehicle fleet of the university
- access to hostels, etc

7. **THE VIRTUAL LIBRARY**

The virtual library; libraries without walls and hours; NREN, electronic journals; Carl's Uncover II; paperless society; human-computer interfaces; OPACS; integrated workstations; electronic highway; Project Gutenberg; CD-ROM; full text databases; information engineer, etc. These are all terms that have become part of

our daily vocabulary. Major changes have taken place in the way that we manage and run our libraries. What caused this? The development and introduction of information technology.

We need the information technology that will enable us to plan and create the library of the future - with the help of information technology we can create a universal window to the extensive array of information available and we can offer this window to the widest possible audience.

Many libraries are experiencing an explosion of new technologies. Information technology with its networks has laid the foundation for a revolution in the control and use of information. As a result of the tremendous growth in the application of technology, the question is no longer whether to embrace technology but rather, which technology is the most appropriate. The new technologies available on the market create an enormous challenge for librarians. In this regard Kelley stated that "libraries must review their policies and mission with the intention of increasing the library's role in using and developing information technology effectively." 1)

The question is whether we will have an active role in an information-based post-industrial society. If we prove to be unable to change, other role players in the information environment will take over our role! This is also emphasized by D. Bishop who says, "In describing the future of university information systems it would be possible to develop a scenario.... without the library serving in a central role but rather being one among numerous providers of information." 2)

Information has become a very important strategic product of modern society. This is clearly illustrated by:

- "Revenues earned by the electronic database industry are already nearly \$11 billion and are expected to grow by 20 percent per year for the next five years, reaching more than \$22 billion by 1995" 3)
- the cooperation between North West and Times Media is going to influence the daily lives of many millions of people and will earn billions by selling information 4)

- "Xerox is testing a system that can produce entire books on demand. It has the ability to create electronic images of documents rapidly, to store and retrieve them and to print high resolution copies of the originals. An entire book can be printed in less than two minutes at a cost of less than \$7 per book"⁵⁾

Are these blessings or a curse?

All technology is not useful or cost effective. However, technology is an integral part of information delivery, and as a consequence, is of great importance to the future of the library profession. W. David Penniman, President of the Council on Library Resources (CLR) describes his vision of the Library of Tomorrow:

"What do I believe the library of tomorrow will look like? Will it be in my briefcase like the Sony Multilingual Data Discman Electronic Book Player TM capable of holding 100,000 pages on a single 3.5" compact disk? This device can provide access to a 500-volume library (plus a full encyclopedia) at a cost of about thirty cents per volume - and it is all keyword searchable.

Or will the library of tomorrow be an extension of this stand-alone device? Will it be the emerging personal digital assistant (pda) under development by several vendors with a telecommunications link and up/downloading capabilities that begin to fulfil the information industry's dream of "information anywhere, anytime"?

Will it be a place - a building (of suitably stunning architecture) where people must go? Or will it be in our homes? Most people have television sets; could this be where people will "go" in the future for their "library" information?

All of these may be descriptions of the library of tomorrow. I prefer, however, to describe the library of tomorrow by describing the users of tomorrow - and I have already done so in discussing the mission of the future library. Our users must become independent problem solvers who know how to use information resources to address the challenges that face them (which include the challenge of educating and entertaining themselves), and that mission will shape the library of the future in ways we may not even be able to imagine today."⁶⁾

8. INFORMATION TECHNOLOGY : BLESSING OR CURSE

It is generally accepted that we live in the information age, or are experiencing the Fourth Revolution, the Information Revolution. Changes are taking place very quickly and what is seen as relevant and new today, might be outdated tomorrow.

For many practitioners this process contains no blessings, but only a curse; eg.

- constant change brings uncertainty
- it requires training and retraining of users and staff
- implementation of information technology is an expensive, fast endeavour; so is replacement of equipment
- moving from the proprietary environment to the unix environment can be a very difficult period. In the case of Stellenbosch many problems were encountered as well as off-time etc.
- it could create an overflow of information if there is a lack of proper planning
- there is the fear of being marginalised by information technology taking over
- sufficient funding could be a problem relevant to a 3rd world environment planning for 1st world applications
- due to the intricacies of information technology, academics doubt that electronic access to information can substitute for local ownership
- there is concern that in trying to respond to variations in information seeking patterns on campus, offering new methods and products ever so often can lead to an unsuccessful and expensive information environment

But what are the blessings of the information technology?

- no more manual procedures, but effective integrated systems offering better access and increasing productivity
- the OPACS ensure better use of expensive collections
- the concept of the global village is no longer a dream but brings the Fourth Revolution to our doorstep!

- it is a challenge to manage change and is a test of leadership
- the creation of a one-stop information shop
- it is an opportunity to plan for the library without walls and hours with a view towards 2000!

