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ABSTRACT

This paper presents a discussion of what reference librarians require with regard to the bibliographic control of networked resources, based on 200 responses to a survey of U.S. reference providers and on comments made at an open meeting on this topic sponsored by the Library of Congress at the July 2000 American Library Association Annual Meeting. The first section describes the survey focus, the survey instrument, the selection process for respondents, and characteristics of the respondents. The second section discusses findings in the following areas: (1) how libraries are providing control for World Wide Web resources; (2) the degree of satisfaction with the current situation; (3) descriptive needs (i.e., cataloging elements) professional reference providers feel to be essential; (4) additional descriptive elements cited by reference providers; (5) optimum levels of library and metadata descriptions; (6) single versus multiple records for works appearing in multiple formats; (7) improved interaction between metadata and present-day technologies; and (8) problems related to the "disappearing" Web, copyright issues, enhanced searching, use of metatags, and controlled vocabulary. (Contains 37 notes.) (MES)

Descriptive Resource Needs from the Reference Perspective: Report on a Survey of US Reference Librarians for the Bicentennial Conference on Bibliographic Control for the New Millennium

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November 15-17, 2000 by
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Final version

This paper presents a discussion of what reference librarians require with regard to the bibliographic control of networked resources, based on 200 responses to a survey of U.S. reference providers and on comments made at an open meeting on this topic sponsored by the Library of Congress at the July 2000 American Library Association (ALA) Annual Meeting in Chicago.

Overall, the responses to the survey reflect the growing reliance of reference providers on Web-based resources. Almost half reported consulting print/microfilm resources and local networked digital resources "somewhat" or "much less frequently," than a year ago whereas considerably more than half reported consulting subscription Internet resources, search engines, and other freely available web-based resources "somewhat" or "much more frequently" than a year ago.

Approximately forty percent of the responding libraries reported providing access to **online subscription** or **selected free Internet** resources through the OPAC. Most of the remainder provide access only through web lists or book marks. In contrast, over eighty percent of the respondents indicated that, in their opinion, selected Internet-based resources **should be** included in the OPAC. Overall, respondents suggested that if Web-based resources are included in the OPAC, it would be most useful from a public service perspective if there were records in the catalog for the individual titles included within aggregated resources or within a Web site rather than for the aggregated resource itself or for the top-level Web site only. For those libraries cataloging either subscription or free Internet resources, about two-thirds report providing AACR2 level cataloging. With regard to the cataloging elements most needed for searching, over two-thirds of the respondents selected the following ten: title, subject keywords, URL, author/creator, link to an index/keyword search of the resource itself, controlled subject vocabulary, date of last update, time period covered by the resource, language of resource, and links to table of contents. With regard to those cataloging elements that must be included in the catalog record regardless of whether or not they are used for searching, over two thirds selected the following ten elements in addition to the previously listed ten elements: date of creation, genre, publisher, copyright/access restrictions, relationships to other works, format, geographic coverage, summaries of the resource, other unique identifying numbers and a statement that the resource is peer-reviewed.

In their free text comments, respondents singled out a number of problems with regard to the bibliographic control of Internet resources within the OPAC including: the need for title access for the full-text titles included in aggregator databases; the need to collapse multiple records for multiple versions/formats of the same intellectual content into a single "record" for public view; the need for greater collaboration both between public service and technical service departments within institutions and among multiple institutions in the selection and control of these resources; the need to ensure the long-term availability of those networked resources added to the OPAC's through greater attention to archival issues, and finally, the need to develop a single user-friendly "interface" that would allow users to link across relevant databases .

Respondents also included comments related to improving search retrieval on the Web at large. These included suggestions focusing on the use of intelligent agents, automated categorization of Web resources, information visualization technologies, and the **application** of concepts from traditional librarianship coupled with the use of XML and innovative technology, most notably in proposals to find ways to match natural language queries with standardized subjects and authorized names and in proposals for encouraging widespread use of unique identifiers for web pages or content including proposals to work cooperatively with selected publishers in order to provide **librarian-created** metadata to publishers which they could add to the HTML headers of their resources.

Survey Focus:

In developing the survey which forms the basis for our presentation, we attempted to address the following:

- Standard descriptive elements that professional reference providers believe to be essential in performing their work;
- Additional descriptive elements which reference librarians believe would facilitate achieving accurate and useful content retrieval in response to user queries and information demands;
- Optimum "levels" of library and metadata descriptions (including descriptive/subject/administrative/access metadata) for content retrieval of Web-based resources (e.g. full MARC records; simpler, more structured Dublin Core records);
- Traditional concepts, such as authority files, uniform titles, specialized thesauri, that might be incorporated into metadata descriptions to facilitate resource discovery;
- Problems which reference providers are experiencing in identifying relevant materials in an online environment which might be addressed through improved interaction between metadata and present-day technologies.

Description of survey instrument:

In an attempt to assess reference needs in this area, the survey contained:

- some basic questions about how the respondent's library was currently providing access to networked resources (and the reference librarian's satisfaction with current access at their institution). These questions focused on:
    - distinctions between bibliographic control of subscription and/or licensed resources and freely available Internet resources of "reference value"
    - the level of granularity of such bibliographic control and how libraries were coping with bibliographic control of resources supplied by aggregators and database producers.
- a series of questions focused on the cataloging elements reference librarians view as most important for inclusion in such records
- a series of questions focused on reference providers' reactions to various proposals that have been made for dealing with the cataloging of electronic resources, including:
    - providing access through separate web lists vs access through the OPAC.
    - providing different types or levels of control to subscription/licensed resources and "free" Internet resources
    - utilizing some type of "core" or "minimal" level of cataloging for electronic resources as opposed to full MARC cataloging.
    - providing single records vs multiple records for resources available in multiple formats (e.g. print and electronically).
- a number of open-ended questions about the major problems related to bibliographic control that reference librarians are facing in identifying (or assisting patrons in identifying) pertinent electronic resources and potential solutions to these problems from a reference point of view.

