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This study describes the investigation of library web pages and online catalogs of fifty libraries across the United States. The investigator compared the online catalog records for two serial titles. Comparisons were made concerning the level of holdings statement used by the library, the availability of MARC records, links to related titles, and how the electronic version of the serial could be accessed. Results show that many of the library catalogs contain records fully detailing both descriptive elements and extensive local holdings information. Many libraries also maintain more than one way to access the electronic version of a serial. Although access to electronic resources was available in the majority of libraries studied, the variety of methods used to access these resources can cause confusion among users. Several suggestions for more user-friendly systems are discussed.

Headings:

Cataloging of serial publications

Electronic journals

Online catalogs

SERIALS HOLDINGS RECORDS IN AN ONLINE ENVIRONMENT—A COMPARISON OF FIFTY ACADEMIC LIBRARIES IN THE UNITED STATES

by
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Introduction

The key role of libraries around the world is to facilitate access to information. University and college libraries dedicate themselves to this task for faculty, graduate and undergraduate students, and even patrons that walk in off the street.

One of the most important elements in any library is the serials collection. Historically, both the serial publications themselves, as well as the indexes and abstracts used to locate individual journal citations were found only in the print form. Over the past five years, the availability of electronic journals and indexing and abstracting resources has grown exponentially. This electronic revolution has forced libraries to change the way they provide access to information about their serials collection.

Gleaning information about a library's serials collection has always been complicated. Years ago, when librarians only had to maintain print lists of their serial holdings, it was not necessarily less complicated than it is today. Notations had to be made for the receipt of every issue of every journal the library collected. In a new century seemingly dependent on the World Wide Web, the task of the serials librarian has not become much easier and in certain aspects, it has only become more difficult. Decisions about selection, cataloging, remote access, and shared resources in the serials

environment have become an integral part of the serial librarian's 21st century transformation.

The research repeated in this paper was designed to investigate the multitude of ways university and college libraries provide information about and access to their serials, both print and electronic in 2002. Specific details about the cataloging and the level of holdings information provided for different serial titles were studied as well.

Literature Review

Whatever challenges librarians have in providing information about their serials holdings, the challenges are only magnified at the level of the end-user. Before the advent of the online public access catalog (OPAC), a listing of all available print serial titles had to be created by each library. As Shouse, Crimi, and Lewis (2001) states, this was usually not an easy task. Scanning titles in the current periodicals room, searching other related locations that also received journals, and cross-referencing with other available title lists was a time-consuming process (151).

The development of the OPAC as a searching tool to find the library's resources has sometimes added to the confusion when it comes to locating serials. Snavely and Clark (1996) describe a five-step process that users must go through in order to retrieve an article published in a serial from a library. The first is to locate the relevant index for the user's topic, in either print or electronic form. This leads to the discovery of a citation that may or may not be useful. The user then takes the citation to the OPAC to see if the library owns the resource cited. This is generally accomplished by a simple title search. The title search leads to what is probably the first of several screens of

information. The first may not include the actual holdings information, if so the user has to proceed to another screen for details about dates and locations. Once this information has been retrieved, the user makes their way to the shelf and locates the serial.

When the Internet began to grow in popularity during the 1990s, publishers began to realize that this might be a new avenue for them to explore, leading to the first electronic journals. When e-journals first appeared and libraries started licensing them, the e-journal's catalog records were not included in the OPAC or even on the library web page at all (Knudson et al. 1999). Many of the first e-journals were based on mailing lists, for example, listproc and majordomo. Users would receive email stating that a new issue had arrived, and they would then download the information through file transfer protocol (FTP) to their own computer. Other full-text journal issues were sent directly to the user's email inbox (Woodward and McKnight 73).

Most academic libraries soon developed and maintained separate web pages that contained listings of all of their e-journals. Numerous articles explain in great detail how individual libraries developed and organized their web pages. The majority of this research shows that pages listing each e-journal by title were the most popular format, with subject listings not far behind (Knudson et al., Rich and Rabine 1999, Montgomery and Sparks 2000, Shouse, Crimi, and Lewis 2001). Some even maintained pages organized by publisher (Rich and Rabine 38).

While many of these e-journal web pages were being created, the larger academic libraries seem to follow a similar pattern of development. The first step in this process was to create a list of all the e-journals that were available through the library and were appropriate for the web page. At the start of the project, the relatively small number of e-

journal titles available at the library allowed for alphabetical listing. Once the numbers of e-journals became too unwieldy for this type of organization, subject listings were developed. These subject categories were usually broad and were often related to the university's departments and the library's special collections. The ability for users to browse e-journal titles in this manner was accepted at once (Knudson et al. 2). Local databases that automatically updated these web pages were the next logical step in maintaining the hundreds or even thousands of e-journal titles.

As the proliferation of e-journals continued, decisions had to be made about what information was being placed on these web pages. Rich and Rabine discussed the selection criteria in place at Jerome Library at Bowling Green State University. The most important was coverage of the periodical; whether or not the e-journal was available in full-text, and the date ranges covered by the subscription. Other criteria included the availability of archives, what type of indexing, and whether or not print equivalents were subscribed to (38).

A study done at Oakland University in 2000 measured the ability of undergraduate students to locate library materials both before and after some type of instruction session. The researchers at OU concluded that while instruction was beneficial to students when searching for library materials, many had difficulties finding print serials and turned to electronic resources instead. Two hundred and seven of the 237 students surveyed reported that having online, full-text articles was important to them. Out of that same number, 174 preferred using online articles, and 84 believed that everything they needed for their research could be found online (Lombardo and Condic 334). E-journals are also becoming *the* choice of resource for the growing numbers of

students involved in distance education, according to Felts, Jr. (282-3). The availability of these full-text resources is something that many library users take for granted today. Joseph W. Barker (1999) terms these types of students "serial-illiterate". He noted that while the students he worked with at the University of California, Berkeley are ranked in the top 10 percent of the state's students, only 25 percent understand journal index citations (51).

Once an e-journal was available for which a library held the print version, the lines between what needed to be in the OPAC and what could be located on a separate web page began to blur. Information about the library's online access to, for example, the *Journal of Molecular Biology*, could theoretically be located along with information about the print holdings.

In the late 1990s, it became feasible for OPACs to include linking to an electronic resource (if it had a URL) directly from the catalog record. This sparked a debate about which resources should be cataloged and which shouldn't. Should electronic versions of print serials have their own record or just a note attached to the print version's catalog record?

Martha Hruska (1995) made it clear that she believes the cataloging of e-resources is an important function of the library. She stated that:

> Library OPACs should include bibliographic records for all the materials libraries collect for their users. If libraries determine that certain Internet serials should be gathered for the benefit of their users, these should be included in the libraries' OPACs. (68)

Hruska believed that many libraries use what is in the OPAC as an attempt to keep items the library owns separate from what they have access to (68).

Montgomery and Sparks later showed support for e-journal cataloging because it allows for integration and access. They stated that:

> In addition to facilitating access to both print and electronic formats, using the MARC standard allows a full search of the information contained in the bibliographic record—ISSN, title changes, series, etc.—and, most importantly, facilitates full application of the Library of Congress subject headings to these records. (10)

Maintaining a holdings record in the OPAC does have some other benefits as well. According to a presentation made by Rosenberg at the 1998 North American Serials Interest Group (NASIG) meeting, a holdings record can:

> serve as a basis for check-in and claiming; record bound units, with barcodes for circulation; generate a spine label; display a summary holdings statement to users; become part of a Z39.50 retrieval from a remote site; serve as a report to a union list; and answer a reference question. (4)

Holdings statements and catalog records have more than one use in the library environment.

Jones (2000) states that for many libraries, the solution to the e-journal problem in the online catalog is just to "piggyback" the electronic version onto the already existing print record. While this may save time and space in the catalog, users should see this as a disservice because added entries specific to the electronic version may be left out of the print catalog record. There is the fact that information about the electronic version will likely be relegated to just one note in the entire record. Although it is possible for added entries to be included, libraries seem to find it difficult to resolve what is known as the multiple versions problem (16-17).

