Online Catalog Development at the University of Guelph

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Introduction

THERE ARE GREAT DIFFERENCES in approaches to library automation, whether in the choice of a vendor or of an in-house design; the use of a bibliographic utility or the sharing of regional records; the initial implementation of a circulation system or of acquisitions. To some it may appear that these differences create impediments in the goal to achieve national and international access systems that will allow effective identification and location of all scholarly resources and thus the efficient sharing of those resources. However, it must be recognized that the direction for automation adopted at any one time by an individual library may reflect a particular set of circumstances in that university or community which make a specific choice or decision uniquely valid. For that reason it is important to understand the environment that existed at the time the direction was established and to place the library and its decisions in that context. The experience at the University of Guelph, in developing and implementing automated systems including an online catalog, illustrates this principle.

The University of Guelph Library 1964-76

The University of Guelph was incorporated as a university in 1964 from the integration of three century-old agriculturally based colleges which are located some fifty miles west of Toronto in the heart of

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Ontario. By 1986 the university had grown to encompass seven colleges with emphasis on biological, physical, and social sciences. Present enrollment numbers more than 10,000 undergraduate students with an additional 1200 graduate and 3000 part-time students. As well, the university includes four research institutes and receives research grants that are among the largest in Canada.

In 1964 the library consisted of three separate operations in each of the original colleges as well as some dozen branch libraries in the largest—the Ontario Agricultural College (OAC). A collection of 350,000 books, serials, and documents was spread across the campus, and access to the collections, through three totally separate cataloging systems, was less than adequate. A Library of Congress conversion was underway in the central OAC Library, with Dewey classification remaining in the branches and in the other two colleges.

With the 1964 incorporation as a university, the library received not only an acquisition budget which was too large for the existing staff to process but also a gift of 65,000 new monographs, complete with catalog cards, from an Ontario government project in support of new universities. An unprecedented work load led to an increasing backlog of unprocessed material—50,000 volumes by 1967. The government document collection, an unusually good but totally unorganized and inaccessible resource of more than 100,000 items, was a serious problem. Moreover, no central record had been kept for periodicals so that duplication and inconsistency was compromising use of this important collection.

In 1965 the university received provincial funding for a central library building of more than 250,000 square feet to house all collections on campus and which was to be opened, with integrated collections and access, by the spring of 1968. Although automation was, at least by today's standards, a very primitive affair, it seemed in the spring of 1966 to be the only solution to the task ahead—i.e., to catalog in one system all monographs belonging to the university; to classify, catalog, and establish check-in records for all periodicals; and to organize and provide access for the government documents. At the same time it seemed foolish to consider designing a new library building with systems—of circulation and access, at the least—that did not recognize new technologies. Accordingly, the new library was planned to incorporate an automated circulation system in the building design, and all library functions were allocated space based on assumptions of the implication of automation for their locations and relationships. With an imposed deadline of only two years in which to design systems, create records, and process material, expediency was the major factor in the decisions that were made.

In Canada at that time there were a few libraries experimenting with automation, most importantly the universities of Toronto and British Columbia, but there were no models to follow for a total program and no vendors from whom to buy a complete product. No thought was given to the possibility of a future in which an integrated online library system might be commonplace, and Guelph initiated a three-phased attack on the collection organization and access problems outlined earlier:

—Serials were to be classified in Library of Congress, with a simplified machine-readable catalog record which included holdings information originally developed at the University of British Columbia. This was used to produce a shelflist as well as paper or book catalogs;
—Documents were organized in an automated system designed in the University of Guelph Library, based on an organizational document code and with access provided through six separate book catalogs: corporate author(s), personal author(s), title, serial title, keyword (KWOC index), and document code.
—The circulation system was based on a limited machine readable catalog record.

Although not all catalog elements were included in the circulation record due to limitations placed on record size by the computer hardware in the University Computer Centre, the early MARC format was followed for the elements which the record contained. This decision proved fortuitous since additions to records, not conversion, were all that was required for the later "automated" catalog.

The new McLaughlin Library did open at the University of Guelph in August 1968 with an automated circulation system using punched circulation transaction cards and card readers. All books and periodicals were on the shelves in classified (Library of Congress) order, with no backlog of unprocessed material, with computer produced cards for the books, and with similarly produced book catalogs for both periodicals and documents. The students and faculty adjusted to the new access tools—including uppercase printing on the catalog cards—as quickly as they did to their surroundings of individual carrels and private studies which were luxurious by previous standards.