Finally, several questions were also included regarding the size and type of the library, the subject areas in which reference service is provided, the extent of use of electronic resources in providing that reference service, the number of years the respondent had worked in reference, and the respondent's general

familiarity with various metadata schemes and projects making use of metadata. These later questions allowed us to consider if there might be differences among the answers given by groups of respondents based on the any of the above factors.

Background on the Respondents:

The Selection Process

Information about the survey (which was posted on the Library of Congress Web site) was sent by email to heads of reference or library directors of approximately 450 U.S. libraries. Drawing on unpublished statistics from the U.S. Dept. of Education showing number of reference transactions, size of staff, and expenditures by reporting U.S. libraries, information in the *American Library Directory*, and information on individual library web sites, we endeavored to contact a small, medium, and large public library and a small, medium, and large academic library in each US state[1], as well as a non-academic library from each of the Special Library Association chapters and divisions. In addition, we endeavored to contact each of the US state libraries and the four US national libraries. Each library was offered the opportunity to supply two responses. The survey was also announced at the end of June on a number of reference listservs prior to an open meeting at the July 2000 American Library Association Annual Meeting at which the topic was discussed, and twenty responses were obtained from that posting. A total of two hundred responses (representing one hundred sixty-nine libraries) were received, broken down as follows:

- Academic libraries: 70 responses (representing 58 libraries out of 159 libraries contacted)
- Public libraries: 56 responses (representing 47 institutions out of 151 libraries contacted)
- State libraries: 29 responses (representing 24 libraries out of 46 libraries contacted. Several state libraries were not contacted because a valid email address could not be located)
- Special libraries: 22 responses (representing 21 institutions out of 94 libraries contacted)
- US National libraries: 2 responses (Both from LC. The National Library of Medicine, the National Agricultural Library, and the National Education Library were also contacted, but did not respond. In addition, two of the responses in the Listserv category are from LC employees)
- Listserv postings: 20 responses (15 of those libraries identified themselves as "Academic," 2 as "public," 1 as "private non-profit"; 1 as "private for profit"; and 1 as "governmental.")
- Total responses: 200
- Total libraries represented: 169
- Total libraries contacted: 453

In addition, we received 17 direct replies (email or telephone) from librarians indicating that after looking at the survey, they felt that they could not respond. Their reasons varied from the academic librarian who said that between relocating and opening for the new school year, her library did not have the resources to respond, to the state library which indicated its function was more coordination than reference, to a special librarian, who wryly observed that the information center at her organization had been deep-sized and she was now functioning in a different capacity within the organization. However, most of the libraries in this

category gave as their reasons for non-response small size and lack of online databases of any description in their library. The following two comments are typical:

When I looked at the survey, I decided our library should pass the opportunity to respond on to another library from our area since in our small library we have neither an online catalog nor any databases.

When I got to the question about whether access to databases such as those available through FirstSearch was by OPAC or Web, I wanted to cry. I'd be happy if we had *ArtIndex* in electronic form at all, regardless of whether we accessed it from the OPAC or the Web, or both.

Characteristics of Respondents

A little more than half of the respondents (110) report they work in institutions having 1-10 reference staff. Slightly more than half (104) report working in reference less than fifteen years compared with those reporting fifteen or more years of work in reference positions (94); almost one third (61) reported more than twenty years experience. Thirty-eight respondents are part of what we are calling, for want of a better term, a "metadata aware" group, which includes those who indicated either "substantial knowledge" or "general understanding" of at least six out of eleven metadata projects/schemes listed on the survey or who indicated "substantial knowledge" of either three and "general understanding" of two of these projects/schemes or "substantial knowledge"of four and "general understanding" of one of them.[2] For the responding group as a whole, there was at least name recognition by approximately half of the respondents for five of the listed projects/schemes.[3]

A few of the respondents reported being in positions in which a single "reference" role dominated eighty percent or more of their time: "expert" end user, doing searches for patrons [24]; "trainer," teaching others to search (19); or "author," searching in order to prepare guides, current awareness services, training materials, etc. (1). As a group, however, most of the respondents indicated that their time was more evenly split between these three roles.

With regard to the subject areas most frequently searched, the responses indicate respondents are working in a wide variety of subject areas. Multiple responses were permitted on this question: a majority of respondents (118) selected "general reference", but there was also significant representation from the sciences, including medicine and technology (86), business (74), humanities (63), and arts (32); other areas mentioned by respondents included government documents, fire safety, newspapers and periodicals, current events and news, and local history and genealogy.

Their searching is primarily text-based, although somewhat less than a tenth did indicate that they spend up to one half their time searching for images. When using Web-based resources, the respondents reported being least likely to turn to such resources (subscription or free) to locate a specific fact, most likely to utilize them when searching for broad information on a particular topic.

Responses to several questions regarding the frequency with which these librarians are searching particular formats in connection with reference work, indicate that, overall, they spent the least amount of their time

(under 20 percent) searching local networked digital resources; the remainder of their searching time as a group was fairly evenly distributed among print resources, subscription Internet resources, search engines, and online library catalogs.

Of perhaps particular interest to this conference are the responses to questions comparing how frequently the survey respondents are using various types of resources compared to a year ago. These responses reflect the growing reliance of reference providers on Web-based resources. Almost half report consulting print/microfilm resources (98) and local networked digital resources (90) "somewhat" or "much less frequently," whereas considerably more than half report consulting the following types of resources "somewhat" or "much more frequently": subscription Internet resources (142), search engines (122) and other freely available web-based resources exclusive of search engines and OPAC's (115).[4]

The Current Situation:

How libraries are providing control for Web resources

Karen Calhoun, in her paper for this conference [5], found all seven major ARL libraries which she surveyed were providing discovery and access to selected subscription resources both through the OPAC and via Library-created Web lists. Our survey results suggest a somewhat greater split among our respondents: sixty-eight libraries report access to subscription electronic resources through the OPAC;[6] ninety-seven through web lists alone; (with four libraries leaving the question blank).

Of those sixty-eight libraries reporting access to subscription Web resources through the OPAC, fifty-seven are cataloging the resource (such as *FirstSearch*) itself; forty report cataloging individual databases within resources such as *FirstSearch*, (for example, "Readers' Guide Abstracts"), whereas only thirty report cataloging full-text titles within such databases.

