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THE RISE OF THE PC:
Changes In Library Systems at the
University of Technology, Sydney

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There have been significant changes to library automated systems at the University of Technology, Sydney Library from April 1986 to December 1989. This article updates a 1986 one, documents the changes and makes some predictions in the context of the institutional and library automation environments.

Introduction

In March 1986, Kevin Shanahan and Robin O'Mara described the evolution of automated library systems at The New South Wales Institute of Technology¹. Since then, there have been significant changes to the institution, the Library, the technological environment and Library systems. This article describes the development of Library systems from April 1986 to December 1989 within the context of these changes.

Institutional Change

On 26 January 1988, The New South Wales Institute of Technology became the University of Technology, Sydney. Its new institutional mission included greater emphasis on postgraduate studies and research. The name used for library services - Information Resources Service (IRS) - was changed to University Library. In 1990, there will again be major change and growth in the University through the amalgamation of three educational institutions - the old UTS, Kuring-gai College of Advanced Education and Sydney College of Advanced Education (Institute for Technical and Adult Teacher Education). For this reason, it is appropriate to document the changes of the past three years, concluding with December 1989.
Changes in the Library

Changes in the Library and its environment which had a direct impact on systems development in this period can be divided into three major groups - financial, organizational and technological.

1. Financial

In 1986, the Institute Council recognized the need to direct an established percentage of its annual recurrent funds to library services. Although the proposed 6.5% has not yet been reached, the decision was important in establishing the central role of the library in the institution’s academic endeavour. In 1988, the University introduced Management Centre Funding and the Library received a one-line budget for the first time. The combination of these two factors allowed the Library to improve services and resource allocation through more effective financial management. Removal of artificial divisions in the budget permitted some increase and flexibility in equipment expenditure and assisted in the development of Library systems.

2. Organizational

The Library planning process was formalized in 1987 with the development of the IRS Corporate Plan for 1988 to 1990. This was supplemented in 1989 with a Strategic Plan for Information Services at UTS 1989 to 1991. In both plans, automation, cooperation and effective organizational structure are central to the achievement of the Library’s mission.

In 1987 and 1988 the staffing structure gradually changed to a ‘team’ model so that user needs could be met more effectively. The senior staff in charge of each team were actively involved in the strategic planning process. Developments in systems anticipated and supported their strategic objectives and the team structure facilitated the introduction of new technology.

These financial and organizational changes are more fully documented in A History of Library Services at the University of Technology, Sydney².

3. Technological

Since April 1986 there has been a flood of technological change which shows no signs of abating. Developments of great significance for the Library have included the increasing power and decreasing cost of the personal computer (PC), and the emergence of optical disks and digital communications technologies.

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The combination of these factors has made it both more possible and more necessary to distribute both computing resources and access to library-based information to staff and library users.

**Changes to Library Systems**

The 1986 article concludes with Computer Systems Chart H and some predictions for the future. Chart H has been reproduced as Figure 1 on the facing page for comparative purposes.

1. **CLANN Network Systems**

Because the prediction is made in 1986 that "the move to the network will be complete" for major library functions, discussion of developments will begin with CLANN Network systems (shown as 'CLANN PROCESSING' at the bottom of Figure 1).

Implementation of the CLANN/Geac Integrated Library System began in 1986. The first module to go 'live' at UTS was the online public access catalogue (OPAC) on 1 May 1986. This was followed on 4 July 1986 by implementation of Circulation, which replaced the in-house CIRCUS system. Use of the IDAPS LION cataloguing system and a trial of the LYNX database for acquisitions trade data continued in 1986. Use of these systems was discontinued by CLANN in 1987 due to a sudden rise in costs. As a temporary measure, network cataloguing was carried out on the Geac MRMS (MARC Record Management System) module. This was replaced in 1988-89 with Geac BPS (Bibliographic Processing System) software with MARC records now requested directly from ABN. UTS participated in a trial of the Geac Acquisitions module in 1988-89 and this module may be implemented for the network in 1990.

Through contribution to network systems, the UTS Library has been able to provide a sophisticated library system for a fraction of the cost of a similar in-house solution. However, use of network systems in the past three years has not been without problems, particularly in cataloguing throughput, file transfers and local requirements for management information. The hope of a fully integrated system for the major library functions has yet to be realized, and to achieve this may not require the use of a single system in future.

