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Electronic Reference Options: How They Stack up in Research Libraries

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Electronic reference in a variety of forms is becoming a reality in libraries today. Whether it is online, CD-ROM, or databases loaded from magnetic tapes or a combination of several options, patrons have access to more electronic resources than ever before. We recently surveyed research libraries in the U.S. and Canada to see which electronic reference options they offer. ARL libraries may not be typical because they tend to be heavy users of technology and have relatively large budgets, but they can be considered trendsetters. What these libraries are offering now will be found in all types of libraries within the next few years.

Academic and other research libraries have been in the forefront of electronic database access since online searching first became available in the early 1970s. They were some of the first libraries to offer intermediary online services, and by 1979 almost half (49%) of academic research libraries offered intermediary services [1]. In the mid-1980s some research libraries added end-user online searching on systems such as BRS/After Dark or DIALOG's Knowledge Index [2]. These systems usually supplemented, but did not replace, intermediary search services.

CD-ROM databases were added to reference departments starting in the mid-1980s. By 1987 approximately 30% of academic libraries in the United States had databases on CD-ROM [3]. In just one more year the percentage increased to almost 60%.

Although it predates even online intermediary searching, end-user searching of databases loaded on an in-house computer has become popular with the recent widespread use of online public access catalogs (OPACs). An increasing number of database producers are entering into agreements with OPAC vendors so magnetic tapes of reference databases will be compatible with a library's OPAC [4]. A 1990 survey by ALA found about 8% to 35% of all academic libraries had databases loaded on their OPACs [5]. The low end was for two-year and liberal arts colleges; the high end for doctorate-granting institutions.

Many research libraries now offer two or even three or four of electronic options for database searching. In May 1991 we surveyed the libraries that are members of the Association for Research Libraries (ARL) to discover how many offer each four electronic options and how the addition of each new option impacts the others. We also asked for information on what the libraries are offering now and what they plan to do in the future.

This article presents the survey results and paints a factual picture of electronic reference in 1991 in ARL libraries. In addition to the facts," many respondents responded with detailed comments about how electronic reference sources are changing their libraries, their workload, and their users. In a later article we will discuss these issues based on more in-depth interviews with selected librarians.

THE SURVEY POPULATION

Surveys were sent in May 1991 to the 119 ARL members. Of these, 96 (81%) responded [6]. The Association of Research Libraries is an organization of libraries that have research as a primary mission. According to the Encyclopedia of Associations, its goal is to "identify and solve problems fundamental to large research libraries so that the libraries may effectively serve the needs of students, faculty, and the research community; to strengthen and extend the capacity of member libraries; to provide the recorded information needed, both now and in the future, by the research community" [7].

The members are mostly university libraries, with a few large public, government, and other special libraries. More than half the libraries that responded to our questionnaire serve constituencies of 20,000 or more (including students, faculty, or researchers), and have six or more branch libraries.

Online catalogs are common in these libraries - 94 of the 96 responding libraries (98%) have their catalogs online. Some libraries, notably those in the state of California academic system, have more than one OPAC available. They may have access to library

catalogs and other databases on a shared system, such as Melvyl, with their own collection on another, in-house system. (Some California libraries counted Melvyl, others probably did not.)

NOTIS is by far the most popular OPAC system, with 41% of the libraries surveyed. Other popular OPACs are Geac 13.5%), Innopac 6%), Melvyl (5%), CARL (4%), and Dobis (3%). The rest of the libraries are spread over at least 16 different OPAC systems. (As will be seen later, most ARL libraries have not yet loaded reference databases on their OPACS, but almost all the popular OPAC systems have the capability to do so.) Nearly all libraries offer dial-up access to their OPAC (only 4 of 94 do not).

OPTIONS FOR ELECTRONIC REFERENCE

Figure 1 shows the number of libraries that offer each of the four search options.

Online Mediated Searching: Online mediated searching is still the most common electronic option, offered by 93 of the 96 libraries (97%). Not surprisingly, it was the first electronic reference service to be offered by most (92%). Nearly all of these libraries charge for intermediary searching 95% charge all or some of their search service users.

Throughout the 1970s and early 1980s, online mediated searching was the sole method of accessing reference databases in most of these research libraries. A second service was not offered until the mid to late 1980s in all but one of the libraries that responded to this question. The second service was most often CD-ROM (59.3%) or end-user online searching (24.2%).

