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# Links and Bibliographic Databases

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AROUND A CENTURY AGO, when indexes and abstracts first became widespread, it was revolutionary to provide descriptions of articles in the form of indexing and abstracting records. Indexes such as *Readers' Guide to Periodical Literature*, *Index Medicus*, and *Chemical Abstracts* noticeably increased the periodicals audience among students and researchers.

Indexes were the solution when the number of periodicals published exceeded people's ability to read and remember relevant articles. They also opened up periodical literature to readers beyond subscribers. Later, indexes became the first machine-readable reference tools, when bibliographic databases started the online revolution in libraries over 30 years ago.

Indexes initially helped solve part of the article-finding problem. Still, as the number of articles published continued to escalate—and, ironically, as bibliographic databases helped patrons identify articles quickly and easily—libraries faced major challenges in providing quick, easy, and cost-effective access to full articles. Although there are still many solutions to finding an article after a search—including interlibrary loan, document delivery services, and full-text databases—digital linking seems to be gaining the most momentum. Links to full texts from bibliographic records in indexing/abstracting databases or from the footnotes or bibliographies within articles are facilitated by the public's acceptance of the web model of linking and by the participation of publishers.

## CrossRef

The largest cooperative project, CrossRef (www.crossref.org), began just last year. As I reported ("Trekking Through Exhibit Halls," *LJ* 9/1/00, p. 152,154), major commercial and not-for-profit scholarly publishers joined to use a common standard to identify journal articles. CrossRef, implemented through the Publishers International Linking Association, employs a common standard based on the Digital Object Identifier (DOI), developed by the International DOI Federation (www.doi.org), and also uses the DOI-X metadata standard to ensure consistent, permanent links.

The agreement allows bibliographic databases to provide links to articles published in CrossRef member journals, while the articles themselves are usually held at the primary publisher's web site. Typically a journal subscription (or pay-per-view payment) is required before a user can complete the link, so the success of this initiative relies on libraries. CrossRef links also can be embedded in full texts, so references and footnotes can be linked to corresponding articles.

While this project has made linking in commercial products widespread, many secondary publishers and aggregators have been working on linking for the last five years. Now, whenever they provide a bibliographic database to their users, there should be some method to link to full articles. Methods and costs still vary.

## Internal or external?

Links from a bibliographic database to full articles through a system like CrossRef are most often external links; the articles are housed on a different server from the bibliographic records. Libraries may need to buy a separate subscription for the bibliographic database and each full-text journal, depending on publishers' requirements. Also, there may be variations in article format, including PDF, HTML, and SGML.

The older model of internal linking keeps control over both the bibliographic information and the corresponding full texts within a single company. This offers libraries the advantages of a single interface and often a single subscription negotiation.

A growing new approach is to combine both internal and external links within the same system, depending on the licensing agreements between the aggregator and the primary publishers and the formats supported internally.

## Internal linking systems

OCLC FirstSearch (www.oclc.org/firstsearch) is probably the best-known example of internal linking. OCLC began obtaining licenses from primary publishers several years ago to create its Electronic Collections Online (ECO) database. ECO morphed through three stages, from a standalone full-text searchable database to a separate database that could also be accessed from links in the FirstSearch bibliographic files to its present incarnation as a collection of articles accessed by users solely through database links.

OCLC's approach is significant for several reasons. With internal links, neither the library nor the user ever has to leave the OCLC system. This makes record-keeping simpler, both for time spent on FirstSearch and for subscriptions. Secondly, the decision to make bibliographic databases the first place to search while full texts remain available only from links emphasizes the high-precision searching that bibliographic files offer. Searchers can judge relevance with the indexing and abstracting record, then use the links to select full documents. Though this saves time and money, the number of journals available is limited to those that allow OCLC to load their articles.

ProQuest also has offered full texts to libraries for quite some time. After a search of its bibliographic records, the ProQuest database provides links to internally held articles. Even though the articles are licensed to ProQuest, which converts and loads them onto its own system, the full articles come in different formats, such as ASCII text or PDF, and are pay per use. Some articles are available in more than one format, depending on the licensing agreement between ProQuest and the primary publisher. The charge may vary by format.

Other systems that provide internal linking include DataStar, EBSCO, Gale

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Group, Ovid, and NorthernLight (NL). NL's Special Collection database includes some 25 million full-text articles (among them from magazines and newswires), all housed on the NL server.

Ovid links from its bibliographic files to its journals@OVID full-text collection. Within Ovid, users will find over 7.5 million links from bibliographic records and from footnotes or references to a collection of nearly three-quarters of a million full-text articles. Ovid emphasizes medical and science titles.