We also asked our respondents about the level of cataloging provided for these subscription Web resources. Bear in mind that the responses to these questions are those of reference librarians, not catalogers, who may or may not have consulted with catalogers at their institutions before responding. With this caveat in mind, around two-thirds report full level AACR2 cataloging for these resources, whether at the resource, database level, or individual title level, and the remainder indicated either "some other level" of cataloging or "not sure." This latter group was asked to select from a list those cataloging elements which they typically found in catalog records for subscription Web resources at their institution today. Elements (in order of frequency cited) selected by a majority of those who reported that their institutions catalogued either the resource or the database included: title, publisher, place of publication, URL, author/creator, format [7], date of creation of resource, genre[8], and time period covered by the resource. For those reporting their institution cataloged the individual titles within resources, only title, URL, publisher, format and time period covered were cited by more than half the respondents.

The situation with regard to free Internet resources showed a somewhat greater split. Only fifty-one of the

surveyed libraries report adding free Internet resources to their OPAC's. All of them are also creating weblists of selected free Internet resources. An additional one hundred libraries are providing guided access to selected web pages only through bookmarks or web lists; thirteen libraries indicated they were neither developing webliographies nor adding records for such resources to their OPACS, and five left the question blank.

Table 1
Library Access to Web Resources

	Access via Web Lists Only	Access via OPAC Only	Access via Both Web Lists and OPAC
Subscription Web Resources	97	2	66
Selected Free Web Resources	100	0	51

With regard to the levels of cataloging of free Internet resources, of the fifty-one libraries reporting access through the OPAC, thirty-three indicated that these free sites are given full AACR2 cataloging, two reported such sites were cataloged at a Dublin Core level; eleven reported "some other level" or "not sure," and five left the question blank. We asked the group reporting "some other level" or "not sure," in a follow-up question, to select from a list, those cataloging elements they typically found in catalog records for free Internet resources at their institutions. Elements (in order of frequency cited) selected by a majority of those responding were: title, URL, author/creator, publisher, and place of publication. In other words, a shorter, but similar, list compared to the elements selected by this group for subscription web resources.

Degree of Satisfaction with the Current Situation

Somewhat surprisingly, by an overwhelming majority (144 of the 195 who answered this question), seventy-four percent indicated that the current method of access for web-based subscription resources at their institution (whether by Web, OPAC or both) was satisfactory for their work as reference providers.

Looking more closely at some of the characteristics of this group -- such as time spent accessing subscription web resources, type of library setting, number of reference staff, years of reference experience, subjects most frequently searched, and level of metadata awareness, we found that the percentage reporting satisfactory access remained fairly constant in all cases with the exception of those respondents working in institutions with more than twenty reference staff. In those cases, the percentage reporting satisfaction with the current mode of access dropped to just over fifty percent.

We might note that somewhat less than half of this satisfied group (60) are providing access to subscription Internet resources through the OPAC, and all that do provide catalog access also report access through web lists as well. Looking at these sixty who are accessing these resources from the OPAC, forty-seven report that the institution is cataloging the online resource itself, [9] thirty-three, or just over half, report that their library is cataloging at the database level,[10] while twenty-nine report that the OPAC contains records for the individual titles within such databases.[11] Twenty report that their institution is cataloging at all three levels.

Turning to free Internet resources, a smaller number, (114 out of 191), but still a majority responded positively to a similar question about satisfaction with access to free Internet resources. Of this group, sixty-nine are accessing these resources only from the Web; forty from both the web and the OPAC, one from the OPAC only; while four reported providing no guided access from either the OPAC or the Web.

Given the relatively large number of respondents who reported that the current situation is "satisfactory" for their reference work, it might be tempting to assume that there is nothing more to say and conclude the paper right here. However, if we look at responses in two other sections of the survey -- a series of questions on whether such resources **should** be in the OPAC and a series of free text comments on problems and wished-for improvements -- we discover some interesting things.

First, let us look at the responses to the survey questions on whether web resources should be in the OPAC. In line with some of the discussion on the Alternative Architecture thread on the Conference listserv, eleven of our survey respondents (out of one hundred seventy-five responding) felt that neither subscription nor free Internet resources should be added to the OPAC. An additional twenty-six would incorporate records for subscription Internet resources in the OPAC, but exclude records for free Internet resources. A few added comments to reinforce their position.

> Incorporating links to Internet resources from the catalog may open up the catalog to unrestricted Internet browsing which conflicts with Library Board policy, and may also result in lack of access to the catalog if the limited number of work stations are tied up by Internet users.
>
> I have always had some misgivings about offering access to all types of resources at the same time.....We have found it very useful to suggest students keep the idea of the in-hand materials and the method of locating them (the PACs) separate from the virtual web-based resources (periodical databases, Internet databases, etc.) and the more complex methods of searching them.
>
> In some ways, I think the library catalog should be restricted to materials the library actively acquires. Otherwise it is in danger of losing its identity. But I think some kind of cross-reference to other resources would be good.

However, the majority of respondents, including those who also reported that they found their current access satisfactory, came down on the side of adding such resources to the OPAC. Of the eighty-four who reported both that present access is satisfactory and that their institution provides access to subscription Internet resources only through web lists, forty-nine answered "yes" to the question on adding web-based subscription resources to the catalog. When asked if it would facilitate access to **individual titles** within subscription databases if records for them were added to the OPAC, the number of positive responses among this satisfied group, rose to sixty-six.

With regard to free Internet resources, thirty-six of the sixty-seven "satisfied" respondents who are not currently providing access to selected free Internet resources via their OPAC, answered "yes" to the question of whether it would facilitate access to these resources if they were added to the online catalog."

Looking at the comments of those who reported that access is satisfactory for their work as reference providers, we find additional evidence that these providers still see the need for improvements in that access. Among those who report their current access is satisfactory and who provide access through the OPAC, we found strong comments from respondents in institutions which do not catalog individual full text titles supplied by aggregators indicating a need for such access, a point even more forcefully brought home by respondents who indicated that the current situation at their institution was **not** satisfactory for their work as reference librarians. Both groups also cited difficulty in determining which journal titles are indexed in which online resources; while subject access for e-journal titles was viewed by others as inadequate. Several respondents pointed to technical problems arising in the OPAC when a single catalog serves a consortium, but access rights or access methods (IP address versus passwords) to individual resources vary by member institution.