Whether e-journals have their own catalog record or not, changes in the Machine-Readable Code (MARC) records had to be made in order for pertinent information to

display. The first major change was the addition of the 856 field (see Figure 1). According to the *MARC 21 Concise Holdings Format*, this field identifies the location that the e-journal is coming from as well as how the source is retrieved. This second piece of information is located in the first indicator of the 856 field, the most common indicator being 4 for http. The second indicator identifies how the electronic resource is related to the MARC record as a whole ("Electronic Location and Access."). Is the record for the electronic version only (2nd indicator = 0)? Is it a version of a print resource (2nd indicator = 1) or is it a related resource (2nd indicator = 2)?

Figure 1: 856 Field of MARC Record for UNC-Chapel's E-journal (Journal of the American Medical Association)

856 41 $3 Full text via UNC-CH Libraries E-Journals List $u http://eresources.lib.unc.edu/ejournal/EJdescription.cfm?EJID=12383 $x http://jama.ama-assn.org/

There are several other important fields in MARC records for e-journals. One is the 530 field, which is important in print serials records that only contain notes about the electronic version. This field allows for mention of the resource appearing in another physical format, in this case, electronically ("Online version available…") ("Additional Physical Form Available Note."}. The 246 field codes for varying forms of the resource title. In e-journal records this usually refers to title abbreviations like *JAMA* or *J.A.M.A.* for the *Journal of the American Medical Association*. This is an important feature for users who want to search under the abbreviated title ("Varying Form of Title."*)*.

Aside from the MARC record, there have also been several standards for OPAC holdings display developed by the National Information Standards Organization (NISO). The first holdings standards were developed in the 1980s and were for the paper and microfiche environment (Z39.42). The holdings display could have open-ended date

entries and the highest level recorded was the journal volume (which the library holds if it owns 50 percent or more of the volume). This was superseded by Z39.44, which defined volume so that if a library owns any of it, it is counted in the holdings. In this standard, date entries were developed further, so that all gaps in ownership had to be accounted for. This standard along with the standard for monograph holdings (Z39.57) have been combined to form the newest standard for bibliographic holdings: Z39.71 (Rosenberg 4).

Z39.71 was developed by NISO and the American National Standards Institute (ANSI) in 1999. Whereas the MARC holdings format mentioned above provides the *structure* for holdings records, the NISO standard specifies the content. The most important parts of this standard are the four levels of holdings statements that libraries can use in their catalogs. Level only identifies the bibliographic item (Item Identification Area) and where it is located in the library (Location Data Area). Level two has both of these pieces of information, as well as the date that the record was created or modified in the catalog (Date of Report Area), and *may* have some details about which volumes the library holds. Level three is required to include these details about the library's holdings, but only the highest level of enumeration and/or chronology is recorded. For example, the library may have the first five volumes of a serial, which would be recorded: v.1-5 1996-2001. This is known as a compressed record. The last level, four, takes the enumeration/chronology details a step further. Any gaps that may occur in the library's collection are noted, and each individual issue may be itemized and displayed for the catalog user to see (ANSI/NISO Z39.71-1999 15).

While it is important that these types of standards have been developed and they may make it easier for library users to distinguish between what the library holds and what it doesn't, cataloging is still a process that takes time and money. University and college libraries have to decide for themselves what level, if any, they are going to catalog serials (print and/or electronic) at and the time and resources necessary for the job. The University of Washington developed guidelines for its libraries in regards to cataloging serials. It was decided that UW would implement CONSER (CONversion of SERials Project) full-level records for most of their serials (Lindlan 9). According to CONSER guidelines, there are three types of records. Minimum level records contain only the essential elements needed for description of the serial and may or may not have authoritative subject elements. Core level records contain descriptive details, information about access, and are completely authoritative. Full level records contain every piece of information that is applicable to the serial and is also completely authoritative ("Description of Record Levels."). UW originally planned on using core level records, but discovered that for their purposes, there was not a significant amount of time saved compared with implementing full level records. They did, however, decide to create core level records for electronic resources they had access to without a print equivalent (Lindlan 13).

Although catalog records for print serials and their electronic equivalents may seem closely related, Seys (2001) argues that librarians must understand that the processes for creating them are actually different languages. While monographic cataloging involves elements like examination and transcription, serials cataloging turns those into extrapolation (making informed guesses) and supervision (monitoring each

incoming issue for changes). The issue becomes even more complicated when electronic resources are added into the mix. While both print and electronic serials are in a constant state of flux, Seys states that in the electronic environment the "meaning itself is changing" (171). This leads to another set of cataloging terms. Examination turns into creation (metadata and markup occur immediately) and transcription becomes internal markup, or embedded transcription. Seys concluded the presentation saying, "Serials catalogers must find ways to provide a layer of meaning, so that users no longer have to navigate through an incoherent jumble of objects that were not created with them in mind" (172).

In the end, it comes back to the question of access. How can library users access everything the library owns, holds, or has access to. What everyone in the library world today would like to develop is a common user interface. As Arant and Payne (2001) put it, a common user interface would provide "an all-inclusive overlay to multiple systems, databases or applications with added functionality and integration for the purpose of optimal information retrieval" (63). These systems would include the library catalog, any lists of links to e-journals, as well as all of the e-indexes and databases a library might have access to. Libraries aren't the only ones to have their own specialized interface anymore. Vendors and publishers each have an interface that they think works best for their resources. There are times when these various interfaces do not mesh with each other. Important components to remember when developing a common user interface include: a search interface that covers all of the resources available; links between relevant resources; some type of personalized account that allows users to compile

records for themselves; and sources of assistance in the form of online chats and help guides (Arant and Payne 65).

Methodology

The first step in analyzing the way that libraries display serial titles and their holdings was to identify library web sites that could be studied. Fifty libraries were chosen from *The Carnegie Classification of Institutions of Higher Education* (2000). The classification includes doctoral/research universities, master's colleges and universities, baccalaureate colleges, associate's colleges, specialized institutions, and tribal colleges and universities in the United States.

Two of these divisions were chosen for this study. The institutions categorized as "Doctoral/Research Universities-Extensive" award 50 or more doctoral degrees per year across at least 15 disciplines. Those categorized as "Master's Colleges and Universities I" award 40 or more master's degrees per year across three or more disciplines (1). In the past, the *Carnegie Classification* included research funding as part of its criteria, but has discontinued that in this latest publication. These two groupings were chosen for both the probable difference in size of the libraries and the variety of their academic programs. An additional factor in choosing these larger institutions was the likelihood of them having a library web page and an ability to obtain access to their OPAC. Twenty-five libraries from each category were chosen based on a random number table. Eleven of the chosen libraries were replaced in the study when access to their library home page was not available.

The selection of journal titles also had to be addressed Although it was hoped that relatively new titles could be used, in order to include as much information as possible about the use of the new NISO standards for bibliographic holdings, this was not successful. Two other titles were chosen instead, by using a random number table. Because of their long publication history and their availability in a large number of libraries, they seemed ideal. *JAMA: The Journal of the American Medical Association* has been in publication since 1960 (earlier under other titles) and is available in approximately 3800 libraries worldwide, according to *OCLC WorldCat* Also selected was *Harvard Business Review*. It began in 1922 and appears in approximately 3900 libraries.

Both the web page and the available OPAC of each university library were studied in depth. Each journal title was entered into each OPAC as a title search and the resulting records retrieved. Searches were also limited, when possible, to serials or periodicals. The library web pages were then investigated for other sources of information about the availability of electronic resources, for example, and E-journals page linked from the main library web page.