A significant achievement for CLANN in 1989 was the introduction of the CLANN CD-CAT (the CLANN database on CD-ROM with powerful search software developed in conjunction with Info-One). The CLANN CD-CAT is the first
Figure 1. Library Systems Chart, March 1986
Australian library database on CD-ROM. Its prime purpose is to provide sophisticated public catalogue access for small library sites where OPAC is not an economic proposition. As a result, it acts as a powerful supplement to the OPAC for other network libraries, rather than just providing an alternative to microfiche for back-up.

Library use of CLANN Network Systems in December 1989 is outlined in Figure 2 below.

![CLANN Network Systems Diagram]

Figure 2. CLANN Network Systems

2. UTS Administrative Computing Systems

Use of this facility in 1986 is shown in the central section of Figure 1. Because CLANN acquisitions has yet to become a reality, the in-house acquisition system is still in use. In 1986 the Library's PDP minicomputer was decommissioned and the acquisition software was rewritten for the third time to run on the Data General equipment provided for UTS central administrative computing. Other programs still in use are those that transfer library orders data to the central finance system and that generate the student records data for load to CLANN circulation each semester. This tape load of student data is still the only direct link between UTS systems and CLANN.

After 16 years of use and growth the in-house COBOL acquisitions system is definitely showing signs of age. Although it runs on a minicomputer and there are three terminals, only one person can do orders data entry at a time and there is no up-to-date interactive file of on order items. The COBOL programs are very stable but are very difficult to modify because there was very little documentation of them.
In addition to the acquisitions system, there were four library databases maintained under COBOL on the Data General in 1986 that were not mentioned in the first article - Closed Reserve, Suppliers, Gore Hill Library Serials List and Australian Bureau of Statistics publications control. These databases are gradually being moved to the library microcomputers described below.

Library use of UTS Administrative Computing Systems is shown in Figure 3.

![Diagram showing UTS Administrative Computing Systems](image)

**Figure 3. UTS Administrative Computing Systems**

### 3. Library Microcomputers

The Library's use of microcomputers in 1986 is shown as the top section of Figure 1. The 1986 article concludes that word processing and management information systems would always be regarded as 'in-house' activities, regardless of network participation. It is in this area that most change has occurred in the last three years.

In 1988, the Library began research into the concept of the 'scholar's workstation'. Apart from gaining insight into the scholarly research process, it was hoped that this project would form the basis for evaluation and introduction of new PC and related technology to the Library. This hope has been realized in the provision of a basic PC 'workstation' to each Library team during 1989. The basic 'team PC' configuration is an IBM PC AT compatible running under MS-DOS with an EGA monitor, 2 MB of RAM, a 40 MB hard disk, dual floppy drives taking both common floppy disk sizes and a letter quality dot matrix printer. Most workstations also have a CD-ROM drive and a modem as part of the standard configuration with word processing and communications software to support online searching and other section activities.
This basic configuration is supplemented by special software and products relevant to the work of each team. Examples of these specialized applications are shown on Figure 4 and include electronic mail, CD-ROM products, specialized online services and database applications. During 1989, several smaller library databases, e.g. Closed Reserve, were transferred from the central computing facility to team PCs running dBase to give greater flexibility and control of workflow. The in-house dBase source code written for the 4,600 record Closed Reserve database took only three or four weeks to produce. It provides Closed Reserve staff with a menu system to locate and edit records in the indexed database and to print a variety of listings and reports. Work is faster and easier and there are probably only 5% as many lines of code using dBase than there were with the old COBOL programs.

**Basic Configuration**
AT compatible
EGA, 2 MB RAM, 40 MB HD

**Basic Applications**
Word processing
Online searching
CLANN CD-CAT

**Specialized Applications**
CD-ROM: BIP, BBIP, CDATA
Online services: ABN, Medianet
Databases: Closed Reserve, Serials
Electronic mail: ILANET

Figure 4. Library Microcomputers: Basic Workstation

With the introduction of the CLANN CD-CAT in 1989, the UTS Library moved into public access microcomputers and CD-ROM products. To date the CLANN CD-CAT is the only CD product available for public use, but this is likely to change rapidly in 1990. The basic configuration of the public access PCs is the same as for
the staff machines without a modem and printer. In total, there are 17 IBM PC compatibles in the Library, but six of these are still XT standard only.

