

On-Line Search Services: Implications for Libraries and Library Users

The recent rapid growth of on-line searching of bibliographic data bases by libraries is having considerable impact on the information community. This article discusses some of these effects from the point of view of the search service facility at the University of Pennsylvania. Among the implications for library users are an increased appreciation for the complexities of information handling, a greater acceptance of fees to help defray on-line search costs, and accelerated demands upon other supportive services. The implications for libraries include an inevitable increase in the costs of maintaining the services, the necessity of charging fees to patrons in order to minimize these costs, and a continuation of a trend in academic libraries toward personalized services for individual library users.

ON-LINE, INTERACTIVE SEARCHING of bibliographic data bases is here to stay in academic and research libraries. Indeed, the increasing number of public and smaller academic libraries currently committing themselves to on-line search services is demonstrating that, in a very few years, on-line searching will likely be as common in most libraries as conventional reference service is today.

But while the continued growth of on-line services is assured, the effect that this growth will have on libraries and their users is far less certain. Until recently, the relative novelty of on-line searching has kept librarians somewhat in awe of its potential. Now the novelty is wearing off, and much of the enthusiasm that accompanied the advent of these services has given way to a certain uneasiness about their future.

With few exceptions (most notably an article in *Library Journal* by Gardner and Wax,¹ there has been little effort to examine

the fundamental impact of what is clearly one of the most important developments to have occurred in the field of information exchange. Since 1973, when the increase in on-line searching began in earnest, literature on the subject has dealt primarily with the transitional aspects of manual or off-line versus on-line search capabilities,² the practical implementation of on-line services,³ or general state-of-the-art surveys and review articles.⁴ This is hardly surprising since, up to now, there has simply not been a sufficient reservoir or experience upon which to base any reliable speculation. But now that on-line searching has clearly established its importance, it should be possible for some of the institutions that shared its initial growth to assess some of its implications for the future.

This paper will seek to outline some of the essential ramifications of on-line bibliographic search services as they affect two segments of the information community: the individual information user and the libraries offering the services. The implications of the services will be discussed from the perspective of the data services office of the Uni-

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versity of Pennsylvania's Van Pelt Library. This office, discussed in an earlier article by Randolph E. Hock,⁵ was established in July 1973 within the central university library's reference department to administer on-line search services in disciplines exclusive of the biomedical sciences. (A separate on-line search facility in the medical school of the university serves the medical and life sciences disciplines.)

IMPLICATIONS FOR INDIVIDUAL INFORMATION USERS

The availability of on-line search services is precipitating a number of changes in the attitudes of users toward libraries and librarians. The extent of these changes is not easily measured and is now largely a matter of conjecture, but there are nevertheless indications that changes are occurring.

Increased User Sophistication

One of the more subtle yet perhaps most significant changes may be an increased appreciation for some of the complexities involved in the process of information retrieval. At the data services office the vast majority (over 90 percent) of on-line searches are performed by a trained reference staff member, with the requesting patron present at the computer terminal. This approach, which is the preferred method of rendering search services at Penn (and at most other academic libraries),⁶ permits the personal, one-to-one exchange between requestor and reference professional, which maximizes the interactive capabilities of on-line searching. Further, it allows a degree of individual attention to specific user needs that is only rarely encountered in conventional literature search methods.

At the University of Pennsylvania a typical on-line search requires close to one hour of professional staff time, of which only fifteen minutes, on average, is spent in performing the actual computer search. The remainder of the time is occupied by the most important part of the search process, the presearch interview, which lasts some thirty to forty minutes. During this interview, the reference professional explains in detail the content and structure of individual data bases, the various means of access to them, and their capacities as well as

limitations. The information requestor frequently learns of the existence of a thesaurus of controlled vocabulary in his or her field, of the phenomenon of citation indexing, or of the availability of additional data bases that may further aid the search for relevant literature.

During the actual computer search, the first-time user is often visibly impressed by the power of on-line services. Even relatively sophisticated library users can be surprised by the sheer bulk of material that may exist in just one data base. Regardless of the degree of patron sophistication, however, searchers at the university have observed that patrons of the services are much improved in articulating their needs on subsequent information requests, whether using on-line or printed bibliographic tools. The user, in short, takes away from his or her experience not merely a printed bibliography of relevant materials, but also a greater awareness of what is involved in coping with an information explosion.

User Attitudes toward Fees

This increased awareness may also help to explain another perceived change in user attitude. The question of charging fees for on-line services will be dealt with below, but a discussion of user response to those fees is appropriate at this time.