Results and Discussion

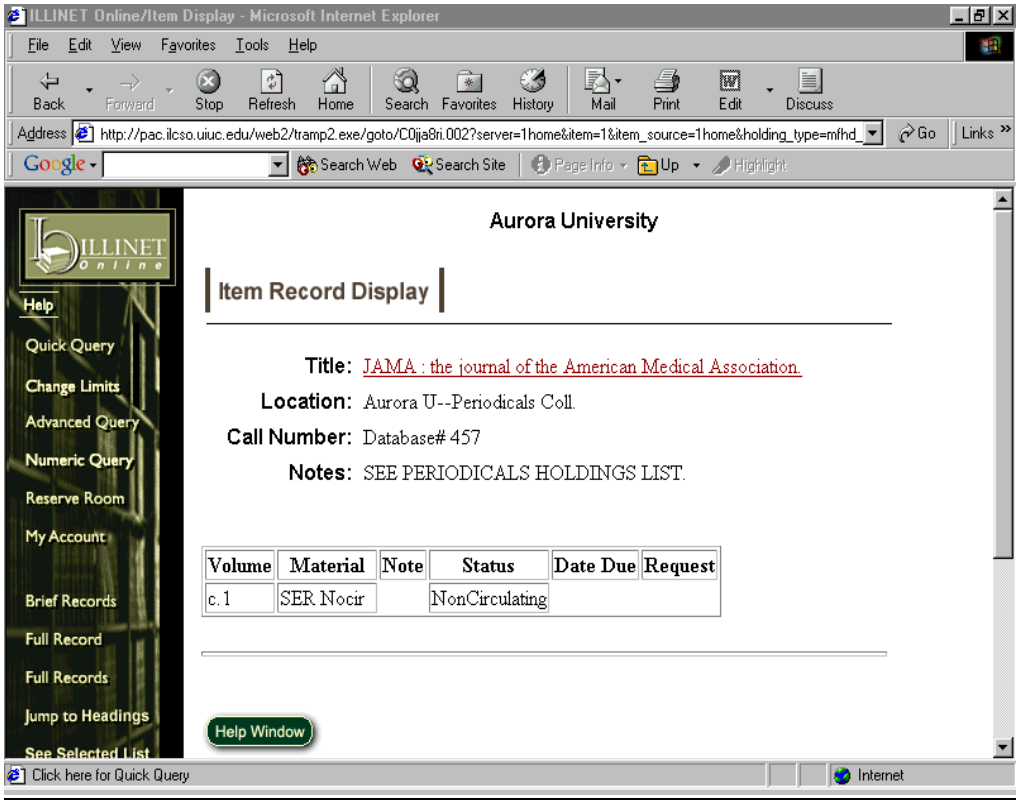
The majority of the OPACs in the study appeared as part of a library's integrated library system (ILS). There were several different systems represented in this study, whether they were mass market or home grown. These included CARLweb, DRA, Endeavor, Epixtech, GeoWeb, HOLLIS, Innovative Interfaces, MARION, Quest, Sirsi,

WebPac, WebPALS, and WebVoyage. Some OPACs did not provide any information to the type of ILS in use. The most popular ILS in the study was Innovative Interfaces with 32 percent of the 50 libraries using that system.

Twenty eight percent of the OPACs did not specify which type of system, if any, they were using. All of the other systems were found in two to six percent of the libraries.

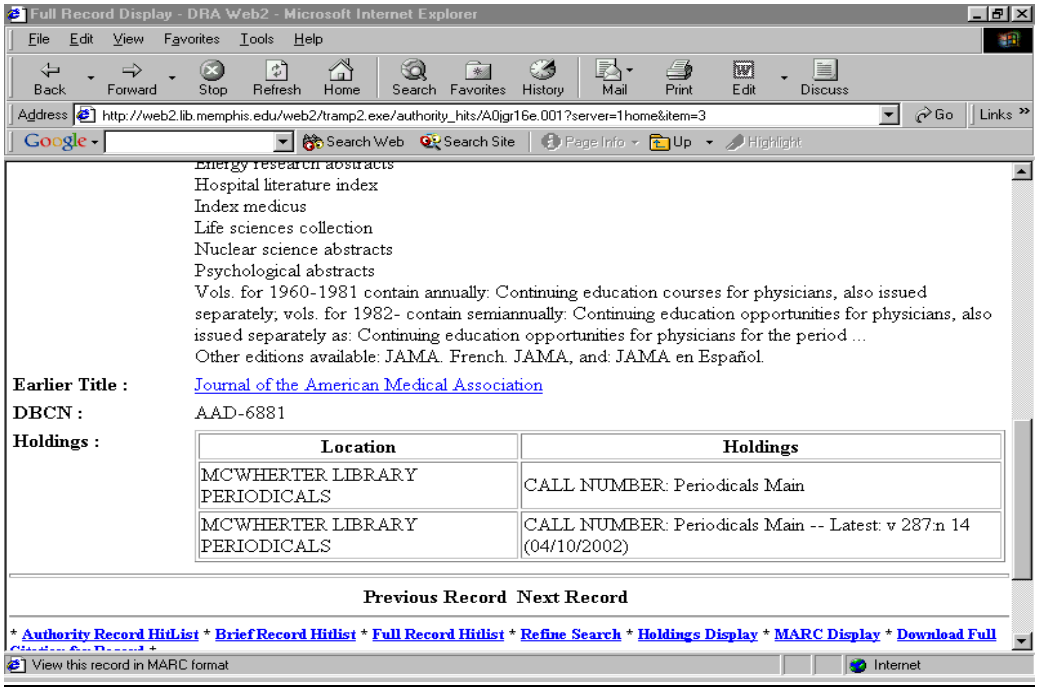
The next item of information taken into account was the level of holdings statement provided by the OPAC display. The four levels were taken from ANSI/NISO Z39.71-1999, the most recent standard for bibliographic items holdings statements. The fact that the standard was only released in 1999 means that past records have been "grandfathered" in and will not necessarily have all of the new requirements. Libraries are given the option of displaying holdings at any of the four levels. The lowest level, or Level 1, identifies only the bibliographic item and its location, and requires an Item Identification Area and a Location Data Area (see Figure 1 below). There is title information and location information, but no volumes.

Figure 2: Level 1 Holdings Statement from Aurora University OPAC for the *Journal of the American Medical Society*



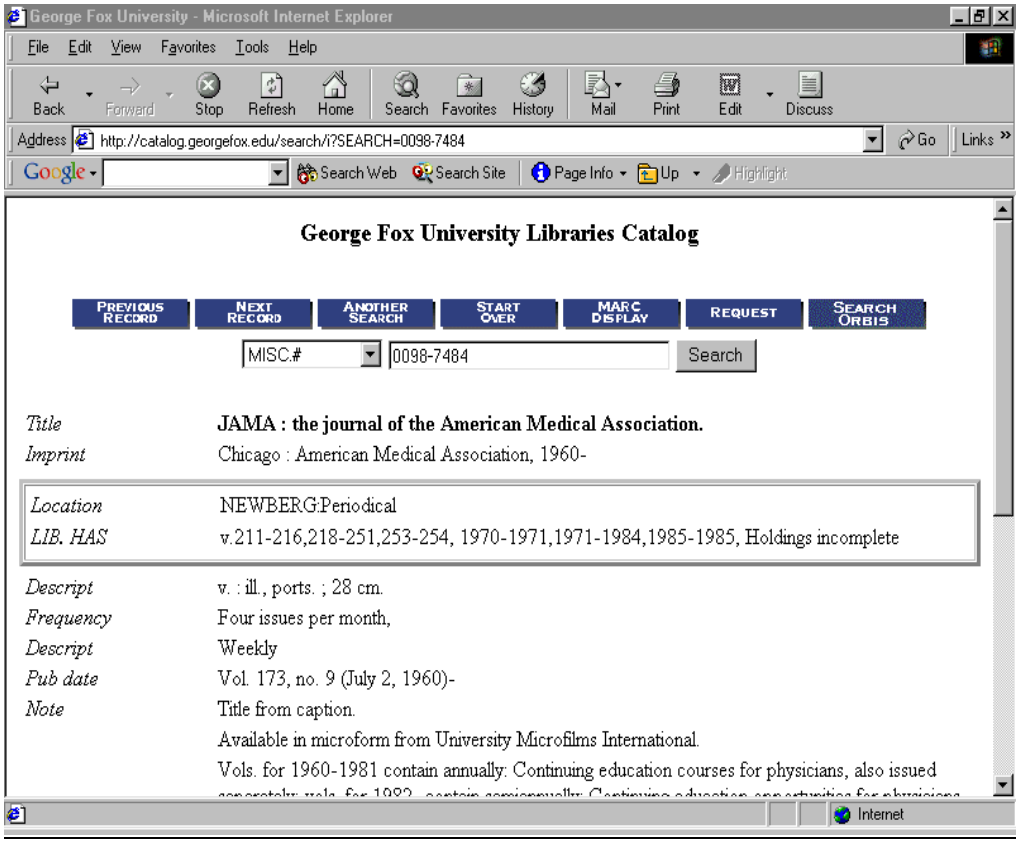
Level 2 holdings must reflect all Level 1 items, a Date of Report Area, as well as possible extent of holdings for the institution. The date is recorded as YYYYMMDD. None of the records studied included this piece of data, so without the Date of Report Area these records are not up to the ANSI/NISO standard for Level 2, 3, or 4, even though other information provided *does* fit the standard. Figure 3 from the University of Memphis OPAC is an example of what a Level 2 record might look like (minus the Date or Report information).