CD-ROM: Although it is a relatively new medium, CD-ROM databases are now offered by nearly as many research libraries as offer online intermediary services; almost 96% (92 of 96 libraries) offer reference use of CD-ROM databases. Multiple CD-ROM titles are the rule - over half the libraries offer more than 20 titles and 35.4% offer more than 30.

Since so many libraries offer multiple CD-ROM titles, physical access to the disks becomes an issue. Although a large majority still rely on single-user workstations, nearly 38% of the libraries have their CD-ROMs available over a CD local area network (CD-LAN). This shows a fairly rapid acceptance of CD-LAN technology, which even only a few years ago was considered impossible. Dial-up access from remote sites to CD-ROM databases is technologically even newer, but six libraries now offer the capability.

Online intermediary and CD-ROM searching are offered by almost all research libraries. The other two options, end-user online and reference databases on the OPAC, are not nearly as common.

End-User Searching: End-user online searching is offered by fewer than half (45%) of the libraries. Of the libraries that responded to the question, 57.5% charge all or some users of end-user online. Although this means that more than half charge, it is perhaps more interesting that 42.5% do not charge, offering free end-user searching. The widespread practice of charging for mediated online searching can be justified because a professional service is being performed for a customer (and the systems tend to be more expensive), but more libraries are willing to subsidize database access charges for self-service online searching.

Locally Mounted Tapes: For most libraries the newest, and still least common, electronic reference option is the local loading of magnetic tapes of reference databases for searching on the library's OPAC software. Thirty-six libraries (37.5%) have such external databases available through their OPACs as of May 1991. Another 48% plan to load them within the next two years. Clearly, this is destined to be a common option (and probably the most widely used one) very soon. For 13 libraries, a reference database on the OPAC was their second electronic search offering (and for two it was their first electronic service).

Loading magnetic tapes of databases on a local computer is actually not as clear-cut as the other electronic search options. Most libraries lease tapes from database producers and load them onto the same computer with the same software as the OPAC. Searching a periodical database is usually an option on an opening menu screen, and searching is done using the same commands and features as are used for searching the catalog. Other libraries may load databases with different software, or even on a separate computer. Some responding libraries indicated such an arrangement with the BRS/OnSite system. (Others may have a system such as BRS/OnSite, but may have not indicated it on our questionnaire, since we worded the question as "Do you have periodical databases available on your OPAC?")

Another way to provide periodical databases via a local OPAC is to share the burden. One site might be responsible for leasing the tapes and loading the database. Access then is on a dial-up basis from all member sites to the one central site, creating a customized online network. Melvyl works this way for access to MEDLINE and other databases. CARL member libraries can access the Uncover Periodical database. Some libraries that responded to our questionnaire counted these "remote, but via OPAC" databases in the question about OPAC databases, but we suspect others did not.

Still another trend that muddies the water, is the capability of accessing CD-ROM databases with a file server from the OPAC. Some of the six libraries that indicated they offered dial-in access to CD-ROMs have them as a menu choice on their OPAC. These were counted as CD-ROM databases, not locally loaded databases searchable over the OPAC.

WHO ARE THE USERS?

Each of these search options seems to be finding its own group of frequent users.

Online Mediated Searching: Online intermediary customers are most often faculty and graduate students, as can be seen in Figure 2. Only six libraries replied that undergraduates use the mediated search service more than faculty or graduate students.

Fees are a major determining factor. One librarian commented that "mediated searches are primarily used by individuals with grant funds." Another said, "We have concluded that most patrons would rather do a free search in a marginal' database than to pay a

small fee for a search in a more appropriate subject-specific online database." Several said that undergraduates are not allowed to request mediated searches.

Online mediated searches are used increasingly only for complex topics or for databases that are highly specialized such as patents or grants. One library commented that intermediary searches are still popular because users who recognize that intermediary assistance or access to particular databases unavailable through other avenues are still willing to pay for online services." In most of these libraries, intermediary online is used by only a few library patrons and infrequently even by these users. But "there will still be faculty and some graduate students who prefer to have someone do the search for them."

CD-ROM: CD-ROM use, on the other hand, is split almost evenly between undergraduates and graduate students (Figure 3). Only one library responded that faculty were equally frequent users of CD-ROM databases.

In many libraries CD-ROM opens up electronic reference to undergraduates for the first time, and to many more graduate students or faculty than ever used intermediary online searches.

