OCLC: ORIGINS, TODAY, AND TOMORROW

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In this presentation I will describe the origins of OCLC including the relevant library conditions in the United States when OCLC was incorporated in 1967, the original system design work for the OCLC network, and the implementation in 1971 of the OCLC online interactive computerized system. Next there will be a section reporting on the size of the OCLC network and the amounts of activity on the network. The presentation will conclude with a discussion of new types of library services likely to come into being in the next decade.

Origins

Thirty years ago some Ohio colleges and universities had begun to give instruction involving independent study, and the presidents of these institutions realized that their libraries did not have sufficient resources to support such an educational program. These presidents were members of the Ohio College Association (OCA), and in discussions at association meetings they decided to attempt to develop some kind of an organization that would make the resources of all Ohio academic libraries available to students at each institution and at the same time reduce the costs of libraries. First one OCA committee and then another struggled with this problem throughout the 1950's and the first half of the 1960's 1.

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The first committee brought in a consultant, Mr. Wyman Parker, to advise it on means for attaining increased availability of library resources, and in 1963 Mr. Parker presented the committee with his report. The essential recommendation in the report was for a traditional bibliographic center with a union catalog that would be available in each academic library in the form of microfilm or microfiche.

OCA accepted and approved Mr. Parker's report and formed the second committee charged with seeking means for establishing the bibliographic center that he recommended. The committee obtained proposals from four commercial firms to establish a union catalog of Ohio academic libraries that could be made available in each library. Two proposals were rejected, and the committee proceeded to debate the advantages and disadvantages of the other two proposals, one of which would have cost more than a million dollars and the other nearly two-fifths of a million.

To resolve its debate, the committee requested in 1965 that Dr. Ralph Parker of the University of Missouri and the present author serve as consultants to assist the committee in evaluating the two proposals. After meeting with the committee, Dr. Parker and I concluded that the traditional type of union catalog would not be satisfactory in the years immediately ahead, but that an online computerized union catalog could be established that would cost less and be far more beneficial to the Ohio institutions. Toward the end of 1965 we made our report to the committee recommending that a network be established based on a computer having a secondary memory that would contain a catalog of the Ohio academic libraries. The report proposed that the libraries would do their cataloging on terminals connected to the central computer and its catalog, and would use cataloging already at the central site, thereby reducing duplication of activity among Ohio libraries. This reduction in duplicate cataloging would, of course, reduce costs in libraries.

The committee accepted and approved the Parker/Kilgour report and forwarded it to the Ohio College Association with the
recommendation that it be implemented. The OCA in turn approved the report and established another committee charged with incorporating an organization to be called The Ohio College Library Center and to appoint an executive director of the Center. After considerable search for an executive director, the committee approached me. At the time there was no online computerized library network in existence, and the prospect of implementing one in Ohio was so bright that I accepted the invitation to become the executive director of OCLC, which was incorporated as a not-for-profit corporation on 6 July 1967. As a not-for-profit corporation, OCLC has no shareholders. Its purpose is "to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information."

Although no computerized library network existed in 1967, there were many aspects of library activity at that time in the United States that facilitated establishment of such a system. For example, American libraries were used to copy cataloging, for the Library of Congress had started to make its cataloging available by selling catalog cards in 1901. Also, the American Library Association had established the professional policy of interlibrary lending in 1917, and union catalogs had come into being in the 1920's and 1930's, with the National Union Catalog being founded in 1927 and a variety of local union catalogs in the mid-1930's. Financial support of libraries in the United States in the mid-1960's was good, and librarians were familiar with computation because a few libraries had already begun to use computers.

On the other hand, there were some hurdles to be sur-
mounted in terms of the environment for computerized library networks, the major hurdle being that already mentioned, namely that there was no major computerized library network in existence. Also in 1967 there were no cathode ray tube terminals with lower-case characters, and it was certain that libraries would not accept cataloging all in upper case. Moreover, in 1967, there were no files of MARC records although the design of the OCLC system did not require the existence of such a file. Finally, for cataloging, it was imperative that a retrieval system exist that would swiftly and accurately retrieve single entries from an online catalog, and in 1967 all retrieval systems were designed to retrieve as many entries as possible relating to some specific subject.

It was decided that the system to be designed should be a comprehensive library system that would not mimic existing procedures, but would produce new benefits by new means. The principal benefits to be striven for were increasing the availability of the resources in all the network libraries to individual patrons at individual libraries, while at the same time reducing the rate of rise of per-unit costs in libraries.

Toward the end of the 1960’s there was extensive concern about library expenditures, and during the next half dozen years several publications appeared on the economics of libraries, culminating in 1973 with the appearance of Economics of Academic Libraries. This book revealed that unit costs in academic libraries in the 1950’s and 1960’s had been rising seven times more rapidly than the Producer’s Price Index then known as the Wholesale Price Index. Clearly, libraries were headed toward financial bankruptcy or educational and research bankruptcy in the form of reduced financial resources for acquiring published materials. At the very least it could be said that the rapid rise of per-unit costs would endanger the economic viability of libraries. Indeed, in the 1970’s, society began to support libraries less and less, so that in terms of real dollars U.S. libraries have less financial support than they did a decade ago.