During the next few years, the library kept pace with changing technology, moving from the crude IBM punched cards to a C-DEK data-collection system for circulation; from simplified uppercase catalog cards to full MARC records in standard format. The book catalogs for documents and serials were transferred to microfiche in 1973 and were joined by a similar (and duplicate) catalog for mono-

graphs. These COMfiche catalogs were accepted with enthusiasm by the student and faculty users—they were easier to use and more timely than the massive book catalogs with their irregular supplements. A new system was also developed for cataloging maps, and a supporting acquisition system was in an early design phase.

Concurrent with these developments at Guelph, the other libraries in the Ontario university system were also moving into an automated environment. By the early 1970s the Council of Ontario Universities, a coordinating body for the province's fifteen universities, encouraged the development of a cooperative library system based on existing activities such as interlibrary lending and an interuniversity transit system. Two union catalog systems were added to this foundation—CODOC, a cooperative use of the Guelph document system; and CUSS, a union list of serials based on the adoption by most Ontario university libraries of the University of British Columbia system. These two projects produced what could be called quick and dirty COMfiche lists. Some duplication occurred in both lists but this was not considered a serious problem, since the primary intent of the projects was to share resources and provide locations. The provision of catalog records, although the union lists could be and were used for that purpose, was seen as a secondary objective.

These objectives were reversed, however, with the initiation in 1974 of a union catalog project based on a concept of the sharing of catalog records through the Canadian bibliographic utility, UTLAS. The six Ontario pilot libraries—which included Guelph—were joined by seven university libraries from Quebec, making the project, Unicat/Telecat, bilingual. Representatives from each library began the development of agreed standards for cataloging and record format as well as a process for monitoring their use and ensuring quality. This idealistic concept turned out to be expensive, particularly for those libraries which had existing machine readable catalog records for all holdings. A review done at Guelph during the second year of the project revealed that the majority of records received through the project were actually from the Library of Congress, and that the benefit of receiving records from other libraries was outweighed by internal costs for revising existing records to meet the standards of the received copy; for communications and centralized processing charges; and for loss of staff time in Unicat/Telecat meetings. Guelph withdrew from the project in July 1976 and returned to tapes from the National Library of Canada (which included the Library of Congress MARC records) as the source of machine readable catalog copy at a fraction of the cost of records received from the centralized bibliographic system.

Changed Directions—1976

It was at this point that local events again precipitated a new direction. The offline circulation system—C-DEK—was no longer on the market, and its Mohawk terminals were breaking down with no opportunity for replacement or repair. Internal charges from the University Computer Centre for the production of the serial, map, book, and document COMfiche catalogs and supplements, as well as for the catalog cards, daily circulation lists, and overdue and fine notices, were mounting. At the same time the university was moving into a period of financial restraint which was already reflected in the library's operating budget.

Changing technology also precipitated Guelph's action. As Richard de Gennaro noted in April 1983: "Three major developments occurred in the early 1970's which had profound and far reaching effects on the course of library automation and library management: 1) the emergence of the first cheap and powerful minicomputer; 2) the coming of sophisticated online systems; and 3) the development of powerful telecommunications capabilities."[1] Anxious to make use of these new directions, Guelph surveyed the marketplace but found no vendor willing to meet the requirements which were established for a Guelph online circulation system: namely, public access to both borrower (circulation and reserve transactions) and book information and a linking of the databases for monographs and serials (MARC standard) with documents and maps (non-MARC) in one access system without record conversion.

Guelph therefore entered into a joint development agreement with the Geac Corporation, and an online circulation and inquiry system was implemented for the 1977 fall semester. This system—now known as the Geac Library System—initially had two modules, Book Inquiry and Borrower Inquiry, and could be accessed at Guelph in the central library or in the branch in the Ontario Veterinary College.

From Online Inquiry to Online Catalog—1983

It was originally assumed that the circulation or borrower inquiry function would be the most important feature of the online system, as students determined which books they had out, when they were due, and what, if any, fines were owing. It was quickly proven that this assumption was wrong, however, as students discovered that they could use the book inquiry function as a catalog for locating desired books or documents by author, title, or call number. An in-depth study of this inquiry

function conducted in 1980 revealed that 80 percent of the students enthusiastically endorsed the "online catalog" —incomplete as it was— preferring it to the card and COMfiche catalogs with which it was compared in the study.[2]

It is useful to identify exactly what was available in that 1977 online inquiry—the first phase of the Guelph online catalog.

—a brief monograph record, giving author, title, date, edition, and call number in MARC format;
—a government document record in non-MARC format with non-LC classification;
—access by author (personal or corporate);
—access by title; and
—access by call number (LC or document code).