Library policies sometimes dictate who uses CD-ROM and who uses online: "We do not do online searches for students or staff if we have the CD-ROM database. Exceptions are faculty if several databases are involved."

Although CD-ROM has caused migration from online, most CD-ROM users went directly from print sources to CD. Typical comments include: The CD-ROM service is being used by onsite patrons who would otherwise be using print indexes, or another library" and 'all CD-ROM indexes are popular and seem used to the exclusion of paper alternatives."

These are users who want free, convenient, self-service searching. One librarian commented that "using the CDs, which are free and available anytime the library is open, is much more attractive to the undergraduates than the more formal process of filling out a search request and talking to a reference librarian." CD-ROM databases are breaking down many barriers to electronic reference use for a large percentage of a library's patrons.

End-User Searching: End-user online is used most heavily by graduate students in most libraries (34% alone or 76% in combination with other users), as seen in Figure 4. Also, 13% of libraries named undergraduates as the single most frequent group of users (47% total in combination with others). just six libraries said faculty used end-user online searching as much as graduate students or undergraduates.

Locally Mounted Tapes: The audience for external databases on OPACs is more mixed. Responses from libraries about who used the service the most were spread among all user groups (Figure 5). Most responses are educated guesses; many libraries don't know who is using the OPAC databases because the systems don't require passwords and the libraries have not done studies.

One thing is clear, databases loaded on the OPAC are popular with everyone. A major reason is the dial-up access: Patrons like OPAC databases because they don't have to come to the library." Another reason is that users might "stumble" onto the periodical databases when they are using the library catalog. One librarian commented that "our OPAC databases include both our online catalog and periodical databases. They are used without discrimination by all our library users."

Databases on the OPAC use the same software as the library catalog. The possible lack of power is made up by the familiarity and ease of use. Enduser online requires training; CD-ROM requires help sometimes; but databases on the OPAC are used by a vast majority of the users without any assistance by library staff.

One librarian summed up the different audiences nicely: 'I would anticipate that, if we were to load databases on our OPAC (which we are interested in doing), we would be reaching a significantly larger audience, primarily of undergraduate students, but also the graduate students needing to do non-dissertation research. At that point, perhaps we will see the greatest differentiation between users and format: undergraduates concentrating their use on OPAC databases; graduates using CD-ROMs for more sophisticated subject searches; and faculty continuing to rely primarily on mediated online searching for their exhaustive research."

When the services are compared head-to-head, CD-ROM searching is the most frequently used service right now in a majority of libraries (Figure 6). In the small percentage of libraries that now offer external databases on their OPACS, however, those are the most popular. Clearly if all the libraries that anticipate adding OPAC databases do so in the next two years, a majority of research library patrons will be accessing databases via the OPAC very soon.

IMPACT OF EACH ELECTRONIC SEARCH OPTION

CD-ROM and OPAC searching are bringing electronic reference sources to large numbers of users. They are undoubtedly affecting how patrons use the library and their expectations of the reference process. As newer options, they have also affected use of older electronic reference options. Figure 7 shows how many libraries reported increases or decreases in each search option. Six libraries said there had been no decreases; one reported no increases.

Most dramatic has been the impact of CD-ROM searching on intermediary online search services. The last two years have seen a decline in intermediary online searching in 81% of the libraries. (Twelve percent of these also cited a decline in end-user online searching.)

Typical comments in these libraries include: CD-ROM availability has virtually eliminated online searching - but not completely"; "the availability of end-user CD-ROM databases has all but eliminated the need for mediated online searching"; "as recorded CD-ROM uses skyrocket, online searching for library users has plummeted" [8].

One library that eliminated fee-based, end-user online searching did so due to a drastic decline in business. We find that our CD-ROM patrons are the same as were our end-user online patrons, primarily graduate students." Another eliminated end-user online searching because it was not particularly successful and was a casualty - probably well-deserved of library budget cuts."

Others feel that as they load more databases on their OPACS, use of CD-ROM will decrease. Some will select OPAC titles from the most popular CD titles, just as they selected CD databases from the most popular online databases. OPAC searching will be reserved for high-use general periodical indexes, while CD-ROM will be used for more specialized topics.