On the other hand, among those who found access "satisfactory" but who provide access only through the Web, we found comments such as the following:

> I think it is important to let customers know if there is an Internet-based version of something in the online catalog. We should let them know that we have the New York Times in hard copy for a certain period, and also on microfilm, and also full-text through a subscription database. Customers should know that they can read the Ohio Revised Code in our Reference section, but that they can also access the text from the Ohio State website.

Among the reasons for dissatisfaction cited by users who access these resources only via the Web:

- problems with users and librarians finding or remembering what resources are available:
  - Although we feature the resources in many ways, they tend to get buried and lose their importance on our webpage.
  - It is necessary to hold too much information in one's head, that is, to remember all the places (we've already paid for) which might yield pertinent information for the question at hand.
- familiar complaints about maintenance and redundancy,
  - Maintaining lists of links ...on the library web page leads to the need for creating redundant links on the multiple subject guide pages libraries have gotten in the practice of developing. For example, a good biography site probably belongs on every subject discipline page .... but whether multiple people maintain the multiple subject guides or a single person maintains the subject site, every time a new site is added, if it is appropriate for all the subject pages, it has to be added physically to each.
- And a reminder of the primacy of the OPAC as a starting point for research which should be encouraging to this audience:
  - Users are still using the catalog systematically. If these resources are not in the catalog, they are not enough used.
  - Our online catalog should serve as a comprehensive record of all our resources, regardless of format, so librarians and patrons can tell what we have by looking in one place.

Descriptive needs professional reference providers feel to be essential

With regard to the cataloging elements reference librarians view as most important for inclusion in catalog records, the survey attempted to address this issue through questions on current use of various metadata elements by reference providers for searching, and their perceived need for the same elements either displayed on the catalog record or as search elements. When the question was phrased as cataloging elements needed for searching only two emerged as being currently used at least fifty percent or more of the time by two-thirds or more of the 191 responding to this question: title (138) and subject keywords(138) . Rephrasing the question to ask what they thought they would use if it were possible to make all of the elements were available to them as searching elements resulted in a considerably expanded list: Of the 196 responding to this question, two-thirds or more indicated the following would be "essential," or "often useful."

Table 2
Cataloging Elements Considered Essential or Often Useful for Searching

Cataloging Elements	**Total Respondents (out of 196 responding)**
Title	185
Subject: Keywords	178
URL	166
Author/Creator	165
Index/Keyword search of resource	159
Subject: controlled vocabulary	148
Date of last update	143
Time period covered by resource	135
Language of resource	133
Table of contents	132

A specific question distinguishing between the need for elements to be present in the catalog record even if they were not generally used for searching was added following discussion at the open meeting at the American Library Association Annual Meeting **where there was general agreement that all of the elements listed in question 32 of the survey need to be present on the catalog record.**[12] As one survey respondent said:

> While I may not search by each of the elements listed, they are all occasionally essential in that they provide information by which to evaluate the usefulness of the information relative to my need.

The following elements were selected as being either "essential" or "often useful" to display in the catalog record by two-thirds or more of those responding to this question.

Table 3

Cataloging Elements Considered Essential or Often Useful for Display

Cataloging Elements	Total respondents (out of 167 responses)
Title	166
URL	163
Date of last update	160
Author/Creator	157
Subject keywords	157
Language	156
Time period covered by resource	156
Date resource created	150
Genre	144
Publisher	141
Copyright/access rights	141
Subject controlled vocabulary	141
Relation to other works	140
Link to index/keyword search of resource	138
Format	138
Geographic coverage	134
Summary of resource (by librarian)	130
Other identifying numbers (e.g. ISSN, GPO)	129
Link to Tables of contents	126
Summary of resource (by publisher)	119
Statement that resource is peer-reviewed [13]	112

Indeed, we might note that each element on the survey was considered "essential" by at least some respondents; the element that was selected as "essential" the fewest number of times was a " link to or excerpt of a review of the resource" (10 responses). The element selected most often as "not important" was "subject classification code" (23 responses).

Elements which were selected as "essential" or "often useful" by less than two-thirds of the respondents included:

- excerpts or links to reviews of the resource (95)
- place of publication (90)
- subject classification codes such as LC or Dewey (79)

One thing that was somewhat surprising to us in looking at the above lists was the relatively low ranking of controlled subject vocabulary[14] compared to subject keywords, particularly since the need for controlled vocabulary was emphasized in the free text comments of just under a quarter of the respondents. In general, we found few differences among the responses in this regard given by librarians by type or size of library, those having more years service as reference providers, with the percentages of respondents rating controlled vocabulary as either essential or often useful hovering around two-thirds for most of these categories. The most pronounced differences appeared among those eighty-six respondents doing concentrated searching in the sciences and technology, where only fifty-three percent indicated controlled subject vocabulary was "essential" or "often useful"; the forty federal and state governmental librarians where eighty-two percent ranked "controlled subject vocabulary as "essential" or "often useful," and the "metadata aware" group of respondents, in which ninety percent of respondents in this category selected controlled subjects as "essential" or "often useful."

The comments of a few who did not rate controlled subject vocabulary as essential suggest that for some at least, it may be a matter of settling for what they view as practical.

Just getting a brief title and keyword record into the catalog would be better than it is now.

I would like speedy cataloging with minimal information.

Several other comments suggested that controlled subject headings broadly applied to resources as a whole cannot make the fine distinctions needed by patrons to focus in on their specific subjects:

And even if we catalog the web site, will the subject headings assigned be extensive enough to make it clear that the "Voice of the Shuttle: [Web page for Humanities Research" (http://vos.ucsb.edu/)] is a good place to go for links to William Blake, and any other individual author for that matter? This is doubtful. A major search engine would pick this up though.