Is information technology a blessing or a curse? The experience gained with the planning and introduction of a computerized system for the Library Services, University of Stellenbosch, showed that it was a tremendous challenge and blessing. There were phantoms and sometimes a feeling of a curse, but we have overcome that through proper planning and cooperation with Information Technology experts.

If we want to capitalize on the blessings of information technology, we will need to be proactive and promote our special services to our user communities. We will have to function more like consulting information engineers than traditional, passive information suppliers.

If we can achieve this paradigm shift in planning our services, only then will we see information technology as a blessing and not as a curse!

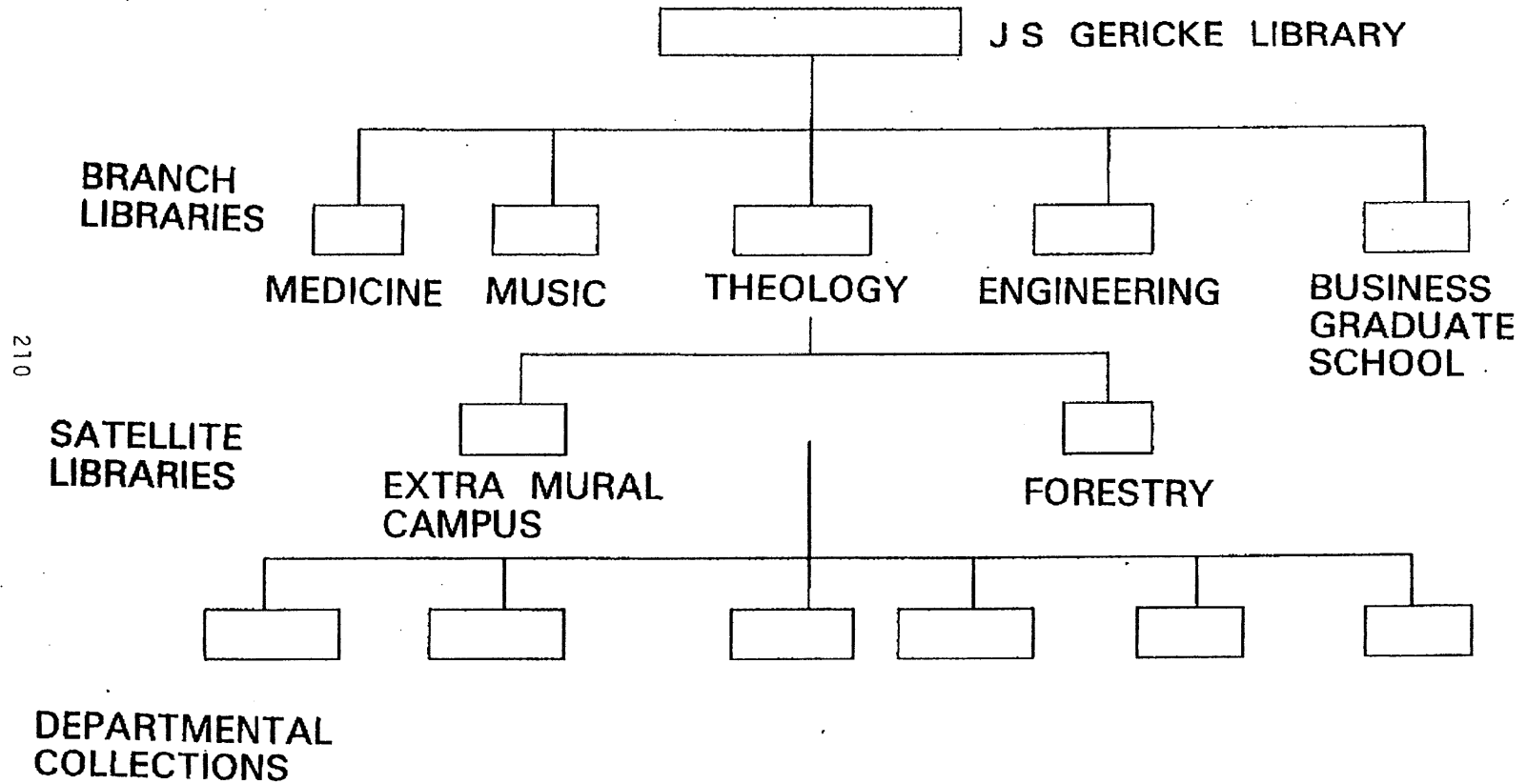
ABBREVIATIONS AND ACRONYMS

CD-ROM	Compact disc read only memory
DM	Deutsch Marks
FTE	Full time equivalent
OPAC	On-line public access catalogue
RFP	Request for proposal
SAMARC	South African Machine Readable Catalogue
SUNET	Stellenbosch University Network
VAT	Value added tax

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UNIVERSITY OF STELLENBOSCH LIBRARY SERVICES



HARDWARE GROWTH PATH

