

CD-ROM CHALLENGES AND OPPORTUNITIES: ISSUES OF CONCERN TO LIBRARIANS - AN INTRODUCTION

By Bill Bartenbach

Introduction

No other new technology has so captivated the library and information community in recent years as CD-ROM (Compact Disc-Read Only Memory). Since the first commercial products became available in 1985, there has been a tremendous growth in the number of CD-ROM producers, vendors and titles. Surveys of CD-ROM database titles show growth not only in titles reaching the library community but also in titles for the home, with no slowdown in sight. Fixed costs, ease of use, and the absence of the psychological pressure of the ticking meter has encouraged libraries to make CD-ROM searching available to their patrons. Both librarians and patrons have embraced the new technology and the library literature is full of success stories. In many ways, librarians are now challenged to deal with a popular technology. At the same time, issues have emerged that are of concern to librarians. Some of these issues were addressed in the CD-ROM workshop entitled, "CD-ROM Challenges and Opportunities: Issues of Concern to Librarians." The workshop was sponsored by the Social Science Libraries Section of IFLA during the 1993 IFLA Conference in Barcelona. This introductory paper is a condensed and revised version of a paper previously given at the International Conference on New Frontiers in Library and Information Services, held in Taipei in May 1991. The paper will address some of the CD-ROM issues that are of concern to librarians.

The Need for Planning

The growing popularity of CD-ROMs poses challenges that require careful thought and planning. Therefore, it is worthwhile to examine some of the implementation issues brought about by the growing number of CD-ROMs in libraries. Implementation requires assessment of the changing, emerging technology and planning for the future.

In comparison to online searching, CD-ROMs have made financial planning easier for library administrators, because expenditures are predictable and thus

can be incorporated into the annual library budget. However, there is real concern among librarians, working under severe budget constraints, regarding the costs of CD-ROM discs.

CD-ROM Networks

Many libraries have implemented or plan to implement CD-ROM networks. CD-ROM local area networks allow multiple users at different locations convenient access to multiple databases, in a secure environment, at a lower cost for hardware and software than multiple single-user workstations. Providing access to CD-ROMs from any workstation connected to the network not only pleases the users but also eliminates the loading of software on every workstation. Convenient access and ease of use may also help library administrators to obtain funding for CD-ROM networks.

Difficulties regarding networks fall into two categories, technical and legal (or licensing). The acquisition, installation and ongoing use of networks are complex and require a high degree of technical expertise. When the technical difficulties have been overcome there are still legal questions to be resolved. Database producers and vendors have developed licensing policies for CD-ROM networks but have not been able to arrive at a standard policy.

Network Security

When a library makes a large number of databases available, security becomes a major issue. Networks permit permanent mounting of CD-ROM databases in nonpublic areas, allowing only authorized library staff control over the databases and thereby minimizing the number of persons having to handle the discs. Multiple CD-ROMs on a network require a menu system from which the user can select the appropriate database to be searched. Menus also fulfill a security function. They help to avoid or reduce error messages, end keyboard lockups and can prevent users from exiting to the disk operating system (DOS). Preventing users from getting into DOS protects programs and data files. Users could create havoc in these files or contaminate them with computer viruses.

Usage information

Many networks include software that tracks the usage of the various CD-ROMs, providing valuable management information that can be useful for reference work and in collection development decisions. Usage can be tracked for each database by day and aggregated by week, month and year.

Network Performance Issues

There is general agreement that multiple access to the same CD-ROM disc slows down response time. Library administrators need to make a careful evaluation of the performance of local area networks.

Tests show that as the number of simultaneous requests go up response time slows down. It is, therefore, not surprising that some libraries opt for site licenses of the magnetic tape to offer databases through a network connecting to their mainframe computer. It provides simultaneous access to a larger number of users at a faster time.

Silver Platter, a CD-ROM vendor, makes available databases on CD-ROM which can then be loaded onto a magnetic system using an automated copy procedure. Searching is up to ten times faster than CD-ROM, and up to 25 users can search the same database and multiple years simultaneously.

Dial-in Access

Students and faculty have asked for dial-in access. It is natural that patrons would like to have the greatest possible convenience to access databases from their dormitories or offices at any time of the day. Dial-in access requires a terminal or personal computer with a modem, a phone line, remote communications software and passwords to prevent unauthorized access. At the library a host computer is needed that will accept dial access and process the information entered at the remote workstation. Dial-in access presents a host of technical problems, therefore, it is advisable to engage a consultant, if technical expertise is not available in-house.

Document Delivery

It has been said that some libraries operate with 20th Century bibliographic retrieval systems that make citations instantly available and 19th Century text retrieval systems in which the item needed is often not available locally and may take weeks to obtain.