Additional descriptive elements cited by reference providers

Respondents were also given the opportunity to list additional cataloging elements which they considered to be essential, for searching, or for viewing on the record, or for accessing directly from the record.[15] In some cases respondents expanded on the kinds of information needed in relation to elements in included in our list and we include that information here as well.

Table 4
Additional Cataloging Elements Cited by Respondents as Essential

Type	Cataloging Elements
Controlled vocabulary (in addition to controlled subject headings)	**Authorized names**
	Uniform Titles
Title Information	**Previous titles** -Include information on previous titles

	Variant titles - Include popular title added entries "for many web resources the title is often difficult to determine due to graphic elements that may or may not be part of the title."
Responsibility for resource	**Publisher**
	- record changes. For example if a Dept of Commerce publication moves to the private sector
	- indicate "authority" of publication; distinguish official site/version from a copy
	Author/Creator
	- include all authors - especially important for multiple authors of scholarly publications and
	- include affiliation
	- include residency/citizenship (important for localities trying to maintain a record of the intellectual output of a particular region.)
	- include name changes, especially corporate names, with links between old and new versions
Access Information	**Notes/Terms of availability**
	- include information on mirror sites
	- include subscription status (free/registration required/fee/pay-per-view)
	- pertinent access information for multiple campuses when the rights to content or access methods vary by campus
	- address of content provider or distributor
	- other access restrictions
	- handicap accessibility
	- specify if material is classified and include contact information for classifying agency
	- specify if material is encrypted and include information on encryption standards used.
Additional Dates	-update schedule of resource, if known
	- date catalog record was updated
Standard Numbers	- include PURL's
	- always include ISSN's, if available. Being used by libraries to link to print holdings for earlier volumes
	- develop a standardized system of digital identifier's so each web page catalogued has a unique number "so when URL changes identifier remains the same."
	- industry codes like NAICS so there can be cross-linking between OPAC and business databases that include these numbers in their metadata.

Resource Description	- presence of images, sounds, text, data, graphics, video clips, etc.
	- size of document/site; downloading information
	- formats available (e.g. .pdf)
Relation to other works	- specify if content is full text or full image. Note if portions of "full text" resources actually omit certain types of materials. (A ds, graphics, etc)
	- note where indexed - including non-electronic indexes.
	- enhancement of online version (multimedia, reference linking, etc.)

Optimum "levels" of library and metadata descriptions:

With regard to the "level" of cataloging needed for these resources, it would seem that the above results indicate that a majority of those responding see a need for description that could be accommodated at the level provided by a "Dublin Core"-like model. All of the elements listed in tables 1 and 2 can be accommodated by Dublin Core[16] and its qualifiers to distinguish between elements that may be repeated with distinct types of data: such as date created and date updated; subject keywords and controlled subject vocabulary; various identifiers such as URL's, ISSN's and descriptions containing tables of contents versus those containing summaries or other descriptive information. Looking at the elements which were added by respondents as "essential," we see a number that could be accommodated by Dublin Core, as well.

These results also appear to be consistent with Lundgren and Simpson's survey of graduate students regarding their need for various cataloging elements for the description on Internet resources.[17] In that study title, primary author, Internet address, and summary were ranked highest, followed by subject, level of information, titles of related works in print, date created, date updated, access limits, additional authors, recommended software, system requirements, size of file, edition, frequency, and inclusion of graphics.

Print and Online: One Record or Two

Another section of the survey which produced many, many comments related to the problem highlighted by Michael Kaplan [18] in his paper for the conference of single versus multiple records for works appearing in multiple formats: the following librarian perhaps put it most forcefully:

Multiple formats for a single serial title result in much confusion for patrons. Many give up rather than search through multiple records to find what they need .... there is great need for consolidating access to different versions or formats for serial titles. Our catalogers are "purists" and want a clean database that will migrate well, but this does not make for a user friendly catalog. We often see 8 to 10 record[s] for the same title: microfilm, microfiche, microcard, online, paper, title changes, etc., etc. Please help!

Trying to balance the strong public service voice for a single record for multiple formats with the technological realities of computer-to computer data interchange of aggregator-supplied data so well described by Kaplan (a method which appears to offer some solution to the equally strong public service call for help in supplying title access in the OPAC to aggregator-supplied titles[19]), a number of our

respondents urged that someone find a way, as one put it, to: figure out some way to maintain a clean database to make the catalogers happy and make it user friendly for patrons. Be able to hang multiple formats and holdings information on a single record."

There should be a way for local control of "holdings" within the authority [master] record

Thus, we strongly second the similar suggestion made by Kaplan and urge that an effort be made to develop a means by which records can be merged "for the public view that are kept separate in the technical services components of our catalogs."[20]

Improved interaction between metadata and present-day technologies

Survey-respondents were also asked to respond to an open-ended question regarding problems which might be addressed through improved interaction between metadata and present-day technologies. Before looking at some of the specific problems raised and the suggestions which our respondents made, we would like to return to the question raised by the Alternative Architecture thread of the conference listserv. Should these resources be in the OPAC at all? Even as reference librarians pointed out over and over again some of the problems of adding Internet resources to the OPAC cited in Barbara Baruth's *American Libraries* article,[21] the majority also made it that they thought selected Internet resources had their place in the OPAC. However, looking at many of the comments supporting the inclusion of these resources in the OPAC, we see one theme emerging over and over again: a unified search interface that is clear and easy to use.

> Again, having one place to search that would include relevant resources would make research less fragmented.
>
> In my opinion, it would be better to go to one place (the OPAC) for all resources, rather than to have to search the OPAC for other materials and then hunt for Internet resources by browsing through extensive "webliographies."
>
> I'd rather have our users have a seamless way of searching for information...
>
> [The interface for accessing networked resources is a problem because of] lack of ease of use. Simple, easy and familiar are VERY critical and are not there yet.
>
> [Access to free Internet resources is a problem because] they are scattered over a variety of access points. For example, some in bookmarks, some in classroom handouts, others in general subject pages.

