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NASIC And The Information Services Librarian: Room In The Middle

As activity related to the provision of information has increased and become more complex in recent decades, the role of the intermediary between the information producer and the information user has similarly become more complex and specialized. The referee, the journal editor, the abstracting and indexing service, the publisher, the bookstore owner and the librarian are all examples of educated intermediaries who have a significant impact on the quantity and kinds of information resources available to the user. This paper will consider the activities of two types of intermediaries in one of the newer and more complex information delivery processes: the computerized bibliographic search.

Initially, I shall discuss a new role for a traditional intermediary—the reference librarian. Later, I shall describe and evaluate an attempt to define an organizational intermediary, of which the Northeast Academic Science Information Center (NASIC) is a prototype, developed specifically in response to this new information service. While this discussion emphasizes the delivery of machine-readable services in the academic community, most of the comments are equally applicable to the special library and public library communities.

Perhaps the easiest way to introduce the role of these two participants is to locate their place on the search service continuum (see figure 1). It is important to bear in mind that information both begins and ends with the members of the research community, for it is they who produce the infor-
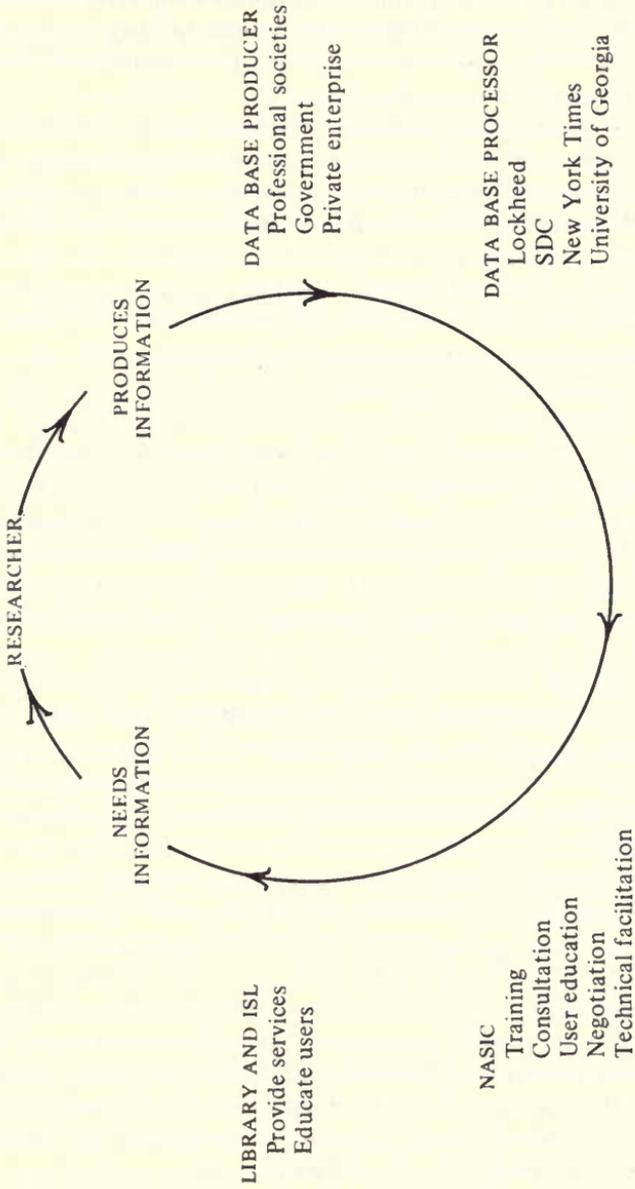
Figure 1. The Search Service Continuum

DATA BASE PRODUCER
Professional societies
Government
Private enterprise

DATA BASE PROCESSOR
Lockheed
SDC
New York Times
University of Georgia

PRODUCES
INFORMATION

RESEARCHER

NEEDS
INFORMATION

LIBRARY AND ISL
Provide services
Educate users

NASIC
Training
Consultation
User education
Negotiation
Technical facilitation

mation in the form of articles and reports, and they who need the search results in the form of citations and abstracts.

The activities of the data base producers and processors have been discussed in great detail in the literature on libraries and information science, so this discussion will relate to them only insofar as they create both the resources which make computer-based searching possible and the environment which makes the other intermediaries necessary.

