

## Library Automation: A Brief Review, With a Hoosier Slant

*Debora Shaw*

### Introduction

Not long ago any librarian contemplating a library automation project was advised to sit quietly and let the urge pass. Today library users, boards of directors, library staff members, and fellow librarians are likely instead to wonder why more is not being done to automate library operations. Computer technology has become part of our lives, affecting everything from utility bills and banking to the games we play. It is small wonder that we look to these machines for solutions to so many of the problems libraries face.

Many of the initial problems with library automation stemmed from a failure to appreciate the special needs of libraries. Early work with computers (in the 1950's and early 1960's) emphasized solving mathematical equations, then expanded to include business applications. Clearly library operations seldom require the mathematical capabilities (sometimes called "number crunching") needed for scientific research. (For example, one does not often wish to calculate the square root of the average Dewey Decimal number.) It

---

*Debora Shaw received a BA in the History of Ideas at the University of Michigan and subsequently an MALS at the same university. She worked at INCOLSA as network librarian and at Indiana University as Project Manager of the Online Union List of Serials Project. She's presently a doctoral student and visiting lecturer at the IU School of Library and Information Science in Bloomington.*

was not equally clear, however, that many library operations are also quite different from business functions. As Richard Boss points out, libraries use much larger files of information, which are consulted less frequently than the typical business inventory files.<sup>1</sup>

Moreover, librarians have developed complex rules and tools for handling a wide variety of information-bearing materials. All too often we overlook the major contributions to information storage and retrieval of classification schemes, vocabulary control devices (such as subject heading lists), indexes and bibliographies. Rather than using computers "because everyone else does" the aid of automation efforts should be to improve libraries' basic information function by taking advantage of the computer's capacity to reduce the manual effort or cost of operations, or to increase their speed and accuracy.

### Early Uses of Computers

Computer technology based on transistors rather than vacuum tubes emerged in the late 1950's. Librarians with access to these expensive but relatively reliable machines were most often in special libraries serving private businesses.<sup>2</sup> They used computers, for example, to do selective dissemination of information (SDI), alerting library users to new items in their fields of interest. Other early uses of computers in library work include production of key word in context (KWIC) and key word out of context (KWOC) indexes, and computer produced book catalogs.

While these techniques provided results less visually elegant than manually prepared information sources, automated SDI, indexing, and lists were sufficiently quick and inexpensive to be used where no such service had previously been possible. From the beginning, then, computers have been used not only to improve existing operations but also to provide additional services. As libraries have "a vast reservoir of unmet needs," this capability to expand services through automation is certainly a welcome development.<sup>3</sup>

### Automation Projects

Pioneers in library automation hoped to go beyond automating single functions, to develop total automated library systems. Early work on such ambitious schemes included projects at Florida Atlantic University and the Information Transfer Experiment (INTREX) at

the Massachusetts Institute of Technology.<sup>4, 5</sup> Unfortunately the computer technology then available could not support the hopes and plans many had for these projects. However, they provided important opportunities to review what libraries do, and to begin to consider how operations might be improved using the new technologies.

Other important contributions to the library automation field came from the Library of Congress. The 1963 report *Automation and the Library of Congress* outlines both short and long range benefits of library automation, and recommends that the Library undertake an automation effort beginning with internal processes.<sup>6</sup>

The next major development was the machine-readable cataloging (MARC) format for describing cataloging information so that it could be handled by computers.<sup>7</sup> The need to express all the possible complexities of what had formerly been done only by people in preparing catalog cards demonstrates again the sophisticated, complex rules librarians have developed to organize the elusive and various pieces of information with which we work.

### Data Base Development

Development of the MARC format for books, followed by formats for bibliographic descriptions of other materials, allowed the Library of Congress to use computers in printing catalog cards. Other organizations were also using computers to speed creation of printed information retrieval tools. For example, *Chemical Abstracts and Psychological Abstracts* were reproduced more efficiently using computers, and the Educational Resources Information Center was able to publish both *Current Index to Journals in Education and Resources in Education* with computer technology.

The availability of these relatively large files of bibliographic information made possible further uses of computers by libraries. In Indiana MARC tapes were used at Indiana University for an SDI project, and at Indiana State University as the basis for acquisitions and cataloging records. Academic libraries across the state purchased data bases from sources including Chemical Abstracts Service, Educational Resources Information Center, and Engineering Index to provide sophisticated searching capabilities and produce bibliographies for researchers.

Hoosiers also created data bases. One experiment in public library SDI done through the Crawfordsville Book Processing Center demonstrated that these "new fangled" developments need not be restricted to special or academic libraries.<sup>8</sup> Another major cooperative effort was the Indiana Union List of Serials, produced at

Purdue University, which listed serial holdings from over 60 Indiana Libraries.<sup>9</sup>

### Networking

Increased computing power and the telecommunications (telephone) support, allowing geographically dispersed libraries to use a central computer encouraged increased cooperation among libraries. This cooperation, termed "networking," developed rapidly in the late 1960's and early 1970's. The best known network of the day was the Ohio College Library Center, a group of libraries using a central computer to produce catalog cards from the MARC tapes and from data they entered themselves.

The basic function of this network, computer support for cataloging, has since been assumed by a new entity, the Online Computer Library Center, which is sometimes referred to as a bibliographic utility. The new OCLC provides much more than cataloging support; OCLC's computers are also available for acquisitions, interlibrary loan, and serials control operations (including union lists of serials production). Other bibliographic utilities have also developed, notably the Research Library Group's Research Libraries Information Network (RLIN), the Washington Library Network (WLN) and the University of Toronto Library Automation System (UTLAS).