We bring these examples up because some of the solutions offered by our respondents actually suggest a more distributed approach, which might well be consistent with Barbara Baruth's observation: "The future of library systems architecture rests in the development of umbrella software that digests search results

from rapid, coordinated searches of a variety of disparate databases-OPACs of locally-held print and audiovisual materials, union catalogs, consortial catalogs of e-books and journals, and specialized digital library collections."[22]

This sounds similar to us to Kaplan's observation that "we are beginning to see the development of search interfaces and search engines that will simultaneously search and unify heterogeneous databases consisting of MARC records in all the bibliographic formats, as well as databases comprising all present and future data structures: Dublin Core, EAD, TEI, CIMI, VRA Core, MAB, MAB2, etc.,"[23] and Calhoun's discussion of "the need to be able to manage loosely federated data from many sources."[24]

We might note in passing that the concept of using "simultaneous" automated searches of multiple databases is under active consideration by the LC-led Collaborative Digital Reference Service (CDRS) project.[25] A recent proposal by Donna Dinberg (National Library of Canada) to the DigiRef team, would make use of captured metadata from bibliographic citations included in responses to users' inquiries to generate automatic searches of appropriate catalogs and databases through the use of Z39.50 protocols, ultimately allowing users to determine local availability of the materials cited and to initiate a loan or document delivery request, if desired.[26] Comments from some of our respondents include:

> [I] would like a more "relational" approach. Example, a subject search would bring up a result that includes categories such as 1. [Library Name] Materials, 2. Free Internet Resources, 3. Fee-Based Online Resources, etc.
>
> [There is a need for] unified searching; cross-platform searching.
>
> We need more automated linages between our Web guides and our online catalog.
>
> .... If the descriptions are part of a federated system where the builders of discovery and access mechanisms have no control over metadata content, there may still be some value in building a search tool that propagates multiple search terms from a single term based on the term variants or equivalents listed in one or more established structures such as authority files or thesauri ... In the best of all possible RDF worlds, a discovery tool should be able to convert a user input search term into the normative form of the term for a given set of metadata, based on the coding of the description itself and offer manipulation of the full panoply of syndetic relationships offered by that particular normative form upon request.
>
> Map specialized vocabularies at the highest level of the hierarchy, e.g. Transportation thesaurus would be mapped to LCSH for general transportation terms such as "Transportation," "Vehicles, etc." the user would be alerted to the fact that the data received is from a non-LC collection, in this case the Dept. of Transportation data. The user would be given the option to enter into the specialized database on transportation or remain in the LC online catalog to continue a search.

Many other comments, which may or may not be applicable to searching distributed databases, clearly move beyond manual cataloging of Internet resources in the OPAC to talk about incorporating various

automated solutions into the mix. Such comments focused on some of the following problems:

On the "disappearing" web:

- Perhaps indexed metadata might include "control numbers" keyed to URL/path so when harvesters build indexes, any metadata value that returns a 404 error produces a mechanism for that search engine to remove all index terms built from metadata in that control number.
- Retrieve "close matches" when 404 error occurs, possibly by truncating the search to the "root" URL
- Additional use of URL and content checking software; perhaps with automated notification service - or even better - automated updating of the metadata record.
- More use of unique identifiers for identification of electronic resources; greater use of PURLs or similar technology plus greater use of automated link checking tools.
- Archive resources "of research value"; provide "traditional" cataloging only for archived resources.

On Copyright issues:

- Set up a system like music played on the radio where any station can play anything and have a formula whereby copyright holders get paid reasonably, but there is little administrative burden on the patron
- For issues of copyright, see Mike O'Donnell's paper presented at the May 2000 National Online meeting, where he discusses a proposal for an IP (Intellectual Property) meter. Clicking on (c) symbol would show the information needed to license the content, including "who owns the material and who publishes the material," along with the "permissions, i.e., "how the content may be used and what it will cost, ...[and] the terms of use."[27] All of this is managed by a copyright clearing house which collects any fees, sends the payments to the publisher with info on who licensed the content, and supplies content to purchaser with a digital marking showing the original source.

Enhanced searching

- Enhance existing search engine technology to move beyond matching strings of characters to search concepts or meaning as well through techniques such as disambiguation, contextual and grammatical parsing and use of semantic networks to increase precision.
- The ability to fine-tune a search, using such methods as frequency of words or location of words and element identification (such as author, title)
- ... better or more exacting search engines within huge searchable databases [would be useful]. I'm not speaking of big search engines like Google, but using this kind of power in smaller subsets like newspaper archives, etc.
- Study how nonlibrarian users do their searching.

On use of metatags:

- Require records management/life cycle controls (metadata fields) on anything added to a library catalog or web page. Unfortunately, this means you'd lose a lot of good information offered for free but if pushed for in quality publishing circles, [this] might be a selection criteria that might drive the market...
- Issuing agencies should include in their metadata the agency name, using a standardized format and they should use controlled subject headings to describe the resource.
- Use XML to create specialized tags for necessary data such as author and title. However, I would also want the metadata to be visible to the user so that the information could be used to construct better searches later.
- If metatag information was more rule-based, as in standard library cataloging, changes in resource URL's would be less of a problem. Searches on resources that use consistent metadata would have repeatable results regardless of some types of changes now inherent in the web.
- Work with selected publishers providing them with **librarian-created** metadata which they could add to the headers of their resources.

On controlled vocabulary:

- Ideally it would be beneficial if the "natural language" type of search could somehow be automatically screened through an "authority file" to eliminate large numbers of false drops. For example, I want material on housebreaking my dog. If as a patron I could type in housebreaking dogs and receive only results on "dogs- habits & behaviors" (or whatever the current "official subject heading" is) I would probably be happier with the result of my search query.