## External linking more common

Many commercial publishers opt for the external linking model, rather than converting and loading millions of articles inhouse. SwetsnetNavigator began offering an ambitious system of linking last spring after Swets and Blackwell merged (www.swetsblackwell.com).

SwetsnetNavigator provides links from many different bibliographic databases to articles from over 3000 journals published by nearly 70 publishers. SwetsBlackwell aggregates but does not create the linked bibliographic databases—instead it has licensing agreements with several companies, including Cambridge Scientific Abstracts (CSA), SilverPlatter, and the H.W. Wilson Company. SwetsnetNavigator is the typical aggregator model, providing software, licensing agreements, and assistance in getting libraries connected to bibliographic information and full articles.

SilverPlatter has offered linking for several years through its SilverLinker software (www.silverplatter.com/silverlinker). It, too, has agreements with many different primary publishers, secondary publishers, and aggregators, allowing SilverLinker to link users from SilverPlatter bibliographic databases to full-text articles located on many different publishers' web sites. As with other external linking services, in most cases the library must subscribe to access the full article.

External linking offers several advantages for the aggregator and database producer. Each database producer need not convert and load all linked full-text articles, as the primary publisher retains control, and many more articles from a variety of publishers may be made available.

External linking can be advantageous to libraries, particularly large ones that have large serials collections or agreements with many primary publishers. By adding in the pay-per-view options, libraries can get access to journals for which they don't have subscriptions.

## Hybrid linking

Some aggregators now recognize the advantages of both approaches and are offering both internal and external linking, depending on their license agreements. The hybrid approach is favored by many of the companies that began by loading everything inhouse with internal linking.

OCLC's WebExpress software consolidates access to external, internal, and local library full texts. Ovid's OpenLinks takes Ovid users to external links in addition to the company's internal collection. ScienceDirect uses internal links to Elsevier Science journals and external links to articles from other publishers. More companies are expected to move toward hybrid linking as publisher agreements become more common and competition heats up.

> No online system or library can afford to ignore linking options

The software that drives these systems is getting incredibly complex and not just due to the mixtures of internal and external linking and the different article formats. When a library decides to offer bibliographic databases with linking from a system such as OCLC WebExpress, the system must bring together licensing agreements, format decisions, library subscriptions, and library holdings.

## Cambridge Scientific Abstracts

CSA's Internet Database Service (CSA/IDS) exemplifies just how complex linking has become. CSA/IDS (www.csa.com) provides access to over 50 mostly bibliographic databases. Many of these (such as Conference Papers Index and Sociological Abstracts) are created by CSA, while others are created by other companies and licensed by CSA (e.g., PAIS and ERIC). CSA also publishes some primary science journals.

Search results from a CSA/IDS bibliographic database lead to a document location screen that offers options for article delivery. The options depend on what systems each library provides. (I'm afraid we have made this process so transparent and easy that many users don't realize that their library is paying for it.)

In a pattern that is becoming the norm, CSA/IDS has agreements with several full-text partners, including ScienceDirect, RoweCom's Information Quest, and more. Still, most articles in most bibliographic databases are not yet available digitally from any provider. CSA/IDS does not abandon the user at this point. The system can be tied to the subscribing library's interlibrary loan system or catalog.

Finally, CSA/IDS can link a user directly to several different document delivery services that hold the article. Under "acquire through document delivery," an automatic request can be sent to a variety of document delivery services, such as the British Library and CISTI. CSA does not provide document delivery itself—access to full articles is done through a complex series of agreements and links.

## Linking is expected

Links to journal articles are now common, either from bibliographic records to the corresponding full article or from within an article to other articles cited or listed in the bibliography.

The first type of link has transformed bibliographic databases into document delivery tools, in addition to their role as document search tools. This has created a whole new role for indexes and abstracts and, perhaps, saved them from extinction. The second type of link mimics the power of citation indexes and provides another level of searching for related, relevant materials.

It took the web and myriad agreements like CrossRef to make linking widespread, but already quick and easy access to digital texts is the expectation, not the exception. Linking has transformed bibliographic databases. No online system or library can afford to ignore the many linking options for its bibliographic files.

For more on linking see: Jill Grogg and Carol Tenopir, "Linking to Full Text in Scholarly Journals: Here a Link, There a Link, Everywhere a Link," *Searcher*, 11/00, p. 36–45 (www.infotoday.com/searcher/nov00/searcher.htm).