The ease of obtaining bibliographic citations has brought with it increased demands for full-text documents. It is quite natural for a library patron who has found the bibliographic citation to expect the library to supply the actual document. Library patrons become easily frustrated if they cannot obtain the full text and exert pressure on libraries and database producers to make the delivery of the full text more easily available.

Inter-library Loan

Online searching has stimulated heavier demand for periodicals and for inter-library loans. The same development has been extenuated by the introduction of CD-ROMs and librarians report a substantial increase in inter-library loan requests. Coincidentally, interlibrary loan librarians report that the quality of bibliographic citations has improved. In many cases, they receive the computer printout of citations from the various CD-ROM databases.

Fax transmission

Inter-library lending has traditionally been a slow process although the fax revolution of recent years has provided opportunities for quick delivery of information. Unfortunately, most libraries still have to go through the tedious process of photocopying, to be followed by fax transmission, sometimes to be followed by a second photocopying at the receiving library, due to the fact that print on thermal paper has a tendency to fade, making documents illegible over time.

Full Text on CD-ROM

CD-ROM has been an excellent publishing medium for bibliographic citations. However, bibliographic databases have also made library patrons aware of the limitations of their libraries. Publishers have responded to the need for full text information by providing it in microform format, online, and more recently on CD-ROMs.

The advantages of combining bibliographies and full-text on CD-ROM are obvious. At a single workstation it is possible to search for the bibliographic citation and to retrieve the full text instantly. It is a very efficient way of doing research as it reduces both time and frustration of library patrons in searching and locating information. The patron does not have to go through the time consuming process of looking for the journal issue, is not frustrated by missing or mutilated issues and does not have to spend time at the photocopying machine. It also reduces the time required for library staff to assist patrons in locating information or to deal with it in the Interlibrary Loan Service.

The disadvantages of full-text on CD-ROM are in their lack of currency and browsability. CD-ROMs are usually behind printed publications and cannot be browsed as easily as their printed counterparts. CD-ROM full-text databases will place an additional burden on librarians to educate users which titles are available in print, which ones are on microforms, and which ones are on CD-ROM. It is

also possible of course that journals may be available in all three formats, with different starting and ending dates.

ASCII Full-Text Databases on CD-ROM

There are two ways of making full-text information available on CD-ROM, as ASCII files or as image databases. The advantage of ASCII files is that they are searchable. However, graphs, charts, chemical and mathematical symbols present difficult problems for ASCII files and the databases generally exclude them.

Halftone illustrations are impossible to include in ASCII files. Although it is possible to search ASCII files, searching of fulltext databases can be very difficult. It is generally agreed that the sheer volume of uncontrolled vocabulary terms in the database will lead to excellent recall but very low precision in searching.

Image Databases

Digital scanning is used to obtain high quality images of document pages. The pages are exact replicas of the original magazine article, including all illustrations. Exact images are achieved by a process called bit-mapping, whereby the laser scans a page from left to right and produces a bit stream of zeros and ones. Scanned images require substantially more storage space than ASCII text.

University Microfilms International (UMI) offers links between bibliographic databases and the full text image database on CD-ROM. Periodicals in these databases are scanned cover-to-cover, displaying the images of every page, including the table of contents, photographs, graphics, illustrations and advertisements.

The bibliographic databases are searched on CD-ROM. The screen shows whether the full text of an article is available on CD-ROM. Simply by pressing the Enter key the user is instructed to insert a particular compact disc containing the full text of the article. The copies, printed on a laser printer, are high quality reproduction of the pages.

ADONIS is a CD-ROM document delivery service in which images of pages from journals are made available on CD-ROM to fulfill delivery requests. ADONIS collects royalties on behalf of the publishers. Resolving the copyright issue was, of course, a major reason for publishers to agree to participate in ADONIS. Librarians and journal publishers have had heated discussions throughout the years regarding photocopying in libraries. Publishers were concerned that photocopying had reached such proportions that it was leading to libraries cancelling subscriptions.

Document Delivery and Optical Discs

Document delivery will become increasingly important as libraries become less concerned with library holdings and more with providing access to information. Optical storage and delivery of full-text information is emerging as a technological solution and can be seen as an opportunity for libraries which have started to experiment with such systems. On the other hand, this development is of great concern to publishers who fear for their journal subscriptions.

Full Text Document Delivery Experiments

A variety of projects in document delivery has been carried out in recent years, such as the Library of Congress Pilot Project that stored images of pages on optical discs. Also noteworthy are the automated document delivery system experiments carried out by the National Library of Medicine and the National Agricultural Library, as well as the projects by the Commission of the European Community, such as the APOLLO Project (digital facsimile transmission), the DOCDEL experiments, including work on full-text electronic journals. In the United Kingdom, the BLEND Programme and the Project Quartet explored electronic journals.