Regional networks providing access to bibliographic utilities and support for library cooperation on a state-wide or multistate basis are an important part of the networking scene. In Indiana the Indiana Cooperative Library Services Authority (INCOLSA) is involved in projects ranging from the creation of an Indiana data base using OCLC to education and planning for on-line information retrieval and automated circulation capabilities. On a more local level the area library services authorities (ALSA's) encourage cooperation among libraries on a multi-county basis.

Barbara Markuson, commenting on the importance of library networks and bibliographic utilities in library automation, points out the relatively small "research and development tax" which each library pays for use of the service.<sup>10</sup> Pooled together, these funds make possible impressive library automation developments which would be beyond the means of all but the wealthiest libraries without cooperation. In Indiana the state legislature has recognized and supported library cooperation by funding part of the cost of the ALSA's and INCOLSA.

### Information Retrieval

Automation of information retrieval for library users has also mushroomed as a result of data base development and advances in technology and communication. Nearly 1000 data bases containing citations or numeric data may be searched using the computers of 170 commercial search service vendors.<sup>1 1</sup> Of these vendors, BRS, DIALOG, and SDC are the most prominent in the library market. They provide computers and programs to search data bases as varied as *Magazine Index*, *Excerpta Medica*, and *Pollution Abstracts*.

Searching these files is much faster than looking through bound volumes of several years' printed indexes. In addition, the computer is able to scan every word in each citation. As citations frequently include abstracts of the articles, searchers can use terms from the abstracts and titles as well as the indexer assigned terms in retrieving citations.

### Mini And Micro Computers

Another advance in computer technology led to further increases in computer capabilities and decreases in cost. Minicomputers arrived in the mid-1970's, and have proved to be a valuable part of many library automation undertakings. A "mini" allows a library to have a "stand alone" operation, with the relatively inexpensive computer in the library and no need to rely on an outside computer center or network.

Many libraries have developed their own programs for a variety of operations using minicomputers.<sup>1 2</sup> For those who prefer letting someone else do the development, several companies sell minicomputer based library systems. These are called "turnkey" systems, as the seller provides the equipment, the programming, and sometimes also the maintenance of the hardware and/or the programs—the library need only turn the key and drive off into the sunset. Several turnkey minicomputer systems, such as CLSA and DataPhase, began as circulation systems. They have since expanded to include at least a rudimentary public catalog capability, and some libraries have used minicomputers to support local networks.

Microcomputers represent an even more recent technological development and their uses in libraries are only beginning to be explored. Larry Woods indicated the remarkable advance in computer technology microcomputers represent—he used to remind computer system users that the display device in the library was a *terminal* attached to a big computer; it was not the computer itself.

With a microcomputer, the entire computer can fit easily on a desk, and the distinction between central computer and peripheral terminal becomes blurred.<sup>1 3</sup>

Microcomputers allow even more distribution of computing power and responsibility to various points in a network. This means more local control or manipulation of information is possible. However, the reliance on large files of data for library functions means microcomputers alone cannot meet all library automation needs.

### Conclusion

The field of library automation has seen rapid changes, resulting both from improved understanding of libraries and from technological advances. We have available a wide range of tools, and are embarking on the political decision making required to help fit together the pieces to provide the best possible library services, using technology where appropriate. Responsible librarians can no longer sit and watch automation pass by. We need as much concern, involvement, and understanding as each of us can contribute to build on the progress we have made and to provide improved services to library users.

### Notes

- <sup>1</sup> Boss, Richard W. *The Library Manager's Guide to Automation*. White Plains, N. Y.: Knowledge Industry Publications, 1979.
- <sup>2</sup> Observations regarding parallels between computer developments and library automation were made in a lecture to Indiana University Graduate Library School students in Introduction to Information Science by Charles H. Davis, February 21, 1980.
- <sup>3</sup> Atkinson, Hugh C. "Personnel Savings through Computerized Library Systems," *Library Trends*, 23 (4) 587-594, April 1975.
- <sup>4</sup> Heiliger, Edward M. "Florida Atlantic University Library." In Frances B. Jenkins, ed. *Proceedings of the 1965 Clinic on Library Applications of Data Processing*. Champaign, Ill.: University of Illinois, 1966, 92-111.
- <sup>5</sup> Overhage, Carl F. J. and R. Joyce Harmon, eds. *INTREX: Report of a Planning Conference on Information Transfer Experiments*. Cambridge, Mass.: M.I.T. Press, 1965.

- 6 King, Gilbert W. et al. *Automation and the Library of Congress*. Washington, D. C.: Library of Congress, 1963.
- 7 Avram, Henriette D. *MARC, Its History and Implications*. Washington, D. C.: Library of Congress, 1975.
- 8 Davis, Charles H. and Peter Hiatt. "SDI Is for People," *Library Journal*, 96 (9) 3573-3575, November 1, 1971.
- 9 Corya, William L. Gary L. Lelvis, and Bonnie A. Siiss. "Indiana Union List of Serials Project," *Library Occurrent*, 24 (11) 455-462, 470, August 1974.
- 10 Markuson, Barbara Evans. "Cooperation and Library Network Development," *College and Research Libraries*, 40 (2) 125-135, March 1979.
- 11 *Directory of Online Databases*. Santa Monica, Calif.: Cuadra Associates, Fall, 1981.
- 12 Grosch, Audrey N. *Minicomputers in Libraries, 1981-1982*. White Plains, N. Y.: Knowledge Industry Publications, 1981.
- 13 Woods, Lawrence A. "Workshop on Microcomputers in Libraries," ASIS 9th Mid-Year Meeting. Pittsburgh, May 14-17, 1980.