Among the most expansive and thorough responses to this question were those provided by Gerry McKiernan, Science and Technology Librarian at Iowa State University, curator of Cyberstacks, and field editor for the *Journal of Internet Cataloging*. His response to this question on the survey was a referral to his 1999 article in the *Journal of Internet Cataloging*[28] and to related resources cited on his web page.[29] In these sources McKiernan refers to a number of projects to facilitate access to relevant Web resources including the use of intelligent agents,[30] automated categorization of Web resources, such as OCLC's Scorpion technology used in its CORC project[31]; information visualization technologies such as the SPIRE(tm) suite of information access and visual analysis tools developed by the Pacific Northwest National Laboratory;[32] and natural language processing programs such as DR. LINK and KNOW-IT of MNIS-TextWise Labs.[33]

We believe that what the above responses suggest is that many public service staff recognize, as Michael Kaplan said in his paper for this conference, that we *are* "really, really drowning" in the sea of electronic resources[34], and carefully hand-crafted records for each, is an impossible dream. We need whatever help technology can give us, and we as a profession need to maintain awareness of the possibilities of current research and openly communicate and work with researchers in these areas if these problems are to be solved.

Concluding thought

In conclusion, we might note another theme that surfaced both at the ALA 2000 meeting and in the comments portion of the survey relating to the interaction of public service and technical services staff and departments. On the one hand there was clear evidence of the walls that have grown between reference and technical services, as reflected in the following comments:

> It's unfortunate that the structure of our libraries into public and technical services units inhibits communications between reference librarians and cataloguers. This survey should not be about "my wishes." It should be about a real conversation that has to go on in the library.

On the other hand, there were also signs of the breakdown of those walls in some places, which librarians described both at the open meeting at the American Library Association Annual Meeting in July 2000 and in comments on the survey. Whether through participation in CORC[35] or through other homegrown efforts at collaborative work between public and technical services in the selection and bibliographic control of web resources[36], these projects easily fit within the framework described by Karen Calhoun in her paper for this conference of the "typical" progress of a new electronic resource through the "resource description" process at many institutions.[37] Even where there was no collaboration mentioned, there were many comments calling for increased communication between the two departments. In this regard, we found our survey results to be very consistent with proposals put forward by Karen Calhoun on the redesign of library workflows within institutions, making increased use of cross-functional virtual teams for the selection and cataloging of networked resources.

Finally, we would like to point out one additional characteristic of our respondents which we think speaks directly to this point and clearly reflects the importance of the topic of this conference to reference providers. In response to the concluding question on the survey asking respondents to leave their email address or other contact information if they wished to receive additional information about the results of the survey or the Bicentennial Conference, one hundred and nine respondents did so. When was the last time you asked a survey-taker to keep in touch? Clearly, there is interest and concern about this topic in the reference community.

Notes:

1. Because of incomplete and inconsistent data for some institutions along with variations in the number and size of institutions in each state, "small," "medium," and "large" were loosely defined, and varied somewhat from state to state and by type of library. Generally, we began by looking at the U.S. D.O.E. data for each state and trying to select one institution with numbers falling in the top quarter, one from the bottom quarter, and one from the midrange of the data available for that particular state, supplementing this information with other sources as necessary.
2. Respondents were asked to rank their knowledge of the following according to these choices: "Have used or have substantial knowledge," "Have a general understanding," "Recognize the name only," or "Have never heard of it": Extensible Markup Language (XML), Standard Generalized

Markup Language (SGML), Resource Description Framework (RDF), Dublin Core (DC), Digital Object Identifiers (DOI), Text encoding Initiative, (TEI), Encoded Archival Description (EAD), Cooperative Online Resource Catalog (CORC), Consortium for the computer Interchange of Museum Information (CIMI), Scout Report Signpost, and Jointly Administered Knowledge Environment (jake).

3. CORC , XML, SGML, Dublin Core, and Scout Signpost.
4. Only for the category "online library catalogs" did a majority report that they consulted them "about the same" as a year ago.
5. Calhoun, Karen, "Redesign of Traditional Library Workflows: Experimental Models for Electronic Resource Description," Bicentennial Conference on Bibliographic Control for the New Millennium, November 15-17, 2000. (http://lcweb.loc.gov/catdir/bibcontrol/calhoun_paper.html) (6 Dec 2000) (hereafter cited as Redesign)
6. Sixty-five of these respondents also report access directly from Web pages is also available.
7. The survey question contained the following explanatory note: "Format: (including description of the software, hardware, or other equipment needed to display or operate the resource)."
8. The survey question contained the following explanatory note: "Resource types (genre). For example: abstracting/indexing services, working papers, technical reports, dictionaries."
9. These respondents responded positively to the question: "For example, if your library subscribes to OCLC's *FirstSearch,* is there a record in the online catalog for *FirstSearch*?"
10. These respondents responded positively to the question: "For example, if your library subscribes to OCLC's *FirstSearch*, are there records in the online catalog for individual Firstsearch databases that are part of your subscription, such as ReadGuid Abs(Readers' Guide Abstracts), HumanitiesAbs (Humanities Abstracts), PAISIntl (Public Affairs Information Service International), etc.?"
11. These respondents responded positively to the question: "For example, if your library subscribes to the database "Periodical Abstracts with full Text" in FirstSearch, are there records in the catalog for the online versions of the journal titles indexed in that database?"
12. Title, Author/Creator, Publisher, Place of publication, Date of creation, Date of last update, Resource type: genre, Format, Copyright restrictions, Relation to other works and formats, URL, Other unique identifying numbers or codes, Time period covered by the resource, Language of the resource, Subject: controlled vocabulary, Subject: keyword, Subject: classification code, Summary/annotation of the resource (publisher supplied); Summary/annotation of the resource (librarian supplied); table of contents; links to index or keyword search of the resource, excerpts or links to reviews of the resource; information that the resource has been "peer reviewed."
13. At the LC-sponsored open meeting on this topic at the American Library Association Annual Meeting (July 2000) several college and university librarians stressed that information indicating that articles in a title are "peer-reviewed" is indispensable in an academic setting; and indeed, among those respondents from academic institutions, just under two thirds (56) indicated this piece of information was either essential or often useful
14. Eighty-four percent of the respondents indicated that it is essential or "often useful" for controlled subject to appear on the catalog record for networked resources compared to ninety-four percent selecting "essential" or "often useful" for subject keywords.
15. As one respondent said: "I am assuming that ... clicking onto one of the elements [in the bibliographic description] will take you to a page that will have many of the elements I marked as being 'not essential.'