The Need for Integrated Workstations

Hybrid systems

The most persistent complaint regarding CD-ROMs is the proliferation of search software and the need for a common command language. The standards developed by NISO (the National Information Standards Organization of the United States) and ISO (the International Standards Organization) have not been adopted by many organizations.

In the meantime some CD-ROM producers replicate the search languages of online systems. If a user has learned how to search an online system he or she will be able to search the disc and vice versa. In effect, the CD-ROM system becomes an educational tool for learning how to search the online system, at no incremental charge to the library. Furthermore, an integrated (or hybrid) system will allow automatic saving of the search strategy, automatic log-on, and re-executed of the same search strategy on the online system. In such an update search the system will automatically limit the search to information published since the mastering of the last CD-ROM disc.

Integrated Workstations

To optimize the use of microcomputers it is desirable to integrate all information activities in the workstation, from searching to the actual delivery of the document.

Engineering Information (Ei) has developed the software for such an integrated software package and is currently testing it in a variety of libraries. The Ei Reference Desk, operating in the Microsoft Windows environment, provides for CD-ROM browsing and searching, by accessing its current awareness service, called Ei Page One. Searchers also have the ability to capture citations, to review them and to order full-text documents electronically. The software also provides the option of manual document ordering by filling out an electronic order form. The Ei order module provides for automatic dial-up to connect to the Ei Document Delivery Service and to upload the orders for full-text documents. The user can specify shipping and billing information in the customer profile. The documents can be supplied in a variety of ways, by mail, Federal Express, facsimile transmission or as an image file sent directly to the computer through Internet. The Ei Reference Desk provides the integration of bibliographic searching, ordering and receiving of the full-text document.

The Future - Multimedia

Multimedia optical products are upon us. Adding audio, graphics and video to the computer is a logical progression. This development has brought with it the expansion into the home market. Predictions abound that a multi-billion dollar market will develop within a few years.

CD-I (Compact Disc Interactive) is a joint development by Philips and Sony, integrating text, audio, video, and graphics, allowing users to interact with the application. Compact Disc-Read Only Memory Extended Architecture (CD-ROM XA) is also a joint development by Philips, Microsoft and Sony and includes text, graphics, FM-quality audio with a small video window on a standard CD-ROM. CD-ROM XA is particularly useful for interactive training. Digital Video Interactive (DVI) is under development by IBM and Intel with Microsoft, although its initial development had taken place at RCA's David Sarnoff Research Center. DVI allows audio, still images, text, computer graphics and up to 72 minutes of interactive full screen and full-motion video on a single CD-ROM disc. IBM announced that it will be very aggressive in the multimedia market. Over time IBM intends to integrate multimedia capabilities as native functions with the personal computer system.

Conclusion

Information technology is changing rapidly. The number of database producers and librarians sitting on the sidelines wondering whether CD-ROM will be just a passing fad and whether it will be obsolete in a few years are dwindling. Growth of CD-ROM titles continues unabated and no slowdown is in sight. In part, the growth is due to the ease with which an online file can be converted to a CD-ROM file. Publishers have recognized CD-ROM as an alternative delivery mechanism for information that has already been created in machine-readable format. At this time, most CD-ROMs are replications of online databases, but that is likely to change as new products are being developed.

Despite its success, the CD-ROM technology is still seen by some as an intermediate technology and there is the fear of obsolescence among database producers, vendors and librarians. However that may turn out, the important fact remains that information has been made machine-readable and been organized in a way that will make it retrievable, whatever new information technology comes along. The intellectual effort that has gone into the creation and organization of the information will not be lost.

What is most important, however, is user acceptance of CD-ROM. There is little doubt that CD-ROM has had a positive impact on the library community, although it has added to the workload of librarians. Library patrons are enthusiastic about CD-ROMs. Their use is growing as more people learn about them and new databases become available on CD-ROM. Library patrons make positive comments about CD-ROMs and the availability of such tremendous information resources. They are thankful for saving them time and for making library visits less frustrating.

Local area networks will provide even wider access to CD-ROM databases. The linking of bibliographic data with full-text, and the efforts of libraries to improve document delivery through optical discs, is greatly appreciated by library patrons.

One of the most exciting prospects of the new technology will be the introduction of new information products, whether they be segments of existing databases, combined subsets of different files, full-text products, or multimedia compact disc including sound, images, graphics and motion video. The introduction of multimedia compact discs in the 1990's changes information delivery and learning in a profound way. Publishers have an opportunity to be innovative in the

way they deliver information and librarians and library patrons will benefit from these innovative new information products.

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