Because of the lack of good applications software, replacement of the 5-terminal CP/M based Televideo microcomputer network used for administrative and some database functions began in 1987. By the end of 1988 the old system was completely replaced with a hybrid of PC and Macintosh. In Library Administration there are now 4 Mac SEs and one Mac II with varying size hard disks connected to a Laserwriter via Localtalk. A scanner has also been purchased for the Mac II. Use of the Macintosh has completely revolutionized word processing and document preparation in the Library - a quick comparison of Figure 1 produced in 1986 and the rest of this article is proof of this! Spreadsheet, graphics and presentation software run on the Macintosh as well. A PC AT compatible is also used to develop and test applications and software for other library sections. File exchange at present is via ‘sneakernet’ - floppy disk and Mac Superdrive. An example of the power of this Mac/PC combination is the production of the results of a survey of access and usage patterns of libraries coordinated by the authors in May 1989.

The two database functions - serials subscription management and the Film and Video List - have been transferred to dBase running on an AT, making production of reports at least ten times faster and with vastly improved output.

Library Administration systems are presented in Figure 5 on the following page.

Changes in Staff

The retirement in 1989 of the Foundation Librarian, Dorothy Peake, marked the end of an era for the University Library. Her vision, energy and dedication have been the catalysts for library systems development at both the network and local level. Neither of the authors of the 1986 article are still at UTS. Robin O'Mara, whose work was so important for the successful implementation of the CLANN network systems, died in 1987. Kevin Shanahan is still supporting library systems, but from the staff of Geac Australia. The change in classification of Kevin’s position from Analyst to Support Programmer reflects the changes of the period - a different mix of network, local and PC systems. Despite (or even because of) the changes, it has still been vital to manage systems and technology at a senior level and to have a system support position on the library staff. One of the hidden costs of systems and rapid technological change is the need for support - policies, training, maintenance and documentation. In fact, the cost of support has been estimated at three times the original purchase price over the expected life of the equipment.7

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Basic Configuration
Ranging from 1 MB RAM, 20 MB
HD SE to 4 MB RAM, 160 MB
HD Mac IIx.

Basic Applications
Word processing
Spreadsheet
Page layout

Specialized Applications
Database development
Desktop publishing
Presentation manager

Mac ------ DOS
file exchange
via floppy disk
& Mac superdrive

Basic Configuration
AT compatible
EGA, 4 MB RAM, 160 MB HD

Basic Applications
Word processing
Online searching
CLANN CD-CAT

Specialized Applications
Database development
Electronic mail: ILANET
Data General emulation

Figure 5. Library Microcomputers: Administration
Plans for the Future

Systems developments have helped the Library to cope with growth and increased activity levels in the past three years and have concentrated on the use of microcomputers for a variety of tasks. What of the next three years? Some developments are already planned in each of the existing systems areas for 1990:

- provision of dial-up and local area network (LAN) access to OPAC;
- a complete systems review of major functions, starting with acquisitions;
- expansion of public access CD-ROM products;
- use of electronic mail for urgent orders and inter-library loans;
- promotion of online database use;
- review of telecommunications facilities.

Our general prediction is for continuing change and continual assessment which can be summarized as ‘a question of balance’. Within the framework of financial constraints and institutional amalgamations we will need to balance:

- user requirements v. technological possibilities;
- possible system solutions (network v. in-house, stand-alone v. PC-based network);
- access to indexes and abstracts v. access to full text of documents.

Richard de Gennaro describes library automation in the last three decades as “shaped and driven by the cost and capabilities of the computer and communication technologies that were available at the time”. He characterizes the three decades as follows: the 1960s were “dominated by primitive local systems”, the 1970s by “large multitype and multipurpose library networks” and that the 1980s would be dominated by “a return to local systems”, but this time to “sophisticated multifunction turnkey systems on mini- and microcomputers” with a variety of external system links. The UTS experience so far has been about five years behind these trends. It will be interesting to see what systems have emerged three years hence and what balance has been achieved.