16. The Dublin Core Metadata Initiative. (http://purl.org/DC/index.htm) (6 Dec 2000)
17. Lundgren, Jimmie and Betsy Simpson. "Looking Through Users' Eyes: What Do Graduate Students Need to Know About Internet Resources via the Library Catalog?" *Journal of Internet Cataloging*. v. 1, no. 4, 1999, pp. 31-44.
18. Kaplan, Michael, "Exploring Partnerships: What Can Producers and Vendors Provide?" Paper prepared for the Bicentennial Conference on Bibliographic Control for the New Millennium, Library of Congress. November 15-17, 2000. (http://lcweb.loc.gov/catdir/bibcontrol/kaplan_paper.html) (6 Dec 2000) (hereafter cited as "Exploring Partnerships"
19. Some sample comments, alluding to the problem of bibliographic control of titles in aggregator databases:
"...access to online resources could be improved if all vendors made cataloging records available for the full text products available through their databases."

"...we catalog journals in publisher-aggregated databases (e.g. Muse, Ideal, etc.) but not in full-text indexes like Lexis-Nexis's various Universes or ProQuest, since coverage, completeness and dates are less than clear or predictable. *IF*, we could get solid data, and IF the records of individual titles could be handled "in bulk", it would be great to have those listed in our catalog, but I honestly don't see us being able to add 2000 individual titles (and then keep track of them) for a full-text index."

"We have an Access database that includes links to more than 19,000 periodicals. We have existing records for the print version of thousands of these titles. It would help us speed things up tremendously if there were a way to do a batch import of the URL's (PURLs) from the Access database to the 856 field, matching on the ISSN for example."
20. Kaplan, Michael, "Exploring Partnerships " (http://lcweb.loc.gov/catdir/bibcontrol/kaplan_paper.html) (6 Dec 2000)
21. For example, the sheer volume of the task; duplication of effort; problems maintaining bibliographic control over e-journals and titles supplied by aggregators. See Barbara Baruth. "Is Your Catalog Big Enough To Handle the Web?" American Libraries. August 2000, pp. 56-60.
22. Baruth, Barbara. "Is Your Catalog Big Enough To Handle the Web?" American Libraries. August 2000, p60.
23. Kaplan, Michael, "Exploring Partnerships" (http://lcweb.loc.gov/catdir/bibcontrol/kaplan_paper.html) (6 Dec 2000)
24. Calhoun, Karen. "Redesign" (http://lcweb.loc.gov/catdir/bibcontrol/calhoun_paper.html) (6 Dec 2000)
25. Collaborative Digital Reference Service. (http://www.loc.gov/rr/digiref/) (6 Dec 2000)
26. Dinberg, Donna. "From CDRS to Document Delivery: a development path toward end-to-end user service," unpublished paper distributed to DigiRef Team 12 October 2000.
27. O'Donnell, Mike, (icopyright.com). "A New Model for Publishing on the Internet," National Online Meeting. Proceedings of the twenty-first National Online Meeting. May 16-18, 2000. p. 303-307.
28. McKiernan, Gerry. "Points of View: Conventional and 'Neo-Conventional' Access and Navigation in Digital Collections," *Journal of Internet Cataloging*, v. 2, no. 1, 1999, pp 23-41.

29. http://www.public.iastate.edu/~CYBERSTACKS (6 Dec 2000)
30. See sources cited at (http://www.public.iastate.edu/~CYBERSTACKS/Agents.htm) (6 Dec 2000).
31. The Scorpion Project. OCLC Office of Research. (http://orc.rsch.oclc.org:6109/) (6 Dec 2000)
32. Information Visualization. Pacific Northwest National Laboratory. (http://www.pnl.gov/infoviz) (6 Dec 2000)
33. MNIS-TextWise Labs. (http://www.textwise.com/) (6 Dec 2000)
34. Kaplan, Michael, "Exploring Partnerships" (http://lcweb.loc.gov/catdir/bibcontrol/kaplan_paper.html) (6 Dec 2000)
35. Cooperative Online Resource Catalog, sponsored by the Online Computer Library Center, Inc. (OCLC). For more information see: (http://purl.oclc.org/corc) (6 Dec 2000).
36. As in the example described by one respondent: "Public services project is identifying which titles in reference collection have electronic counterparts to which catalog needs to link .... we public services/reference librarians need to recommend which links are important to cataloger."
37. Calhoun, Karen. "Redesign" (http://lcweb.loc.gov/catdir/bibcontrol/calhoun_paper.html) (6 Dec 2000)

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Confronting the Challenges of Networked Resources and the Web

sponsored by the Library of Congress Cataloging Directorate

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Descriptive Resource Needs from the Reference Perspective

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About the presenters:

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Carolyn Larson has worked for many years in reference at the Library of Congress, where she has been active on various automation committees relating to staff and public training, user interface design, and indexing issues. She is currently a business reference librarian in the Science, Technology and Business Division. In addition, she is a member of the Library's Bibliographic Enrichment Advisory Team (BEAT), a research and development team charged with the "development and implementation of initiatives to improve the tools, content, and access to bibliographic information," serving as Project Manager of the BECites+ Project as well as participating in the BEOnline+ Project. She is also a member of the ALA RUSA MARS Task Force on the Best of Free Reference Web Sites.

Full text of paper is available

Summary:

Drawing on the results of a survey to be conducted this summer, we plan to address the following topics from the perspective of reference providers:

Optimum "levels" of library and metadata descriptions (including descriptive/subject/administrative/access metadata) for content retrieval of Web-based resources (e.g. full MARC records; simpler, more structured Dublin Core records);

Descriptive needs that professional reference providers feel to be essential in performing their work (e.g. more subject data, more summary information);

Additional descriptive elements which reference librarians feel would facilitate achieving accurate and useful content retrieval in response to user queries and information demands;

Traditional concepts, such as authority files, uniform titles, specialized thesauri, that might be incorporated into metadata descriptions to facilitate resource discovery;

Problems, which might be addressed through improved interaction between metadata and present-day technologies, that arise as reference providers navigate the current "continuum" of resource discovery from catalog through "middleware tools" (such as pathfinders, finding aids, abstracting and indexing services, and databases) to content.

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