Figure 3: Level 2 Holdings Statement from University of Memphis OPAC for *Journal of the American Medical Association*



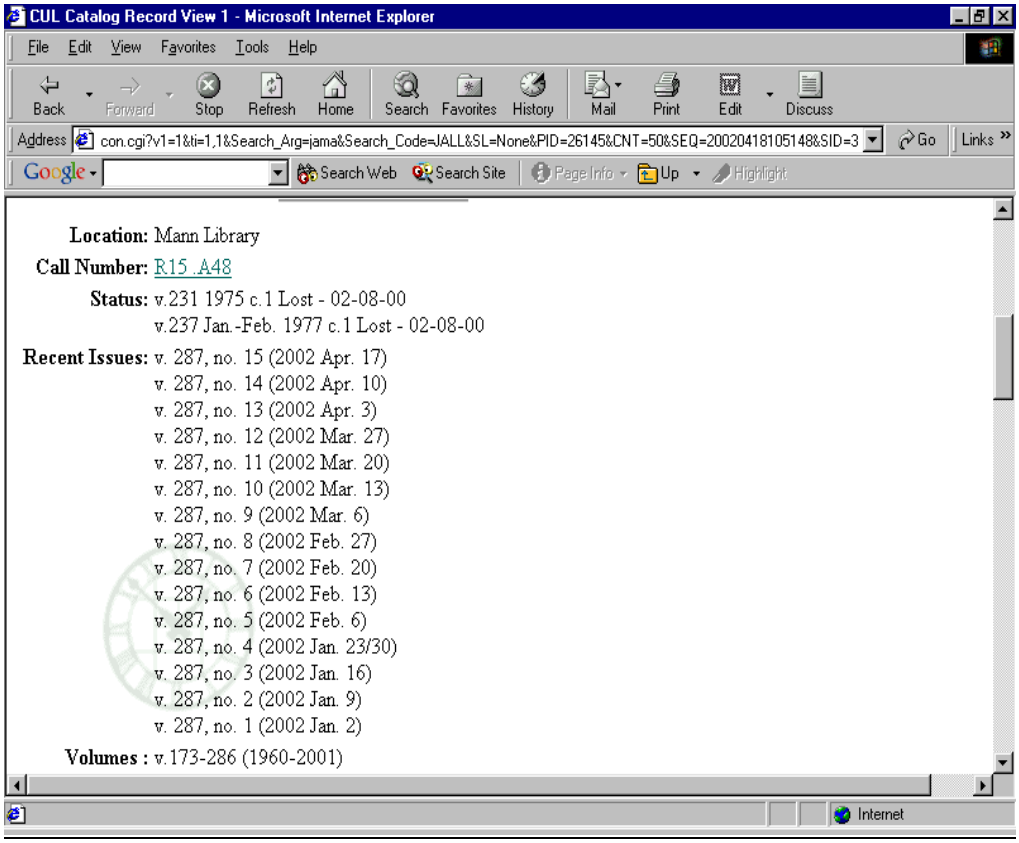
Level 3 holdings include the data elements from Levels 1 and 2, as well as the extent of the library's holdings at the most compressed level. Again, this is where the first and last volume numbers and dates held are recorded. Both enumeration and chronology of the holdings are to be recorded if applicable to the title. This type of compressed statement is sometimes found on the first screen of a bibliographic record. Figure 4 (below) shows what a Level 3 holdings record might look if there were a Date of Report Area included.

Figure 4: Level 3 Holdings Statement from George Fox University OPAC for *Journal of the American Medical Association*



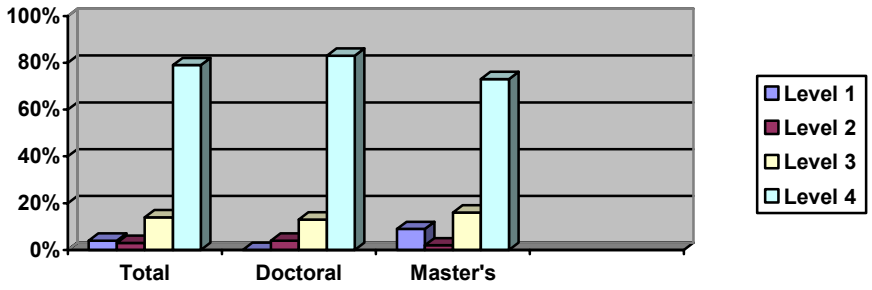
The final holdings statement is Level 4. It includes all of the previous data elements, but can also provide a much more detailed record of library holdings, generally on an issue-by-issue basis. While the first screen the patron sees when they pull up the journal title may not have issues itemized one by one, the more detailed record on the next screen will (see Figure 5 below, where the volume number, issue number, and the date of the issue are recorded for each item)

Figure 5: Level 4 Holdings Statement from Cornell University OPAC for the *Journal of the American Medical Association*



Overall, 4 percent of the holdings displays for the both journal titles closely matched Level 1 standards, 3 percent were Level 2, 14 percent were Level 3, and 79 percent were Level 4. Once again, Levels 2, 3 and 4 would need a Date of Report Area to fit the 1999 standards exactly. Breaking it down to the "Doctoral/Research University-Extensive" level, 0 percent of the journal records were Level 1, 4 percent Level 2, 13 percent Level 3, and 83 percent were Level 4. At the "Master's University I" level, 9 percent were Level 1, 2 percent were Level 2, 16 percent were Level 3, and 73 percent were Level 4. Figure 6 (below) shows a graphic representation of these percentages. The actual figures are represented in the tables in the appendix at the end of the paper.

Figure 6: % of Holdings Displays at Levels 1, 2, 3 and 4



These levels of description are for the holdings portion of the OPAC record and should not be confused with other levels of description in cataloging, specifically those in *Anglo-American Cataloging Rules*. The levels in description in *AACR2* relate more to the title, author, and publisher of a work. The first level of description in *AACR2* must include a title proper, statement of responsibility, edition statement, material specific information, publisher and date of publication, the extent of the item, any notes, and some sort of standard number. The second level of description must include the previous items as well as a general material designation, a parallel title or other title information if available, all statements of responsibility and publication details, and series details. The third level of description means that a record must detail all elements that are applicable to the item being described (15). Like with holdings statements, libraries must make a decision about what level of description will be accepted. While the types of description seem to parallel each other, they are not necessarily related to each other. Choosing to describe an item's holdings at the second level does not require librarians to perform the actual descriptive cataloging of the item at the same level.

There did not seem to be any correlation between libraries that displayed holdings less than Level 4 and libraries whose catalogs and/or web pages did not have access to electronic version of these two journal titles.

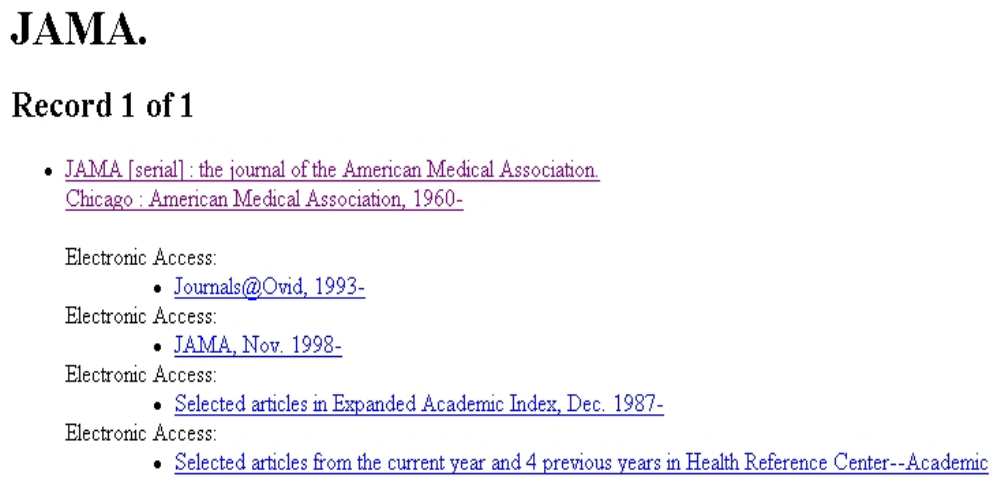
One of the biggest obstacles in incorporating serials, and especially e-journals, into an online catalog, was the complexity of the MARC records for these resources, especially the holdings data. While ANSI/NISO created a standard for bibliographic holdings statements, it is only responsible for the *display* format. There is a USMARC Format for Bibliographic Data as well, that is responsible for the communications format of the data. At the 1995 ALA Annual Conference, there was a program entitled "MARC Format for Holdings Data: An Implementation Status Report By Local System Vendors and Utilities" (Marrill 1995). Almost all of those in attendance responded that they used the USMARC Format for Bibliographic Data to the full extent, only half of them used the holdings format, even partially. That does not appear to be the case in 2002, as evidenced by the 75 MARC records (80%) available through the OPACs.