The major complaint which both faculty and student users had about the system was lack of terminals. Even faculty members—more than 50 percent—concurred with the student assessment that online inquiry was easier to use and was more successful in retrieving books than either the card or COMfiche catalogs.

With this background of positive response, Guelph moved to change the simple book inquiry module to a true online catalog. Using the local experience as well as reports from the growing number of developing online catalogs in other universities, Guelph established requirements for an online catalog. Two factors were considered of paramount importance—cost and user needs, or perceptions. The second factor was the easiest to address.

From a user viewpoint the following criteria were established for online catalog development:

—terminals in sufficient numbers to eliminate waiting;
—response time of less than two seconds;
—all library resources accessible in one system;
—a simple, easy-to-use system, requiring no assistance from staff;
—remote access (this feature was added to the original online system during its second year of operation);
—subject searching, including searching on keywords, not just a controlled vocabulary;
—authority control and linkages from words or names not used to those that are;
—access to more than the basic record elements: series titles; multiple authors, either personal or corporate; and added titles.

As well, it was recognized that online data transfer for acquisition or

bibliographic purposes would be a future requirement as would similar electronic access and transfer activities with other university libraries.

Including cost implications in the design of the Guelph online catalog forced a divergence from concepts being developed in other organizations. Rather than stressing use of full MARC records for all materials, the emphasis at Guelph was put on a system that would require a minimum of staff-oriented operating or processing procedures. It was agreed that the database must accommodate the non-MARC CODOC format, expanded from documents to include theses, technical reports, and archival records; the serial format of the CUSS list; and the separate special formats for maps and atlases. The extremely high use which nonbook materials have received in libraries providing access through these in-depth but inexpensive automated systems supports insistence on this requirement.

These integrated access and cost questions force a local library to define its relationship and responsibility to networks as well as to decide how much control or standardization is necessary and affordable. In addition, the question must be addressed as to whether online catalogs should be based on the same principles as those that dictated the structure of card catalogs—a location tool as well as a mechanism for relating the works of one author. If this latter is a priority, the size of the database and the structured complexity of interrelationships or connections within it may create a hardware problem. A powerful computer with more storage capacity than originally envisaged may be required to meet the increasing access and response loads from hundreds of terminals both on and off campus. The cost of hardware maintenance is an ongoing charge that cannot be overlooked.

The Geac online catalog which replaced the inquiry system and card catalog in 1983 responded to Guelph's requirements and concerns. Little or no user instruction was needed and the expanded access points increased the efficiency and effectiveness of retrieval. Nonstandard entries were identified in the system so that users could be alerted to the compromises made in the Guelph online catalog as a bibliographic tool.

A third phase in the development of the Guelph online catalog occurred in 1985 when a further joint development agreement with the Geac Corporation added Boolean search strategies to the system. This sophistication also made changes in both orientation requirements and in time spent by students at the terminals accessing the system. The bibliographic instruction programs were forced to become more sophisticated, and individual follow-up sessions were found frequently to be necessary. Library staff developed computer assisted (CAI) modules

using videotext technology to assist students who needed such reinforcement. However, general reaction from students and faculty indicated that even though they found the new system more complicated, the retrieval success rate was so high that any complexity was considered to be of less importance. Time spent by some students in accessing the system increased marginally, but average accessing time remained at less than five minutes. It should be noted, however, that the addition of Boolean searching resulted in the need for a second minicomputer, equal in power and capacity to the first machine, in order to keep response time at an acceptable level.

Implications of Online Catalog Development at the University of Guelph

As has been demonstrated, the impetus for development of the online catalog came from factors inherent in the University of Guelph Library and in the university. Early implementation of automated systems, costs, changing technology, and emphasis on local user needs were all important considerations. There were also implications for the library in terms of staffing, organization, and its role in the university community.

Four separate technical service departments were merged into two—technical processing and acquisitions—and some bibliographic functions previously performed in public service departments were accommodated within the two new departments. Staff members and classifications also changed. The increasing availability of Library of Congress copy and the rare changes from Library of Congress standards or procedures allowed at Guelph placed more emphasis on paraprofessional cataloging. Professional cataloger positions were decreased by 50 percent. Data input by clerical staff became a redundant function and all input positions were eliminated. With these changes and the departmental mergers, the 1985 staff in the technical services departments totaled only 60 percent of 1976 numbers, although many positions were transferred to public service departments in response to the increasing sophistication and demand for use, access, and retrieval services. Between 1976 and 1985 the total library staff was reduced by 10 percent while new acquisitions remained constant and overall library use increased from 5 to 10 percent per annum.