In the past year there has been extensive interest expressed in the possibility of direct user access to the information resources available through on-line searching. Indeed, this represents a basic aim of the User Requirements Program of the National Science Foundation's (NSF) Office of Science Information Service. If we could somehow provide for direct "bench scientist" access to the information resources, it is thought, we could eliminate the staff costs associated with the need to have two people understand the problem and could obtain more effective search results based on the user's greater awareness of his own needs.

It is possible, of course, for the end user to learn the literature, the data bases, and the access system in sufficient detail to be an effective searcher. However, because of the substantial time required for training, this would be a costly process if applied to a large number of users. Furthermore, each user would have to make fairly intensive use of search services in order to maintain his knowledge and expertise, so that the amount of time spent conducting the search—and especially time spent connected to the computer—could be minimized.

In the academic environment, and in most cases in the commercial sector, the users of machine-readable search services are likely to be occasional users rather than regular users who could maintain the necessary expertise for efficient searching. One can conceive of only two situations in which it would be possible for these occasional users to conduct a search through direct personal interaction with the search system.

The first situation would require that the data base producers work together to standardize their products, not only in terms of searchable fields, uniformity of material within fields, and indexing philosophy, but most importantly in the area of compatible vocabulary. The difficulty of the latter can be seen in the differing uses of the same term in different disciplines—e.g., the use of the term *power* in physics and in political science. At the same time, this situation would require that the major data base processors or suppliers make their software systems compatible, at least from the perspective of the user, either through internal standardization or through the development of some translation or compiler language.

The second possibility for direct user access lies in the development of a compiler that would not only make the systems compatible, but would also

relate the user's information needs to the appropriate data bases and translate the search question into appropriate strategies with appropriate vocabularies to search these data bases on whichever systems they happen to be accessible.

For reasons of professional pride, entrepreneurial competition, and lack of outside funding to underwrite standardization projects, neither of these situations is likely to occur within the foreseeable future; for reasons of vocabulary incompatibility, they may never occur. Fortunately, a reasonable alternative to these conditions presently exists in the form of the intermediary who is aware of the content of the data bases, the means by which the various systems can be employed for access to the data bases, and appropriate techniques for searching the specific data base on a particular software system.

THE LIBRARIAN AND THE LIBRARY AS INTERMEDIARY

For several years there has been an ongoing debate as to whether this knowledgeable intermediary should be a subject specialist (engineer, physicist, chemist) who has been trained in a particular access system, or a literature specialist (reference librarian) who has sufficient familiarity with the literature of several disciplines as well as training on one or more access systems. Most of the NASA- and NSF-funded search service centers have relied on subject specialists; but with the advent of on-line searching in hundreds of universities, government agencies, and commercial firms, reference and special librarians are now responsible for the great bulk of computerized bibliographic searching.

In most governmental and commerical libraries, the librarian as an on-line searcher represents only an extension of the traditional role of the special librarian. The conducting of personalized bibliographic searches has long been an activity of the special librarian; the on-line search is merely a new and less costly means of providing this service.

In the academic environment, however, with the single major exception of the biomedical library, the reference librarian has not traditionally performed personalized search services for either faculty or students because of the lack of staff time and resources for such services. As a result, the role of the on-line searcher is a totally new one for the academic reference librarian.

Not all of the librarians with whom NASIC has dealt have been particularly well suited to adapt to this new role of information services librarian (ISL). Some, for example, are afraid of the terminal; others are reluctant to type at the keyboard in the presence of a user. A few are unwilling or unable to undertake the intellectual effort associated with conceptualizing a search problem and creating an appropriate search strategy. On the whole, however, the academic librarian has adapted well to this new activity. Of the sample of sixty-four ISLs whom NASIC has trained to date, the staff considers more

than 80 percent to be at least adequate in undertaking searches and more than 50 percent to be very good or excellent. While the members of this group are in many cases administratively or self-selected participants, this nonetheless represents significant documentation of the capability of the traditional reference librarian to fulfill this new role.