The comprehensive library system that the network would
make possible was designed primarily to benefit library users while at the same time benefiting library staff. It consisted of six major subsystems: 1) shared cataloging and an online union catalog, 2) interlibrary lending, 3) acquisitions, 4) serials control, 5) public service including online local catalogs, and 6) circulation control. The first system to be implemented was the shared cataloging and online union catalog.

The online catalog was brought into being with an entirely different design from the linear arrangement of entries in the traditional bookform and card catalogs of the previous four centuries. Rather, the online catalog consists logically of many miniature catalogs averaging fewer than ten entries. This entirely new design was influenced largely by the development of a retrieval system employing derived truncated search keys.

It was realized that the basic design for retrieval from the online catalog must depend on the bibliographic description of items in the catalog and not on any number system. Hence, experimentation was done that led to the development of the derived truncated search key technique. These keys make possible retrieval by author, by author and title, and by title. The basic author key comprises the first four letters of the author's surname and the first letter of his first forename; the author and title key comprises the first three letters of the author's surname and the first three letters of the first non-article word of the title; and the title key is the first three letters of the first non-article word of the title followed by the first letter of the next three words. Two or three additional letters can be added to these keys, as well as other types of qualifiers. The basic keys for Heng-hsiung Cheng's Chuan Kuo Tsa Chih Chih Nan are: CHEN, H, (author); CHE, CHU (author/title); and CHU, K,T,C (title). It was found that these basic keys were adequate for swiftly and accurately retrieving titles from a large online catalog. Known document retrieval techniques were developed first, for it was known at that time that from two-thirds to four-fifths of the use of a library catalog was to locate a known document.
Figure 1 demonstrates the close similarity between the three-corner code of Chinese characters and the OCLC derived search keys. Indeed, existing OCLC programs with hardly more changes than in their parameters could be used for the organization of an online catalog in Chinese characters and for retrieval from that online catalog. As for retrieval, three-corner coding will yield more specific results, because it employs twice as many seven-bit symbols as does the OCLC system, while at the same time it uses 99 numbered symbols, as compared with the 36 alphanumeric symbols in the OCLC procedures. The most striking revelation in Figure 1 is that a computer can process codes for Chinese characters and for words in roman alphabets in exactly the same way, and that cataloging in Chinese characters and roman alphabets could be processed interchangeably in the same computerized system.

The last major event in the initial design of the OCLC system was the selection of the central computer. This selection process among a variety of computers proved to be too complex to be resolved by human minds. Hence, OCLC employed a company specializing in simulation analyses to determine the processing capabilities for OCLC specific type of activity as an important element in choosing a computer. Actually, only three of the computers proposed by ten different computer manufacturers possessed the capability required by OCLC. A subsequent trade-off study, including the results of the simulation as well as other elements such as price, manufacturer’s support, and ease of programming, led to selection of a Xerox Sigma 5 computer. A decade later OCLC had 10 Sigma 9 computers.

OCLC Today

As of 30 September 1981, participating institutions on the OCLC network numbered 2706, of which 1969 were directly connected to OCLC by private tie-line telephone circuits. The
other 737 participants access the OCLC central site via dialup procedures using TYMNET or calling OCLC directly. A recent count revealed that there are over six thousand libraries in these 2706 participating institutions. Table 1 presents a classification of the institution by type of activity.

Also on 30 September 1981, there were 4189 special OCLC cathode ray tube terminals in the 1969 institutions directly connected with OCLC, on more than two hundred and fifty thousand kilometers of telephone tie lines. At the central site in Dublin, Ohio, there are ten large computers, three medium-sized computers, and more than fifty minicomputers.

The online union catalog contains 7.7 million title entries to which are attached 103 million locations. New catalog records enter the union catalog daily at a rate of 500 Library of Congress MARC records, while participating institutions enter 3500 records from terminals each day.

OCLC operates on the revenue it receives for providing its processes and products to the participating institutions. This year its revenue will be in the vicinity of $39,000,000 and it possesses assets in the amount of $61,000,000. Of the revenue earned by supplying online processes to libraries, 84.4 percent comes from shared cataloging and related activity, while 7.4 percent is generated by the online interlibrary lending system. Other online systems generate the remaining 8 percent.

The major benefits that OCLC brings to libraries are attainable only by computerized online interactive networking. The three major benefits are: 1) reduction in the rate of rise of per-unit costs within libraries; 2) increase in the availability to users of library resources; and 3) provision of information, particularly cataloging information, when and where it is needed.