The issue of local *v.* a union or centralized catalog environment has also been reflected in the online catalog implementation at Guelph. Accepting that the most important single requirement of an online catalog in a primarily undergraduate university is immediate access to

material needed for teaching or learning purposes, the discovery that a needed title is at another university is not an essential consideration unless:

—the status of the book is known—i.e., is it or when will it be available?
—the book can be easily retrieved—i.e., the other university is close enough to drive to or there is a transit system which will deliver the book in a few days.

It has been agreed among southern Ontario universities that access to catalog and status information is more important than the costs that the standardization of a union catalog would demand. New communications technology in a network configuration with open system interconnection (OSI) concepts responds to the user needs for location—and status-linked information. Such a network has been established in Ontario and catalog access between universities is being expanded. This allows each library to maintain internal bibliographic control at a cost and using a methodology which the library—not the network—determines.

The impact of the library developments on the university of Guelph community, although less measurable, is of equal if not more significance. It was quite apparent that the library was providing quick and effective access to its collections within the budget that had been provided and with no backlog of unprocessed material. Not only had that access been made available throughout the library, but remote access was also provided in faculty and administrative offices, in residence rooms, or from off campus. The credibility of the library as an information provider and as a responsible major player in the developing university resource network was enhanced. As a result, library staff were invited to sit on both technical and educational policy committees when the university moved to incorporate information technology goals into its educational and research mission and environment.

The impact of the joint development agreement with the Geac Corporation should also be mentioned for this has been a very positive experience. Although a steady stream of visitors toured the library in the first few years after the online system was implemented, the financial benefits which accrued to the library more than offset any inconveniences which may have obtained.

Future Direction: The Educational Network

Technology as well as financial considerations are again suggesting change in online catalog developments. Such changes will not only

relate to the structure or content of the catalog database but to relationships to other information access tools and resources held in the library in machine readable form. More information, not less, is being requested at the same time as the increase in microcomputers—in faculty and staff offices, in microlabs, in student rooms—is placing heavy demands on the remote access module and on the computing and communications hardware necessary to support it.

In April 1984 the University of Guelph adopted as a primary goal the integration of information technology into all aspects of its academic and research programs. An educational network which will provide access for all students and faculty to a variety of information resources has been defined. The campus data network, based on an integrated voice/data switch, connects the central mainframe computers, several department minicomputers (including two Geac's in the library) and microlaboratories in each college, as well as the individual microcomputer or terminal work station for faculty and staff, and the network connections for each of 3000 residence rooms. Off campus students have been assured access through additional ports on the network.

The library, with its online catalog recognized as the original and primary network resource, is also perceived as the logical location for the center of the educational network. A public pool of terminals on the main floor of the library has been expanded to include microcomputers and printers. The network now provides access to a campus conferencing system (used for both teaching and administrative purposes) and generic CAI modules in addition to the online catalog. Basic statistical and word processing packages will be added this year as will faculty access to student management information.

There are several implications for the library, its catalog, and its other retrieval services. Already there are demands for database searching to be available through the network and it is hoped that it will be added in some way to the bibliographic database. Common menu formats—whether for CAI modules, application packages, conferencing, or the online catalog—have also been requested. The library has been asked to coordinate an orientation program which will include not only access to the bibliographic databases now available in the online catalog but also to the conferencing system and other information modules.

Other technologies are also being studied. High-volume storage media such as the compact disk—which can store data from several media in one physical unit—could also store the online catalog or

sections of it for use elsewhere on campus or off. The possibility of more than 12,000 students all wanting remote access to the online catalog at the same time would place a heavy—and expensive—load on the library facilities. Compact disk technology appears to offer an attractive alternative.

The content of the online catalog is being challenged as faculty members, familiar with electronic journals and abstracting services, see no reason why the present bibliographic records could not be expanded to include abstracts. The table of contents of current journals is considered a valuable addition to the serial records. What would be the cost and hardware implications for such an expansion? How many and what level of staff would be required to provide this additional service? What impact would such changes have on the role of the Guelph Library in the provincial and national resource sharing networks? These and many more questions must be answered.

When the University of Guelph Library moved from offline to online catalog access in 1977 there was no thought that within ten years the technology which made that access possible would also introduce dramatic change to the whole academic process. If the library is to succeed in its new role as the information resource center for an electronic educational network, it must be able to place the online catalog in an environment which is not only changed but which is considerably expanded.

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