The introduction of machine-readable bibliographic searching into the academic library also creates a significant change for the library itself. Most of the NASIC-affiliated institutions (see Appendix) already report a noticeable increase in the use of the serials collections and a clear increase in interlibrary loan activity. Indeed, we have come across some libraries that have been unwilling to initiate computerized searching or to publicize or promote the services once implemented for fear that they will place an unmanageable burden on present staff, both because of the time required to provide the search services themselves and because of their impact on other library services.

The introduction of search services has also forced academic libraries to face the issue of charging for information services. Every NASIC participant is recovering at least part of the charges associated with the provision of search services. At one end of the spectrum, several libraries have provided sub-sidized—but never free—searching as a special introductory offer; at the other end, one library has been recovering overhead costs as well as out-of-pocket costs resulting from the provision of these services. Approximately 80 percent of the NASIC libraries, however, are now or always have been charging the user the out-of-pocket costs associated with searching, while allotting funds from the library budget to cover staff and equipment costs. Thus it appears that academic libraries have adopted the position that the staff capability of offering the service is an overhead item, no different from the staff capability of reference librarians or catalogers, but that the unique or personalized aspect of the service—the out-of-pocket costs—should be paid by the beneficiary of these custom services.

The initiation of computer-based reference services has also required the library to adopt a more active role in user education and service promotion. Because these services imply a new means by which the user obtains infor-mation and also require that he pay for the information services, the library is obligated to make the user aware of the existence of this new local capability and to demonstrate the value of the computerized search. Every NASIC library has been engaged in this type of service promotion, albeit with varying degrees of intensity, relying heavily on actual on-line demonstrations as an educational technique. The fact that this technique has had success in attracting users to on-line search services may lead to similar types of active educational and promotional efforts for other library services.

One should not conclude from this rather optimistic evaluation of the introduction of computerized bibliographic search services into some eighteen

academic libraries in the Northeast that this type of personalized, pay-as-you-go service is a forerunner of a reorganization and reformulation of library functions in the academic setting. At this time, this new service constitutes a small addition to traditional library services, generally accounting for less than one percent of library expenditures. The MIT libraries, providing service at the rate of forty to fifty searches per month, constitute one of the more intensive academic users of on-line search services in the country.

A major reason for this low level of activity, of course, is cost. Where search services are heavily subsidized or free, as in the case of MEDLINE, there is much more intensive use of machine-readable searching. A second reason for limited use in the academic setting is the cutback in nonbiomedical research funds which could be used to pay for search costs. A third reason is the lack of awareness among potential users of the existence and value of computer-based bibliographic searching. Acquaintance and initial use of search services stimulate further use, a situation which is documented by the increasing dependence of the biomedical research community on MEDLINE and related services and by the high level of repeat use of NASIC services.

These and other issues underlie the justification and need for an organization such as NASIC to serve as an intermediary between the suppliers of computer-based search services and the academic libraries at which services are delivered to users. It is to the less obvious role of this second intermediary that we now turn our attention.

NASIC AS INTERMEDIARY

NASIC was conceived by the New England Board of Higher Education (NEBHE) and funded by NSF's Office of Science Information Service for the express purpose of increasing access in the academic community of the Northeast to computer-based bibliographic search services. NASIC is the last of the NSF-funded science information dissemination centers and the only one not to become involved with direct in-house processing of bibliographic tapes.

The intent of the original NASIC proposal was to make existing service capabilities accessible to institutions that would never become directly involved in tape processing themselves. This was to be accomplished by working through the university libraries and training reference librarians to become knowledgeable intermediaries between the users and the systems. A secondary aim was to make existing NSF- and NASA-funded processing centers economically stronger by directing to them the "business" generated in the NASIC-affiliated institutions. The first aim, that of making search services more accessible in the academic community of the Northeast, remains the primary goal of the program; the plan to direct the region's searching "business" to the off-line processing centers has been abandoned.

In the period between the conceptualization of the NASIC program in November 1971 and the post-funding organization of the program in July 1973, the on-line search services offered by Lockheed and System Development Corporation (SDC) became available to the general public. Analysis by the NASIC staff of the alternatives led to the conclusion that, for reasons of speed, cost to the user (particularly for multivolume retrospective searches) and, most importantly, improved search effectiveness resulting from interaction with the data base, on-line searching was the more valuable service for the academic library to offer to its users. Accordingly, the NASIC staff initiated discussions with university librarians and with representatives of the search service vendors to determine the appropriate role, if any, for an intermediary organization in assisting the academic library to offer more effective on-line search services. These discussions resulted in a range of NASIC activities, including training, administrative consultation, user education, negotiation and technical facilitation.