The experience of the data services office suggests that, on the part of academic library users at least, there is a high degree of acceptance of charges for such services. Since August 1974 this office has attempted to solicit feedback on the effectiveness of its services by enclosing a brief questionnaire with each patron's bill. The decision to mail the questionnaire with the billing invoice was made in the hope that each patron would better evaluate the results of the search in direct comparison to its cost. Three of the ten questions asked were formulated in a deliberate attempt to ascertain the level of user acceptance of fees. Those questions, in order of their appearance on the form, were: (1) "Do you feel the cost was reasonable?" (2) "Were you satisfied with the service?" and (3) "Would you use the service again?" Each respondent was asked to choose from among five responses ranging from "Yes, definitely" through "Un-

decided" to "No definitely," with space made available to comment further if desired.

From the time the questionnaire was instituted in August 1974 through the end of December 1976, a total of 411 patrons were billed for on-line searches and received the questionnaire. Of this number, a total of 156 patrons returned their questionnaires, a return rate of 38 percent. In response to the first question, "Do you feel the cost was reasonable?" 135 of the respondents (87 percent) answered "Yes" or "Yes, definitely" while only 11 (7 percent) answered "No" or "No, definitely." With regard to user satisfaction, 126 patrons (81 percent) similarly indicated that they were satisfied compared to 13 (8 percent) who answered that they were not. Finally, in response to the third question, 128 patrons (82 percent) answered that they would use the service again, while only 3 (2 percent) indicated that they would not.

Just how representative these response rates are in indicating overall user attitudes is, of course, open to question; but a survey undertaken by the Massachusetts Institute of Technology libraries in 1974 and 1975 reported a similarly high degree of user satisfaction with regard to services and fees.⁷

In addition, companion statistics compiled by the data services office tend to further support the contention that the majority of academic users are willing to bear a portion of the costs for on-line searching. Over the same seventeen-month period involving the questionnaires, 30 percent of the total patrons were repeat users, and another 40 percent had requested searches as a direct result of recommendations from former patrons of the services. This high degree of patron satisfaction, when combined with the increased user sophistication discussed earlier, may explain the overall positive response toward fees for on-line services.

Increased User Demands

Indications of greater patron appreciation for the complexities of information handling and of their willingness to bear a larger portion of its costs may be good news to most librarians, but it should not be grounds for complacency. Libraries undertaking on-line searching, particularly those charging fees,

should be aware that a third impact of the services will likely be an overall rise in the level of patron expectations regarding other library services. Some of the specific implications of this for libraries will be discussed at the conclusion of the following section of the paper.

IMPLICATIONS FOR LIBRARIES

The first and most important fact to be understood about on-line search services is that, for most noncommercial libraries, these services represent a new and significant *addition* to the traditional reference repertoire. The on-line search is a highly personalized service typically resulting in a bibliography uniquely tailored to a particular individual's information needs. It is a service that most academic and public libraries have not previously provided for their patrons. Any commitment to on-line searching will, therefore, require a corresponding allocation of additional staff time, equipment, and funds to maintain the services.

Cost Increases

The following estimates of major costs incurred by the data services office at the University of Pennsylvania may serve to illustrate. During the fiscal year July 1976 to June 1977, a total of 420 on-line searches were performed. (For statistical purposes a "search" is defined as accessing one specific data base for one individual's information request.) Estimating one hour of staff time per search and calculating a cost of approximately \$6.75 for one hour of professional staff time, the total personnel costs for the year were \$2,835. (This estimate is based upon the average yearly gross salary at the University of Pennsylvania Libraries for classification Librarian II, at forty hours per week.)

The total on-line costs (including connect time, printing, and network communications) from the three system vendors (Bibliographic Retrieval Services, Lockheed Information Systems, and System Development Corporation) amounted to \$7,800. Thus even before considering costs for equipment, training, or general overhead, the amount needed to support this search service for one year was approximately \$10,000.

The important point to remember is that this figure represents an *added* cost to the library. No staff services or bibliographic tools have been replaced by the search services. In fact, it is unlikely that academic libraries will be able to realize any appreciable cost savings by implementing the services. Instead, indications are that, for the foreseeable future, libraries are likely to incur still greater costs for on-line searching.

There are a number of reasons for this: First, few academic libraries will be able to eliminate altogether their subscriptions to printed indexing and abstracting tools. To do so would unduly penalize those unwilling or unable to pay the requisite fees for on-line access to those same data files. For some time yet, most academic libraries will be obliged to maintain a minimum number of already expensive bibliographic tools, whose subscription bases shrink and copy costs escalate annually.