As already mentioned, the shared cataloging system with its various processes comprises more than four-fifths of OCLC's online activity. Libraries that change their procedures and organization to attain cost benefits by using OCLC have found not only that they can reduce the rate of rise of their costs, but also that
they can make real savings. Academic libraries in Ohio, before participating in OCLC, were cataloging materials at the rate of about three titles per hour per professional cataloger, whereas several years after participation they were averaging fourteen titles per hour when a cataloging record was already in the online catalog. Today, libraries on average find a cataloging record 95 percent of the time they request one. Other benefits of the shared cataloging and union catalog system are making resources available with the 103,000,000 location listings attached to the 7.7 million entries, providing cataloging information at the terminal within a library when that information is needed, and producing catalog cards in their final form and arranged in packs for filing in specific catalogs in specific libraries.

The online interlibrary lending system provides libraries with a procedure for requesting a loan from up to five libraries until it finds a lender to fill the request. Among the benefits are cost reduction in the interlibrary loan processes, as compared with the traditional manual processes. Ninety-one percent of the interlibrary loan requests are based on the online union catalog, with the system automatically filling out the bibliographic information for the requester. On average, requests go to 1.7 institutions before being filled. The interlibrary loan system obviously increases availability of resources in other libraries, for at the present time it enjoys about ninety percent success rate.

The Future

OCLC has begun to extend provision of its processes and products internationally, and has established an office, OCLC/Europe, in Birmingham, England. Two British universities are conducting initial trials of the OCLC system, and will be operating full time on the system after the transatlantic telephone circuits are installed near the end of 1981. Other British libraries will come on to the system following the operation of the transatl-
lantic telephone circuit. Various libraries in northern European countries have expressed interest in participating in OCLC, and it is likely that they will be on the system some time following 1982.

The more distant future, namely the last half of the present decade, will bring exciting new developments for libraries in the form of videotex systems and electronic publishing. British Telecom, the British government's telephone agency, first developed a videotex system in the latter part of the 1970's. This system, known as Prestel, has been licensed or served as a model for videotex systems in other European countries, Canada, and Japan. Videotex consists of a central computer or computers having files of information in their secondary memories that can be made available over ordinary residential or office telephone lines for display on television sets. The subscriber dials the telephone number from a home or office telephone that connects with the central computer. Once the connection has been made, the telephone instrument is placed in an adaptor connected with the television set and a small touch pad that is used as a terminal. Using this pad, the subscriber can then search the data base for various types of information, including library information.

OCLC developed a videotex system and put it on trial during the last three months of 1980. This trial system provided 200 homes in Columbus, Ohio, with four types of data bases. First, there was the catalog of the Columbus Public Library as well as the text of a computerized encyclopedia. Next there were a variety of community data bases providing such information as a calendar of local events, information about qualifying to vote and procedures to register to vote, and local recreational activities. The third group of data bases were two interactive teaching systems for small children, one of which assisted parents in teaching young children to read and the other provided children in elementary schools with assistance in learning arithmetic. Finally, there was a home banking trial conducted by one of the banks in Columbus, Ohio. A study of the use of these data
bases after the trial was complete revealed that participants were willing to pay money for various information data bases, with the availability of the online computerized encyclopedia ranking highest; next came access to the catalog of the local public library; and third was home banking.

In summary it can be said that the 1970's witnessed the development of online computerized interactive library networks that provided libraries and therefore their users with a variety of benefits, including reduction in rate of rise of per-unit costs in libraries, increase in availability to individual users of resources both within his library and from other libraries, and also supplying information to library staff when and where the staff needed that information. The 1980's will see a continuing development of these procedures, not only in the United States and the few countries outside the United States where such networks now exist, but also in other countries by extension of existing networks. In addition, however, librarians in the 1980's will enjoy further interesting developments in the form of videotex making library information available when and where it's needed in the home and office. At the same time, electronic publishing will provide libraries with information in new ways by new means, and will make it possible for libraries to access information hitherto unavailable to them because of costs. Similarly, electronic publishing will make it possible for libraries to furnish their users with information in ways that Gutenberg technology did not make possible. An exciting decade lies ahead.
Table 1. Number of OCLC Participating Libraries by Type as of 1981 September 30.

<table>
<thead>
<tr>
<th>Number of Libraries</th>
<th>Percent of Total</th>
<th>Type of Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>1516</td>
<td>54.2</td>
<td>College and University</td>
</tr>
<tr>
<td>457</td>
<td>16.4</td>
<td>Public</td>
</tr>
<tr>
<td>329</td>
<td>11.8</td>
<td>Federal Government</td>
</tr>
<tr>
<td>193</td>
<td>6.9</td>
<td>Special</td>
</tr>
<tr>
<td>179</td>
<td>6.4</td>
<td>For-Profit Organizations</td>
</tr>
<tr>
<td>48</td>
<td>1.7</td>
<td>Library School</td>
</tr>
<tr>
<td>39</td>
<td>1.4</td>
<td>School</td>
</tr>
<tr>
<td>34</td>
<td>1.2</td>
<td>State Government</td>
</tr>
<tr>
<td>2795</td>
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Fig. 1. Comparison of Chinese Character Three-Corner Codes and OCLC Derived Search Keys.
References