The training activity is of primary importance, since it is a prerequisite for the reference librarian to serve as an ISL. While both Lockheed and SDC do offer training sessions, their programs are directed more toward the special librarian than toward the academic reference librarian. The vendors assume that the librarian is familiar with the techniques of searching and with the organization and content of the relevant data bases. Therefore, they concentrate on system-related materials (logging on, search commands, output commands, system messages) and some discussions of data base peculiarities. Since approximately 90 percent of SDC and Lockheed searchers are special librarians in commercial or government agency libraries, this is a reasonable plan for a general training program.

However, this type of program does not meet the needs of the academic reference librarian who is to become an ISL. As previously indicated, it is unusual for academic librarians regularly to perform manual searches. Therefore, the conceptualization and organization of the search must be part of any training program oriented toward the academic library community. Also, with limited experience in searching, the academic librarian must be provided with much more extensive material related to the data bases themselves. This requires a particularly substantial training effort since any academic community is likely to want access to virtually every data base available on any system—a circumstance that does not apply in most special library situations, where perhaps only three or four data bases are of particular interest.

To meet the greater needs of the academic librarian, NASIC has developed a training program involving both workshops at the NEBHE offices in Wellesley, Massachusetts, and follow-up sessions at the campus of the participating institution. The workshop agenda includes an overview of computerized

bibliographic searching and its relationship to traditional reference services, an introduction to the techniques and protocols for searching on one software system, and detailed presentations on five data bases (either in science and engineering or social science disciplines) emphasizing the coverage and characteristics of the data bases and the most effective techniques for searching them. Substantial computer connect time is provided for each participant to allow for practice with the system and to develop familiarity with the data bases. The training staff for the workshop includes a representative of the vendor as well as the NASIC staff members.

The workshop is followed by a visit to each campus by the NASIC information services librarian to provide additional instruction and supervised terminal practice time. Furthermore, each library can send staff to as many such workshops as necessary to obtain access to all desired data bases. Finally, NASIC has scheduled workshops for experienced users, at which ISLs can be introduced to newly available data bases. The training materials developed for these workshops include presentation outlines, transparencies and hard-copy prints of the transparencies, actual user problems turned into demonstration searches, and various other materials related to specific data bases, specific search systems, and general concepts of computerized searching. The NASIC staff has placed particular emphasis on the data-base-related materials, and considerable research effort has been devoted to documenting the coverage, indexing philosophy, vocabulary structure and other components of the various data bases. Comments from both training workshop participants and vendor representatives have underscored the utility of this emphasis.

In addition to the training package, the staff is also developing a multisystem, multi-data-base NASIC user manual that will be available to library personnel as a reference tool for the conduct of computerized searches. This manual will include brief reviews of system procedures and protocols, descriptions of computerized data bases and their relationships to printed indexes, matrices of searchable data elements, descriptions of common problems of particular systems and data bases and the most effective solutions to these problems, and possibly a correlative index of systems, data bases, and subject areas.

A noteworthy benefit of the development of the NASIC user manual has been the feedback from the NASIC staff to the vendors. In effect, the NASIC staff is performing an analysis of each of the two on-line software systems from the perspective of the user, and the outcome has been the discovery of previously unperceived system capabilities as well as system bugs. Insofar as the latter will lead to software improvements, NASIC will have performed a service useful to the vendor and user alike.

The second area of NASIC activity is concerned with consultative assistance to university libraries in initiating computer searching operations.

The "Guide to Implementation of NASIC Services" is the basic tool used to aid library administrators in the decision-making process related to delivery of machine-readable information services. A meeting is held at each institution implementing NASIC computer search services to discuss the issues of organization, staffing, training, service promotion, accounting, data collection, etc. The library directors of participating institutions have reported that these meetings have been helpful to them by enabling each library to benefit from the experience of others and from that of the NASIC staff. Thus, potentially difficult problems, such as equipment acquisition and determination of pricing policies, can be isolated and faced before they have a negative or delaying impact on service initiation. Also of significant benefit has been the distribution of model forms for service provision, which has eliminated much of the paperwork associated with initiating a new library service.