Figure 7 shows that CD-ROM searching is the option with the highest increase in the last two years (52% said only CD-ROM had increased, but a total of 88% said CD-ROM or CD-ROM and some other services had increased). This, of course, is to be expected as libraries have added many new CD-ROM titles in the past two years and more patrons have become aware of the service. Only four libraries (4.2%) have seen an increase in their intermediary search services (along with other services).

Sheer amount of use is not the only measure of usefulness, however. Only one library plans to drop any service in the next two years (intermediary online) and 27 plan no additions. Figure 8 shows that over 60% of the libraries plan to add one or more of the three end-user electronic options, usually to supplement their intermediary searching service. Some libraries are finding that "each service tends to bring attention to the other."

All options for electronic reference can be complementary. Databases on OPACs reach the greatest number of people, are easy to use, and extend general interest periodical databases beyond the library. CD-ROMs can be used by both specialists and generalists and foster independent research. End-user online searching provides access to databases not available in-house for graduate students who want to do their own searching and sometimes are willing to pay a small fee. Finally, intermediary online searching allows faculty and others willing to pay to have someone search for them, to receive a special service, and to access current or highly specialized sources.

MOST POPULAR DATABASES

We also asked libraries which online systems and which databases were used the most in their libraries [9]. This information is based on educated guesses by the librarians; most libraries cannot easily compile accurate figures on specific database use.

Online Mediated Searching: DIALOG is still the most popular system by far for mediated online searching - 98% of the libraries that offer online searching search on DIALOG (Table 1). Close in popularity is BRS 95%); no other online system comes close to these two. Most libraries have access to multiple online hosts, with a mean of 7.4 systems. (We did not ask respondents to rank systems by amount of use although several indicated that they use DIALOG the most.)

These systems, of course, provide access to hundreds of individual databases. We asked the libraries what databases they use most frequently when they conduct online mediated searches. Over 115 individual databases showed up on various libraries' 'top ten' lists, but several databases stood out. As shown in Table 2, intermediaries in ten or more libraries judged 15 databases to be the most frequently used. MEDLINE, BIOSIS, CA SEARCH (Chemical Abstracts), ERIC, and Social SciSearch (Social Science Citation Index) lead the pack.

End-User Searching: Libraries are less likely to offer multiple end-user online systems. On an average, they provide access to three end-user systems, with BRS/After Dark, DIALOG's KNOWLEDGE INDEX, and Mead's LEXIS/NEXIS the most often mentioned (Table 3). A few libraries use other BRS or DIALOG options, such as BRS/Colleague or the DIALOG Classroom Instruction Program. BRS and DIALOG would still be number one and two, respectively, with these other options added in.

Of the 27 online systems available for end-user searching that were mentioned, only five are offered to end-users in more than ten libraries. These systems offer access to a variety of databases, and include local community systems and consumer-oriented ones. Most libraries don't keep track of which databases their online end-users are accessing.

CD-ROM: CD-ROM databases require more of a collection development decision since, like paper, each title must be purchased up front. Librarians have to make a conscious purchase decision based on anticipated amount of use. To do this, they often use statistics from online searches to see which databases are accessed most frequently and buy corresponding CDROM versions. Popularity with users may determine whether a subscription is renewed.

The most popular CD-ROM databases as judged by librarians are shown in Table 4, led by PsycLIT (Psychological Abstracts), ERIC, and ABI/INFORM. Twenty titles were judged by ten or more libraries to be among the top ten most popular CD-ROM titles, but over 60 titles were mentioned by at least one library.

Locally Mounted Tapes: Table 5 shows which databases are most common on OPACS. Unlike CD-ROMS, libraries with databases on their OPACs still typically only have one or two titles. For databases available on OPACs, the most popular title is MEDLINE. (This may be because Melvyl has MEDLINE up.) Wilson databases are second most popular. Seventeen libraries now have one or more Wilson databases locally loaded; an additional three libraries said they would by the fall of 1991. Many libraries load more than one Wilson file - but we counted them together since not all libraries specified which Wilson databases they have.

CONCLUSION

In many ways the large academic ARL libraries are leading the way to an electronic reference future. Not all ARL libraries are alike, but one trend is unquestionable: with the addition of new electronic options, more people are searching more sources than ever before. Electronic resources are becoming an integral part of research library reference services, both within the library and from remote sites.

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[6] In two preliminary reports of our survey the data was calculated based on 95 respondents to 119 surveys sent. Since then one additional library responded. The current figures are based on 96 responses.

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