The complexity of serials cataloging is shown again by the existence (or lack) of other title information as well as links to them when other records are available. 76 percent of all the records contained some sort of "other title information" (i.e., preceding title, succeeding title, abbreviation), while 24 percent did not. When arranged by journal, *JAMA* records always (100 percent) contained some form of other title information. This was not the case with *Harvard Business Review*, where 51 percent of the records did contain other title information and 49 percent did not. In the case of *JAMA*, the majority of the other title information included previous titles and parallel titles in foreign languages. In *Harvard Business Review,* there were parallel titles in several foreign

languages, and occasionally an abbreviation of the full title (*Harvard Bus. Rev.*) was listed as well. Fifty four percent (51 out of 94) of the total records included links to these other titles and 46 percent (43 out of 94) did not. In *JAMA*, 74 percent (35 our of 47) of the other titles could be linked to and in *Harvard Business Review* only 34 percent (12) could be linked to. These last two figures correspond with the fact that *JAMA* has more titles associated with it than *Harvard Business Review*.

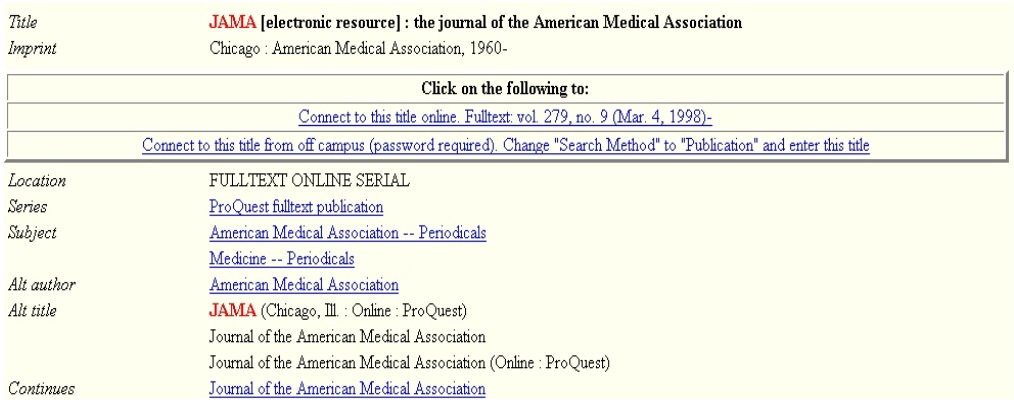
Over the last five to seven years, electronic journal publishing has skyrocketed and library OPACs are starting to reflect that trend. Both library web pages and individual serials holdings records were analyzed for access to the e-journal versions of *JAMA* and *HBR*. Thirty seven percent of the records for both titles included some sort of link to the electronic format.

Figure 7: E-journal Link Embedded in Print Display Holdings from Duke University OPAC



In some cases it was a direct link from the print record (see Figure 7 above) and in others it was a completely separate record for the electronic version (Figure 8 below).

Figure 8: Separate Record for E-Journal from Rensselaer Polytechnic Institute OPAC



Title	JAMA [electronic resource] : the journal of the American Medical Association
Imprint	Chicago : American Medical Association, 1960-

Click on the following to:
Connect to this title online. Fulltext: vol. 279, no. 9 (Mar. 4, 1998)-
Connect to this title from off campus (password required). Change "Search Method" to "Publication" and enter this title

Location	FULLTEXT ONLINE SERIAL
Series	ProQuest fulltext publication
Subject	American Medical Association -- Periodicals
	Medicine -- Periodicals
Alt author	American Medical Association
Alt title	JAMA (Chicago, Ill. : Online : ProQuest)
	Journal of the American Medical Association
	Journal of the American Medical Association (Online : ProQuest)
Continues	Journal of the American Medical Association

Fifty seven percent of the *JAMA* OPAC records contained a link from the holdings statement directly to the e-journal. Seventeen percent of the *HBR* records also had links from the holdings statement. The library web pages themselves were searched for any type of page that listed all of the e-journals the library subscribes to. The majority of these "outside" sources were simple title listings of all the e-journals.

Figure 9: E-journal Page by Title Via California Digital Library from University of California Riverside Library Web Page

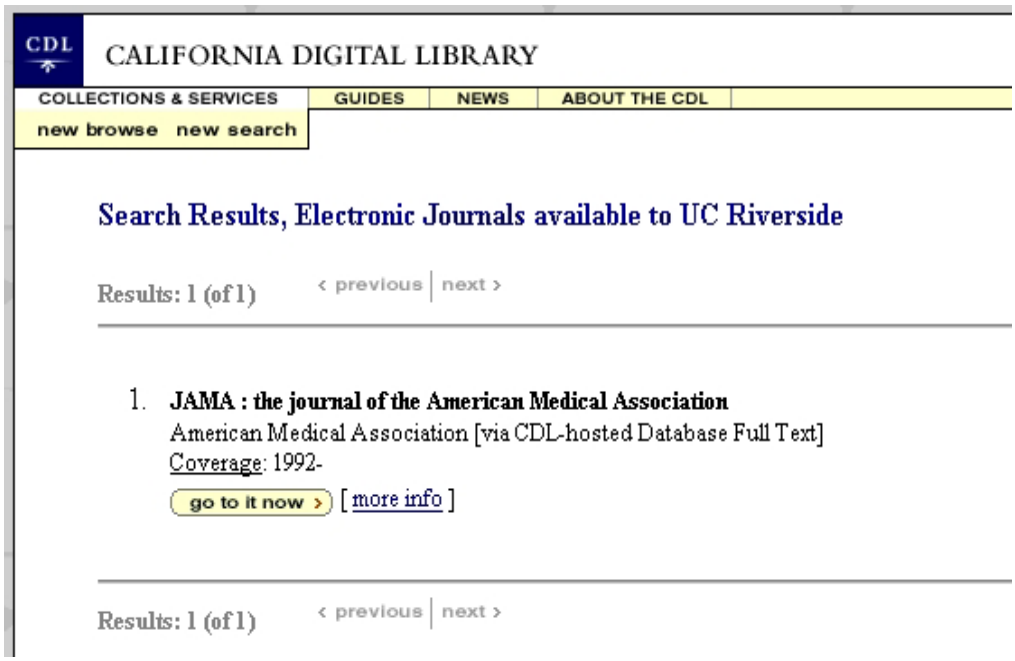


Figure 9 (above) shows an example of an e-journal listing accessed through an e-journal page on the library's main site. In this instance, *JAMA* can be accessed from any of the schools in the University of California system through the California Digital Library (CDL).

Several e-journals could be accessed from web pages of the medical, health sciences, or biomedical libraries. Forty percent of all the libraries had some kind of link to the e-journal outside of the catalog. Both titles were evenly split with 40 percent having outside links and 60 percent not.

While many publishers began by offering electronic journals on an individual subscription basis, eventually they began bundling many of the titles in their publishing house together and selling them as a package. It wasn't long after that vendors, rather than publishers, were packaging resources together. These types of full-text databases with many e-journal titles and the indexes to be used with them became known as aggregators (Rich and Rabine 36).