As indicated earlier, an important component of the successful introduction of computer-based search services on a campus is the effort directed toward user education. NASIC personnel have visited each of the affiliated institutions for day-long sessions at which demonstrations of computerized search services have been provided to faculty and students in the science, engineering and social science departments on campus. These demonstrations have enabled libraries to acquaint their users with one of the newest applications of technology in the information field and to publicize the availability of this new service in the local library, all at no cost to the library as a result of the agreements negotiated by NASIC with the commercial vendors of these services.

A fourth activity of NASIC, covered under the term *negotiation*, relates to NASIC acting as a spokesman for its participating institutions—and, indeed, the academic community as a whole—in dealings with data base producers and computer search vendors. One producer, for example, eliminated for academic users the front-end charge for access to its on-line data base after the NASIC management had pointed out the disadvantages to both producers and users resulting from the imposition of that kind of charge. I think it is also fair to say that NASIC has made the search service vendors more aware of the distinct needs of the academic ISL.

Also in this area has been the negotiation of contracts with the two primary vendors of on-line search services. In general, each agreement provides NASIC with assistance in its training activity through free computer connect time and the time of the supplier's training staff and in the marketing activity through additional free computer time. While the monetary value of these considerations is limited, they do enable NASIC to provide more effective service to its affiliated institutions and thus improve the likelihood of more widespread participation in the program.

It is these negotiated considerations, as well as the experience and

expertise of the NASIC staff, that underlie the success of the program to date. Indeed, several libraries already holding contracts with one or more of the vendors have switched their contracts to NASIC to take advantage of the "value added" components associated with NASIC participation. The two major vendors have allowed and often encouraged universities to obtain search services through NASIC because they perceive that NASIC institutions are likely—or have already begun—to make more intensive use of the systems than the universities that have signed direct contracts. This represents an important perception that the existence of NASIC-like intermediaries is of benefit to the supplier as well as to the academic library.

The fifth NASIC activity, that of technical facilitation, is still in the potential stage. The intent here is to use an existing regional computer communications network, most likely that of the New England Regional Computing Program (NERComP), to implement the actual brokerage of information services. The plan is to buy services in bulk (unlimited use at a fixed monthly cost) and to retail these services via the network to participating institutions on an as-needed basis. While the technical capability of the network to undertake this activity will exist in a few months, the barrier to implementation is the process of negotiation with one or more vendors to arrange for guaranteed revenue/unlimited use contracts, which is necessary if the true brokerage mode is to be viable.

This package of "value added" services has been an important factor in initiating machine-readable searching into academic libraries, both as a marketing device to persuade universities to adopt the service and as an aid to encouraging more effective service delivery. Based on our experience to date, I do not think it unfair or immodest to say that NASIC has demonstrated that there is a role for the organizational intermediary in the provision of computerized bibliographic search services.

THE FUTURE OF THE INTERMEDIARY

There is no question in my mind that there will continue to be a need for the trained and experienced person to serve as an intermediary between the end user and the bibliographic information available via computer search systems. While a few regular users will access these systems directly, the great bulk of searching will be done by an intermediary, at least in the foreseeable future.

In the academic environment—and for the most part in the governmental and commercial sector as well—the library will continue to be the most appropriate service delivery location and the role of the ISL will become firmly established. Furthermore, I anticipate an expansion of the library's user education and promotion activities as experience demonstrates that such

efforts lead to more intensive and more effective use of computer-based search services.

The future of NASIC and other NASIC-type organizations is not so well assured, however. At least part of NASIC's success can be attributed to a program policy of providing "value added" services at no additional cost to the participating institutions. This policy is based on two premises. The first is NEBHE's position that the purpose of the grant from NSF was to implement the provision of machine-readable search services at the colleges and universities of the region and that grant funds should be expended to aid in this implementation process. Furthermore, since pledges of institutional cooperation were a prerequsite to obtaining the grant, it is only fair to distribute the benefits of the NSF funding among the participating institutions. The second premise underlying the provision of "value added" services at no charge is based on pragmatic considerations. Since each of the major vendors sells services on a no-subscription, no-monthly-minimum basis, it would have been very difficult to persuade institutions to obtain services under NASIC auspices if doing so would have entailed a subscription fee. The demise of the Science Information Association, which provided intermediary services on a subscription basis, offers evidence to support this conclusion. Even if institutions did perceive the value of intermediary services and were willing to pay a subscription fee, the absence of demonstrated capability by the NASIC program would have discouraged initial institutional support for the program.