Second, the very pressures that might prompt some libraries to drop sets of expensive printed tools in favor of exclusively on-line access may ultimately lead to substantial increases in the costs of the on-line product itself. A recent article by Donald King pointed out that if the present trend away from printed sources in favor of computer access continues, the abstracting and indexing services will be forced to recover their own costs through higher on-line royalties.⁸

Finally, it must be remembered that, regardless of changes in print or on-line costs, a third factor—personnel costs—shows no sign of diminishing. Currently, large amounts of professional staff time are required to effectively perform on-line searches. While this time element is bound to diminish as user sophistication grows and on-line systems become more simplified, the overall labor costs involved are likely to increase still further before they decline.

Necessity for Charging Fees

In order to contend with the inevitable added costs of these new services at a time when funding for existing services is being stretched beyond its limits, many academic as well as public libraries have resorted to charging fees for on-line services. This chal-

lenge to the traditional concept of "free" access to information has prompted considerable debate on the ethics of cost recovery by libraries. Significantly, at the ninety-sixth Annual Conference of the American Library Association, both the council and a large majority of the membership of ALA voted in favor of a resolution affirming "the concept of access to information, without charge to individuals, in . . . publicly supported libraries."⁹

Although the resolution deals emphatically with the issue of fees, it is virtually silent on the larger issue of how libraries are to fund these additional services. Implicit in the resolution is the idea that more support from public funding must be provided; but current governmental priorities indicate that sufficient aid from this sector simply will not be forthcoming. Unhappily, the costs of handling information are fast outpacing the traditional means of libraries to meet those expenses. The only real alternatives to charging fees appear to be to cut back still further on existing services or to discontinue on-line services altogether. Faced with choices such as these, the question to be answered by most libraries will be not *whether* to charge, but rather *how much* to charge for on-line searching.

Since January 1974 the data services office has charged fees for on-line searches. From the outset, however, it was recognized that total cost recovery was neither justifiable, in view of the traditional service orientation of the library, nor practical, due to the elusive nature of the overall cost factors involved. A logical compromise seemed to be partial library subsidy for staff time, equipment, and general overhead, coupled with a payment by the patron to recover most of the direct costs charged by the on-line system vendors.

Table 1 summarizes the direct vendor costs and patron charges of the data services office over the past three fiscal years. Column A lists the number of searches performed in each year; column B gives the total amount billed to patrons for searches; and column C lists the total costs charged by the on-line vendors for computer connect time, off-line printing, and network communications.

Only in the past two years have patron

TABLE 1
Patron Charges and Vendor Charges to Library for
On-Line Search Services, University of Pennsylvania Libraries

Fiscal Year	A. Number of Searches	B. Charges to Patrons	C. Vendor Charges to Library
1975	162	\$3,600	\$8,100
1976	347	\$5,800	\$7,100
1977	420	\$6,500	\$7,800
TOTALS	929	\$15,900	\$23,000

fees been sufficient to recover most of the direct costs charged by the vendors. (Added costs for training, demonstrations, and the like account for the higher cost overrun in the first fiscal year.) If costs for staff, equipment, and overhead were added to the vendor charges in the most recent period, the patron share of the overall search costs would be only slightly more than 50 percent.

In academic institutions there is ample precedent for compromises in which persons most directly benefiting from a particular service bear a larger portion of its costs. Additional laboratory or computer fees are commonplace in many college-level courses, and students as well as faculty have become accustomed to charges for using various athletic and recreational facilities. In each case, the added fees merely help to maintain the availability of such services to all institutional members without unduly penalizing members who do not choose to use the services. Notwithstanding the ALA resolution, a growing number of academic and public libraries will rely on similar cost compromises to fund on-line searching.

Impacts of User Demands

But while user charges may be a necessary complement to on-line search services, it should be recognized that their imposition may cause patrons, with heightened expectations toward efficient information retrieval, to feel justified in demanding improvements in related library services. Some examples of these demands have already become apparent. An increasing number of users are expressing the need for greater ease in document access to match their newfound ease of bibliographic access. As a result, demands upon interlibrary loan and other cooperative library efforts, already

on the increase, are sure to receive further impetus.

Pressures are likewise being felt to make on-line services more readily available to a greater number of library users. As one consequence, large research libraries with a centralized search facility will likely be obliged to decentralize in order to serve a more diversified clientele. A final example of patron demand is the shift in user emphasis from off-line printing of relevant citations, with risks of delay in the mails, to the more immediate on-line printing alternative. The resulting pressure to replace long-familiar 300 baud (thirty characters per second) terminals with more expensive 1200 baud (120 cps) terminals is steadily mounting.