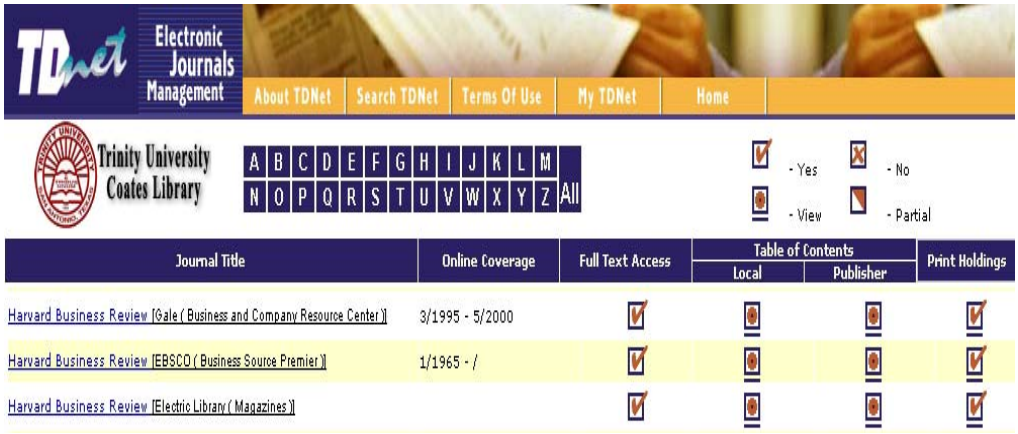
These aggregations of information, when they are all placed under one banner (i.e., NCLive, OCLC FirstSearch, Past Masters) have made it possible for libraries to provide far more information access. However, they have made it much more difficult for users, especially un-experienced searchers. A multitude of problems continue to arise, including titles that are in more than one database under different names. Shouse, Crimi, and Lewis provide the example of the databases ABI/INFORM GLOBAL and Ebscohost's Academic Search Elite. In Academic Search Elite, the *Journal of the Academy of Marketing Science* is listed under its correct title, but in ABI/INFORM GLOBAL the same journal is listed under *Academy of Marketing Science Journal* (153).

Another example of the difficulties in searching through shared resources and huge databases occurred in California with the California Digital Library. While the CDL is supposed to allow the entire university system access to information, each school does not get the same information. Joseph W. Barker admits that UC Berkeley does not subscribe to all of the journals in the CDL, nor are the journals in the CDL the only ones Berkeley subscribes to (53). For example, Berkeley's catalog lists 120 e-journals while CDL lists 582. This is common for many subjects, forcing users to become extremely aware of how and where they are searching for information (Barker 55).

For a long time, the only way librarians could help their users find full-text journals hidden away in aggregators was to sit down themselves, try to figure out what titles they had, where they were located in the electronic resource environment, and what dates were available, then include them in an e-journals page, searchable by title or subject. This all-inclusive title list is the best way to maintain a balance of access between smaller, independent presses that sell individual e-journal subscriptions and the more popular publications bundled together (Dentinger 92).

In the past several years, there have been new advances from outside companies (Serials Solutions and TDNet are two) providing services to help libraries keep their e-journals and e-resources straight, while allowing users the most access. Such companies act as an intermediary for libraries, vendors, and the publishers they deal with, compiling databases, reports, and statistics about what one particular library has. Figure 10 (below) is an example of an e-journals page compiled by TDNet from every electronic resource the library has access to.

Figure 10: TDNet E-journal Listing from Trinity University Web Page Showing Access to *Harvard Business Review*



This is extremely useful for journal titles that aren't available on their own, only through an aggregator. This type of service can help to explain that *Harvard Business Review* is actually available in more than 17 percent of the libraries studied. While there may only be direct links in the record for 17 percent of the libraries, it is likely that more of the libraries license an electronic resource such as Business Source Elite through EBSCOHost. This makes the resource available for use but hidden from direct path of the library user.

One might wonder how many library web pages allow patrons to search other library catalogs, whether related to the university or not. Out of all 50 libraries, 45 allowed searching in other catalogs, while 5 did not. Several of the library OPACs searched for resources in more than one catalog automatically; these libraries were usually part of a statewide or regional consortium (CLICnet in Minnesota and the Washington Research Libraries Consortium in Washington, D.C.). Analyzed further, 42 out of 50 (84 percent) of the "Doctoral/Research-Extensive Universities" provided searching of other catalogs, while 48 out of 50 (96 percent) of "Master's I Universities" provided this function. It would appear, from the slightly larger number of "Master's I

Universities" that have the ability to search other catalogs from their library web page, that these types of institutions are making an effort to provide as many resources as possible for their patrons, regardless of the university size. With shared searching capabilities, users can find out which libraries in the area may have the resources they need and order them through Inter-Library Loan. This type of consortia-based arrangement between libraries is becoming more important every year. By sharing resources in a city, state, or region, libraries can specialize in certain areas of their collection, without neglecting the needs of their patrons.

Conclusion

There will always be those who wonder exactly how much time, energy, and money should be spent trying to catalog serials, whether print, electronic, or if it should be done at all. Library users will continue to want easier and faster access to all of the journal titles that have as few as one article available in full-text online. In the future, there is hope for integrating document delivery system with e-journal collections, turning the library's electronic resources from "just in case" to "just in time" (Felts, Jr. 290).

Finding serials in the past has been confusing for students, faculty, and staff alike, but progress is being made towards a more user friendly, and hopefully, more comprehensive, display of serials holdings. If the library is going to continue to fulfill its role in the university as the center of information, it needs to keep up with the expectations of its users. This study has emphasized the usefulness of standards in holdings data, which provide a certain amount of context for the patron as well as the library staff to use when conducting serials searches. It has also brought to attention the

need for more than one way to access the library's electronic information. Even if every electronic resource is cataloged and placed in the OPAC someday, there will still be those users who prefer to browse by title or subject. While it may be somewhat expensive and time-consuming to prepare both catalog records and dynamic databases and web pages for e-journal listings, it appears to be a project that some libraries are willing to undertake for the benefit of their patrons.

Proprietary services such as TDNet should continue to provide comprehensive e-journal listings to those libraries willing to pay, until such time as a true common user interface has been developed. As Arant and Payne stated a year ago, the pieces of the puzzle are all out there right now; they just haven't been put together yet (75). When that happens, searching for serials may become much more of a positive experience for all involved.

Appendix. Results in Tabular Form

The following tables are the result of searching both the OPAC and subsequent web pages of each academic library. Each row represents a specific university, and each of the four tables represents searches executed for *The Journal of the American Medical Association* and *Harvard Business Review* in both the "Doctoral/Research-Extensive" Universities and the "Master's I" Universities.

Journal of the American Medical Association-
Doctoral/Research Extensive Institutions

COLLEGE/UNIVERSITY NAME	ILS NAME	LEVEL
Brigham Young University	Sirsi	4
Colorado State University	?	3
Cornell University	?	4
Duke University	MARION	4
Georgia Institute of Technology	?	4
Harvard University	HOLLIS	4
Louisiana State University and Agricultural and Mechanical College	Sirsi	4
Marquette University	Innovative Interfaces	4
Rensselaer Polytechnic Institute	Innovative Interfaces	4
State University of New York at Albany	GeoWeb	3
The University of Alabama	WebVoyage	3
The University of Memphis	DRA	2
University of California-Riverside	Innovative Interfaces	4
University of Connecticut	?	4
University of Houston	Innovative Interfaces	4
University of Maine	Innovative Interfaces	3
University of New Mexico (main campus)	Innovative Interfaces	N/A
University of North Carolina at Chapel Hill	DRA	4
University of Pennsylvania	?	4
University of Rochester	?	4
University of South Carolina-Columbia	WebPac	4
Utah State University	Epixtech	4
Vanderbilt University	?	4
Wayne State University	?	3
West Virginia University	WebVoyage	4

Journal of the American Medical Association-
Doctoral/Research Extensive Institutions

COLLEGE/UNIVERSITY NAME	D.A.R. AREA?	MARC RECORD?	OTHER TITLE INFO?	ALTERNATE TITLE LINKS?
Brigham Young University	no	yes	yes	yes
Colorado State University	no	yes	yes	yes
Cornell University	no	yes	yes	yes
Duke University	no	no	yes	yes
Georgia Institute of Technology	no	no	yes	no
Harvard University	no	no	yes	no
Louisiana State University-A&M	no	yes	yes	yes
Marquette University	no	yes	yes	yes
Rensselaer Polytechnic Institute	no	yes	yes	yes
State University of New York at Albany	no	yes	yes	yes
The University of Alabama	no	yes	yes	yes
The University of Memphis	no	yes	yes	yes
University of California-Riverside	no	yes	yes	yes
University of Connecticut	no	yes	yes	yes
University of Houston	no	yes	yes	yes
University of Maine	no	yes	yes	yes
University of New Mexico (main campus)	N/A	N/A	N/A	N/A
University of North Carolina at Chapel Hill	no	yes	yes	yes
University of Pennsylvania	no	yes	yes	no
University of Rochester	no	yes	yes	yes
University of South Carolina-Columbia	no	no	yes	no
Utah State University	no	no	yes	no
Vanderbilt University	no	no	yes	no
Wayne State University	no	no	yes	yes
West Virginia University	no	yes	yes	no