NASIC's mandate from NSF is to assist the universities of the region in developing and implementing local search service capabilities. This development process requires substantial funding, and it is for this purpose that NSF provided the NASIC grant to NEBHE. By the time the NSF funding is exhausted (probably the end of June 1976), it is projected that NASIC will have assisted all Northeast academic institutions desiring to provide search services under NASIC auspices.

The tasks of an ongoing NASIC will be significantly fewer than those in the development phase. The training will be primarily of a continuing education sort, with emphasis on new data bases as they become available. Materials development will concentrate on the updating of documents already produced. User education and negotiation with vendors will continue to be important activities, but there will be far less administrative liaison with participating institutions. We presently estimate that a professional staff of one person at full-time and a second at one-fourth- to one-half-time, along with a half-time secretary, will be sufficient for an ongoing NASIC program. The cost of such a program would be $50,000-$60,000 per year.

Where will this money come from? The primary source will have to be institutional support. With an anticipated thirty to thirty-five participating

universities, each institution probably will not have to pay more than $1,000-$2,000 per year, based on volume of system use.

The willingness of the institutions to commit funds to underwrite the intermediary role of NASIC will depend on many factors, including their perception of the quality of service provided by the NASIC staff. However, the major justification for such support clearly will lie in the financial benefits NASIC will have negotiated with the vendors. The greater the benefits, the greater the likelihood of institutional support. The present package of free computer time for training and service demonstrations appears to be an absolute minimum—and perhaps not enough.

NASIC has demonstrated success in signing up academic users and in creating more intensive use of computerized search services by existing academic customers, i.e., in increasing the revenue flowing to the service vendors. From the vendors' perspective, NASIC has functioned effectively and at very little cost as a marketing agent. An ongoing NASIC will continue to provide these benefits to the vendors, which implies that the survival of NASIC is in the vendors' interest.

The vendors can assist in assuring the survival of NASIC in two ways. The first is to negotiate an agreement whereby the vendors recognize the value of the training and marketing services provided by NASIC and compensate NASIC in the form of rebates which can be passed along to the participating institutions. This kind of savings would assure institutional support for NASIC and, if the savings were passed along to the users, would lead to more intensive system use and, thus, to ultimately greater revenues for the vendors.

The second means by which the vendors can facilitate the survival of NASIC is through direct monetary compensation for training and marketing services rendered. Any revenues so obtained would decrease the sums required from the institutions and would thus increase the probability of institutional willingness to support an ongoing NASIC.

Although I have been discussing the future of the intermediary organization specifically in terms of NASIC, the problems faced by our program are no different from those that would have to be overcome by any organization attempting to play an intermediary role in the delivery of computer-based reference services. While there is no doubt in my mind that the activities of NASIC-like organizations are of benefit to academic libraries, to service vendors and, most importantly, to users, the ultimate test of their utility lies in the willingness of those benefiting to underwrite the program. The success or failure of NASIC in this test will be of great interest not only to the National Science Foundation but to other organizations, both public and private-for-profit, that might consider undertaking an intermediary role. And, insofar as this role does have an effect on the use of machine-readable

bibliographic services, the results of this test will also have a long-term impact on the use of scientific and technical information in American society.

APPENDIX

NASIC-Affiliated Institutions, 1974-75

Columbia University
Dartmouth College
Harvard University
Massachusetts Institute of Technology
New York Institute of Technology
Northeastern University
Plymouth State College
Princeton University
Tufts University

University of Connecticut
University of Delaware
University of Massachusetts/Amherst
University of Massachusetts/Worcester
University of New Hampshire
University of Pennsylvania
University of Rhode Island
Worcester Polytechnic Institute
Yale University