Of these few examples, the increased demand for document delivery is clearly the most significant. The recent recommendation by the National Commission on Libraries and Information Science (NCLIS) to establish a National Periodicals Center at the Library of Congress¹⁰ underscores the priority of librarians to streamline the conventional channels of document access.

Ultimately, the document procurement problem will most likely be handled on-line at the same computer terminal through which literature searches are now performed;¹¹ but it will be some time before the technical possibility of on-line text retrieval becomes an economical reality. When it does, it is likely that the question of fees for such a personalized information service will again emerge. The solutions reached by individual libraries concerning library subsidies and patron charges for bibliographic search services may be used in the future as guidelines for financing this, the final step in the information retrieval process: the delivery of the documents themselves.

REFERENCES

1. Jeffrey J. Gardner and David M. Wax, "On-line Bibliographic Services," *Library Journal* 101:1827-32 (Sept. 15, 1976).
2. Some examples of articles dealing with the transitional aspects of manual versus on-line searching are: Margaret M. Bivens, "A Comparison of Manual and Machine Literature Searches," *Special Libraries* 65:216-22 (May/June 1974); Stanley A. Elman, "Cost Comparison of Manual and On-line Computerized Literature Searching," *Special Libraries* 66:12-18 (Jan. 1975); Ronald M. Kaminecki and others, "Searching CA Condensates, On-Line and Batch," paper presented at the annual meeting of the American Chemical Society, Chicago, Ill., Aug. 26, 1975 (available as ERIC document ED 121303).
3. Some examples of publications dealing with the practical implementation of on-line search services are: Jeffrey J. Gardner, David Wax, and R. D. Morrison, Jr., "The Delivery of Computer-based Bibliographic Search Services by Academic and Research Libraries," *ARL Management Supplement* 2 (Sept. 1974); Mary L. Calkins, "Online Services and Operational Costs," *Special Libraries* 68:13-17 (Jan. 1977); Barbara G. Prewitt, "Online Searching of Computer Data Bases," *Journal of Chemical Documentation* 14:115-17 (Aug. 1974).
4. Some examples of reviews or state-of-the-art publications are: Roger W. Christian, *The Electronic Library: Bibliographic Data Bases 1975-1976* (White Plains, N.Y.: Knowledge Industry Publications, 1975); F. Wilfrid Lancaster, ed., *The Use of Computers in Literature Searching and Related Reference Activities in Libraries* (Champaign, Ill.: Univ. of Illinois, 1976), proceedings of the 1975 Clinic on Library Applications of Data Processing; Peter G. Watson, ed., *Online Bibliographic Services—Where We Are, Where We're Going* (Chicago: American Library Assn., Reference and Adult Services Division, April 1977).
5. Randolph E. Hock, "Providing Access to Externally Available Bibliographic Data Bases in an Academic Library," *College & Research Libraries* 36:208-15 (May 1975). See also Richard De Gennaro, "Providing Bibliographic Services from Machine Readable Data Bases—The Library's Role," *Journal of Library Automation* 6:215-22 (Dec. 1973).
6. The experiences of the more than forty academic institutions formerly affiliated with the Northeast Academic Science Information Center (NASIC) bear this out. For a discussion of some of the merits of "delegated" versus "non-delegated" on-line searching, see David M. Wax, "A Handbook for the Introduction of On-line Bibliographic Search Services into Academic Libraries," *Association of Research Libraries Occasional Papers* 4:6-8 (June 1976).
7. Alan R. Benefeld and others, "User Receptivity to Fee-for-Service Computer-based Reference in a University Community," *Information Revolution: Proceedings of the 38th ASIS Annual Meeting* 12:151-52 (Oct. 26-30, 1975).
8. Donald W. King, "A Potential Pitfall in the Economics of Information Products and Services," *Bulletin of the American Society for Information Science* 3:40 (June 1977).
9. From the resolution on "Free Access to Information" submitted by the Social Responsibilities Round Table to ALA membership and Council, Detroit, June 1977. See *American Libraries* 8:378 (July-Aug. 1977).
10. NCLIS Task Force on a National Periodicals System, *Effective Access to Periodical Literature: A National Program* (Washington, D.C.: U.S. Government Printing Office, April 1977).
11. "Full-text" availability of documents on-line is already a reality in LEXIS, the legal archive of court decisions and tax law produced by Mead Data Central. See Jerome S. Rubin, "LEXIS Has Made Computer-assisted Legal Research in the United States a Practical Reality," *Law and Computer Technology* 7:34-50 (March/April 1974).