Journal of the American Medical Association-
Doctoral/Research Extensive Institutions

COLLEGE/UNIVERSITY NAME	E-JOURNAL LINK IN CATALOG?
Brigham Young University	yes
Colorado State University	yes
Cornell University	yes (in long view as opposed to brief view reco
Duke University	yes-4 different ways to access it
Georgia Institute of Technology	no
Harvard University	yes
Louisiana State University-A&M	yes-4 different ways to access it
Marquette University	yes
Rensselaer Polytechnic Institute	have separate records
State University of New York at Albany	yes
The University of Alabama	no
The University of Memphis	yes
University of California-Riverside	yes-2 different ways to access it
University of Connecticut	no
University of Houston	yes
University of Maine	yes-2 different ways to access it
University of New Mexico (main campus)	N/A
University of North Carolina at Chapel Hill	yes
University of Pennsylvania	yes
University of Rochester	has separate record
University of South Carolina-Columbia	no
Utah State University	no
Vanderbilt University	yes-3 different ways to access it + separate re
Wayne State University	yes
West Virginia University	no

Journal of the American Medical Association-
Doctoral/Research Extensive Institutions

COLLEGE/UNIVERSITY NAME	OTHER E-JOURNAL LINKS ON LIBRARY SITE?	OTHER CATALOGS?
Brigham Young University	separate e-book & e-journal search screen	yes
Colorado State University	no	yes
Cornell University	e-journal title list/med.lib.has page w/e-journals page	yes-hard to find
Duke University	link to Duke Med. Center lib. Full text e-journal page	yes
Georgia Institute of Technology	no	yes
Harvard University	no	yes
Louisiana State University-A&M	e-journals page	no
Marquette University	no	no
Rensselaer Polytechnic Institute	e-journals page	yes
State University of New York at Albany	online journals page	yes
The University of Alabama	no	yes
The University of Memphis	e-journals page	yes
University of California-Riverside	e-journals page (through California Digital Library page)	yes
University of Connecticut	e-journals page	yes
University of Houston	no	yes
University of Maine	no	no
University of New Mexico (main campus)	e-journals page	yes
University of North Carolina at Chapel Hill	e-journals page (Health Sciences Library page also has link)	yes
University of Pennsylvania	no	yes
University of Rochester	e-journals page	no
University of South Carolina-Columbia	School of Medicine Library e-journals page	yes
Utah State University	e-journals page	yes
Vanderbilt University	Biomedical Library e-journals page	yes
Wayne State University	e-journal finder list	yes
West Virginia University	no	yes

Journal of the American Medical Association-
Master's I Libraries

COLLEGE/UNIVERSITY NAME	ILS NAME	LEVEL	D.A.R. AREA
Aurora University	?	1	no
Bellarmine University	Innovative Interfaces	4	no
Bowie State University	CARLweb	4	no
California State University-Hayward	Innovative InterfaceS	4	no
California State University-Los Angeles	?	3	no
College of Saint Catherine	?	4	no
Converse College	Innovative Interfaces	N/A	N/A
Freed-Hardeman University	Endeavor	4	no
George Fox University	Innovative Interfaces	3	no
La Salle University	Innovative Interfaces	4	no
Lamar University	?	3	no
Manhattan College	WebPALS	N/A	no
Minot State University	WebPALS	4	no
North Carolina Agricultural and Technical State University	Innovative Interfaces	4	no
North Park University	epixtech	4	no
Rivier College	Innovative Interfaces	4	no
Robert Morris College	WebVoyage	N/A	N/A
Saint Cloud State University	WebPALS	4	no
Simmons College	Innovative Interfaces	4	no
Southwest Missouri State University	Innovative Interfaces	4	no
State University of New York College at Cortland	DRA	1	no
State University of New York College at Fredonia	?	4	no
Trinity University	Quest	4	no
University of Houston-Clear Lake	Innovative Interfaces	4	no
University of the District of Columbia	?	4	no

Journal of the American Medical Association-
Master's I Libraries

COLLEGE/UNIVERSITY NAME	MARC RECORD?	OTHER TITLE INFO?	OTHER TITLE LINKS?
Aurora University	yes	yes	yes
Bellarmine University	yes	yes	yes
Bowie State University	yes	yes	no
California State University-Hayward	yes	yes	yes
California State University-Los Angeles	yes	yes	yes
College of Saint Catherine	yes	yes	yes
Converse College	N/A	N/A	N/A
Freed-Hardeman University	yes	yes	yes
George Fox University	yes	yes	yes
La Salle University	yes	yes	yes
Lamar University	no	yes	yes
Manhattan College	yes	yes	yes
Minot State University	yes	yes	no
North Carolina Agricultural and Technical State University	yes	yes	yes
North Park University	no	yes	no
Rivier College	yes	yes	yes
Robert Morris College	N/A	N/A	N/A
Saint Cloud State University	yes	yes	no
Simmons College	yes	yes	yes
Southwest Missouri State University	yes	yes	yes
State University of New York College at Cortland	yes	yes	yes
State University of New York College at Fredonia	yes	yes	no
Trinity University	yes	yes	yes
University of Houston-Clear Lake	yes	yes	yes
University of the District of Columbia	yes	yes	yes

Journal of the American Medical Association-
Master's I Libraries

COLLEGE/UNIVERSITY NAME	E-JOURNAL LINK IN CATALOG?	OTHER E-JOURNAL LINKS ON LIBRARY SITE?
Aurora University	yes	no
Bellarmine University	yes	no
Bowie State University	no	no
California State University-Hayward	yes	no
California State University-Los Angeles	no	no
College of Saint Catherine	yes	no
Converse College	N/A	N/A
Freed-Hardeman University	yes-3 different ways to access it	no
George Fox University	no	no
La Salle University	has separate record	supposed to be link to online journals page
Lamar University	no	e-journals page (but need student id # to access)
Manhattan College	e-journal only, no print version	e-journals page
Minot State University	yes	no
North Carolina Agricultural and Technical State University	no	no
North Park University	no	no
Rivier College	no	no
Robert Morris College	N/A	N/A
Saint Cloud State University	no	no
Simmons College	yes	e-journals page (but hard to find)
Southwest Missouri State University	no	no
State University of New York College at Cortland	no	no
State University of New York College at Fredonia	no	no
Trinity University	no	e-journals page (journal titles thanks to TDNet)
University of Houston-Clear Lake	yes	no
University of the District of Columbia	no	no

Journal of the American Medical Association-
Master's I Libraries

COLLEGE/UNIVERSITY NAME	OTHER CATALOGS?
Aurora University	yes
Bellarmine University	yes
Bowie State University	yes
California State University-Hayward	yes
California State University-Los Angeles	yes
College of Saint Catherine	yes-searches entire system automatically
Converse College	yes
Freed-Hardeman University	no
George Fox University	yes
La Salle University	yes
Lamar University	yes
Manhattan College	yes
Minot State University	yes
North Carolina Agricultural and Technical State University	yes
North Park University	yes
Rivier College	yes
Robert Morris College	yes
Saint Cloud State University	yes
Simmons College	yes
Southwest Missouri State University	yes
State University of New York College at Cortland	yes
State University of New York College at Fredonia	yes
Trinity University	yes
University of Houston-Clear Lake	yes
University of the District of Columbia	automatically searches all WRLC libraries

Harvard Business Review-
Doctoral/Research Extensive Libraries

COLLEGE/UNIVERSITY NAME	ILS NAME	LEVEL	D.A.R. AREA?	MARC RECORD?	OTHER TITLE INFO?
Brigham Young University	Sirsi	4	no	yes	no
Colorado State University	?	4	no	yes	no
Cornell University	?	4	no	yes	no
Duke University	MARION	4	no	no	no
Georgia Institute of Technology	?	4	no	no	no
Harvard University	HOLLIS	3&4	no	no	no
Louisiana State University and Agricultural and Mechanical College	Sirsi	4	no	yes	yes
Marquette University	Innovative Interfaces	4	no	yes	yes
Rensselaer Polytechnic Institute	Innovative Interfaces	4	no	yes	yes
State University of New York at Albany	GeoWeb	4	no	yes	no
The University of Alabama	WebVoyage	4	no	yes	no
The University of Memphis	DRA	2	no	yes	no
University of California-Riverside	Innovative Interfaces	4	no	yes	yes
University of Connecticut	?	4	no	yes	no
University of Houston	Innovative Interfaces	4	no	yes	yes
University of Maine	Innovative Interfaces	3	no	yes	yes
University of New Mexico (main campus)	Innovative Interfaces	4	no	yes	yes
University of North Carolina at Chapel Hill	DRA	4	no	yes	no
University of Pennsylvania	?	4	no	yes	no
University of Rochester	?	4	no	yes	no
University of South Carolina-Columbia	WebPac	4	no	no	yes
Utah State University	epixtech	4	no	no	no
Vanderbilt University	?	4	no	no	no
Wayne State University	?	4	no	no	yes
West Virginia University	WebVoyage	4	no	yes	no

Harvard Business Review-
Doctoral/Research Extensive Libraries

COLLEGE/UNIVERSITY NAME	OTHER TITLE LINKS?	E-JOURNAL LINK IN CATALOG?
Brigham Young University	no	no
Colorado State University	no	no
Cornell University	no	has separate catalog record-no link
Duke University	no	yes-three different ways to access it
Georgia Institute of Technology	no	no
Harvard University	no	no
Louisiana State University-A&M	yes	yes-three different ways to access it
Marquette University	no	yes
Rensselaer Polytechnic Institute	yes	no
State University of New York at Albany	no	no
The University of Alabama	no	no
The University of Memphis	no	no
University of California-Riverside	yes	no
University of Connecticut	no	no
University of Houston	yes	no
University of Maine	yes	no
University of New Mexico (main campus)	yes	no
University of North Carolina at Chapel Hill	no	no
University of Pennsylvania	no	no
University of Rochester	no	no
University of South Carolina-Columbia	no	no
Utah State University	no	no
Vanderbilt University	no	no
Wayne State University	no	no
West Virginia University	no	no

Harvard Business Review-
Doctoral/Research Extensive Libraries

COLLEGE/UNIVERSITY NAME	OTHER E-JOURNAL LINKS ON LIBRARY SITE?	OTHER CATALOGS?
Brigham Young University	no	yes
Colorado State University	yes-Full Text Database page	yes
Cornell University	yes-e-journal title list	yes-hard to find
Duke University	link to Ford Bus. Lib. Full text e-journals page	yes
Georgia Institute of Technology	no	yes
Harvard University	no	yes
Louisiana State University-A&M	e-journals page	no
Marquette University	no	no
Rensselaer Polytechnic Institute	e-journals page	yes
State University of New York at Albany	no	yes
The University of Alabama	no	yes
The University of Memphis	no	yes
University of California-Riverside	e-journals page (through California Digital Library page)	yes
University of Connecticut	e-journals page	yes
University of Houston	no	yes
University of Maine	no	no
University of New Mexico (main campus)	e-journals page	yes
University of North Carolina at Chapel Hill	no	yes
University of Pennsylvania	e-journals page	yes
University of Rochester	no	no
University of South Carolina-Columbia	no	yes
Utah State University	no	yes
Vanderbilt University	e-journals page	yes
Wayne State University	e-journal finder list	yes
West Virginia University	e-journals page	yes

Harvard Business Review-
Master's I Libraries

COLLEGE/UNIVERSITY NAME	ILS NAME	LEVEL	D.A.R. AREA?	MARC RECORD?	OTHER TITLE INFO?
Aurora University	?	N/A	N/A	N/A	N/A
Bellarmine University	Innovative Interfaces	4	no	yes	yes
Bowie State University	CARLweb	4	no	yes	yes
California State University-Hayward	Innovative Interfaces	3	no	yes	yes
California State University-Los Angeles	?	3	no	yes	yes
College of Saint Catherine	?	4	no	yes	yes
Converse College	Innovative Interfaces	N/A	N/A	N/A	N/A
Freed-Hardeman University	Endeavor	4	no	yes	no
George Fox University	Innovative Interfaces	3	no	yes	yes
La Salle University	Innovative Interfaces	4	no	yes	yes
Lamar University	?	3	no	no	yes
Manhattan College	WebPALS	1	no	yes	yes
Minot State University	WebPALS	4	no	yes	yes
North Carolina Agricultural and Technical State University	Innovative Interfaces	4	no	yes	yes
North Park University	epixtech	4	no	no	yes
Rivier College	Innovative Interfaces	4	no	yes	yes
Robert Morris College	WebVoyage	2	no	yes	no
Saint Cloud State University	WebPALS	4	no	yes	no
Simmons College	Innovative Interfaces	4	no	yes	no
Southwest Missouri State University	Innovative Interfaces	4	no	yes	yes
State University of New York College at Cortland	DRA	1	no	no	no
State University of New York College at Fredonia	?	4	no	yes	no
Trinity University	Quest	N/A	N/A	N/A	N/A
University of Houston-Clear Lake	Innovative Interfaces	4	no	yes	yes
University of the District of Columbia	?	4	no	yes	no

Harvard Business Review-
Master's I Libraries

COLLEGE/UNIVERSITY NAME	OTHER TITLE LINKS?	E-JOURNAL LINK IN CATALOG?
Aurora University	N/A	N/A
Bellarmine University	yes	yes
Bowie State University	no	no
California State University-Hayward	yes	no
California State University-Los Angeles	yes	no
College of Saint Catherine	yes	no
Converse College	N/A	N/A
Freed-Hardeman University	no	yes-2 ways to access it
George Fox University	yes	has separate catalog records-no link
La Salle University	no	no
Lamar University	yes	no
Manhattan College	no	no
Minot State University	no	no
North Carolina Agricultural and Technical State University	yes	no
North Park University	no	no
Rivier College	yes	no
Robert Morris College	no	no
Saint Cloud State University	no	no
Simmons College	no	yes-2 ways to access it
Southwest Missouri State University	yes	no
State University of New York College at Cortland	no	no
State University of New York College at Fredonia	no	no
Trinity University	N/A	N/A
University of Houston-Clear Lake	yes	no
University of the District of Columbia	no	no

Harvard Business Review-
Master's I Libraries

COLLEGE/UNIVERSITY NAME	OTHER E-JOURNAL LINKS ON LIBRARY SITE?
Aurora University	no
Bellarmine University	no
Bowie State University	no
California State University-Hayward	no
California State University-Los Angeles	no
College of Saint Catherine	no
Converse College	N/A
Freed-Hardeman University	no
George Fox University	no
La Salle University	supposed to be link to online journals page
Lamar University	e-journals page (but need student id # to access)
Manhattan College	e-journals page
Minot State University	no
North Carolina Agricultural and Technical State University	no
North Park University	e-databases page (journal titles thanks to Serials Solutions)
Rivier College	e-journals page
Robert Morris College	no
Saint Cloud State University	e-journals page
Simmons College	e-journals page (hard to find)
Southwest Missouri State University	no
State University of New York College at Cortland	full text periodicals holdings page
State University of New York College at Fredonia	no
Trinity University	e-journals page (journal titles thanks to TDNet)
University of Houston-Clear Lake	no
University of the District of Columbia	no

Harvard Business Review-
Master's I Libraries

COLLEGE/UNIVERSITY NAME	OTHER CATALOGS?
Aurora University	yes
Bellarmine University	yes
Bowie State University	yes
California State University-Hayward	yes
California State University-Los Angeles	yes
College of Saint Catherine	yes-searches entire system automatically
Converse College	yes
Freed-Hardeman University	no
George Fox University	yes
La Salle University	yes
Lamar University	yes
Manhattan College	yes
Minot State University	yes
North Carolina Agricultural and Technical State University	yes
North Park University	yes
Rivier College	yes
Robert Morris College	yes
Saint Cloud State University	yes
Simmons College	yes
Southwest Missouri State University	yes
State University of New York College at Cortland	yes
State University of New York College at Fredonia	yes
Trinity University	yes
University of Houston-Clear Lake	yes
University of the District of Columbia	automatically searches all WRLC libraries

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