
Gateways to the Internet: Finding Quality Information on the Internet

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ABSTRACT

Librarians have long sought to select, evaluate, and organize information on the Internet. Efforts began with individual librarians sharing bookmark files of favorite sites and progressed to increasingly large, collaboratively produced general and subject/discipline-specific gateway Web sites or megasites. Megasites list major resources usually in a particular subject area or discipline. Library portals that review, evaluate, and sometimes rate and rank resources grew from some of these Web sites. Both megasites and portals serve as gateways to the Internet. Many portals have developed from relatively small static files into large, dynamically generated databases providing descriptive annotations of selected resources and are increasingly overseen as global projects with formal policies and procedures. Portals now provide increasingly complex and sophisticated browse and search capabilities with a multitude of access points, often including call numbers and subject headings. These are described and compared. Future trends such as increased collaboration among portals; automated location, selection, and cataloging of resources; integration of multiple resource types; and increased access to full-content and virtual library services are also discussed.

INTRODUCTION

Librarians have long been involved in efforts to select, organize, describe, and evaluate Internet resources. Librarian-produced Internet tools have much to offer that commercial search engines and other tools lack:

While these search engines [Yahoo and Alta Vista] and others like them have strengths, their weaknesses are well known: a high percentage of nonauthoritative content mixed with quality content that, when indexed together, makes locating relevant information serendipitous at best. (Wells et al., 1999, p. 347)

Early on, individual librarians compiled bookmark files that listed favorite sites. These lists often reflected institutional priorities and usually had a limited geographical focus as well. In fact, the well-respected Librarian's Index to the Internet began as then Berkeley Public Library librarian Carole Leita's gopher bookmark file (Buchwald, 2002, p. 38). As the Internet grew in size and audience and became more accessible, librarians worked collaboratively to create and maintain resource sites and megasites. These might be multidisciplinary, as in selections of general reference resources, or subject or discipline specific. Initially, following print models of bibliographic control, these guides were essentially Web bibliographies or "Webliographies." Megasites (sometimes called "metasites") are larger and more comprehensive. Webliographies and megasites became increasingly sophisticated, providing descriptive annotations. Portals are larger still and often evaluate and sometimes rate megasites and other Internet resources.

The LITA Internet Portals Interest Group

defines a portal as a service (and related systems and approaches to organization) that facilitates organized knowledge discovery via information accessible through the Internet. (American Library Association. Library and Information Technology Association, n.d.)

Portals are now often supported as independent projects and are frequently underwritten financially through state, local, or national governments or private philanthropic funding (cf., for example, Ansdell, 2000; Buchwald, 2002, p. 38; Wells et al., 1999, p. 347).

As portals became more established and grew larger, librarians took advantage of software advances to convert them into databases that are browsable and searchable by multiple access points, frequently including call numbers and subject headings.

SCOPE

This article will focus primarily on librarian-produced portals or portals with a high level of librarian participation. Sites described and discussed are freely available on the Web. These portals will be described and compared. Excluded or de-emphasized are sites created and maintained primarily outside the library community, print resources including books and articles, information available only in fee-based subscription databases, and search engines.

ARTICLE BACKGROUND

This article grew out of a presentation given on October 14, 1999, by the author and a colleague, Richard Palladino, at the 10th Annual Meeting of the International Information Management Association (IIMA) held at Iona College. An invitation to participate in this conference was extended to Iona College faculty and staff. The concept of information management seemed especially pertinent to librarians and the opportunity to present before an audience of nonlibrarians was especially intriguing and attractive. Aware of widespread concern about the quality (or lack of quality) on the World Wide Web, thoughts of librarians extending bibliographic and quality control from print to the Web came to mind, and so we decided to share this with our fellow information professionals. The Web page "Finding Quality Information on the World Wide Web" (<http://www.iona.edu/faculty/afranco/iima/webliog.htm>) was created for presentation at the conference and has been maintained since then and most recently updated on April 4, 2002. We were the only librarians to present at this conference. Information professionals from around the world attended, and their feedback was overwhelmingly positive. Some took us aside and said they had been unaware of librarians' attempt to select, organize, and evaluate Internet resources.

FINDING SUBJECT GUIDES AND MEGASITES

Finding the Newest Quality Sites

Although subject guides and megasites are included in the portals discussed in this article, newer resources may not yet be included. Methods that are described here are often also used by librarians at portal sites to find resources to be considered for review and inclusion.

Subject guides and megasites are often created under the auspices of organizations such as college and university academic departments, government agencies, nonprofit organizations, professional associations, trade associations, and corporations, as well as libraries. Some are the product of special, highly structured projects while others may represent the efforts of individuals or informal groups. For example, a university biology faculty member or librarian may create a Webliography of favorite sites.

Methods used to find quality sites include:

- Mailing lists and discussion groups for resource announcements and recommendations;
- Print sources such as books and journal, magazine, or newspaper articles;
- Search engines, using carefully constructed search queries. Such queries may include terms that describe a discipline or broad subject area as well as words such as "resources," "megasites," "Webliography," "Internet," etc. For example:

- biology + megasites
- biology + "internet resources"
- biology + "information resources"
- biology + webliography (or, biology + bibliography)

It may be helpful to limit searches to the titles of Web pages only and possibly to domains such as .edu, .gov, or .org to retrieve megasites produced by academic institutions, libraries, nonprofit organizations, or government agencies. One can exclude domains if desired as well, e.g. exclude ".com." Of course, you will have to screen search results yourself.

- Other strategies for locating megasites include the following:
 - Determine which academic institutions have degree programs in a particular field or discipline. (To help you identify which institutions have programs in a particular field, consult print or electronic directories, e.g., *College Blue Book* or *Peterson's college guides*);
 - Once you've identified an appropriate institution, try using the url: "www.universityname.edu" (for U.S. universities), or use a Web directory such as: *American Universities* (<http://www.clas.ufl.edu/CLAS/american-universities.html>);
 - Look for appropriate academic department page(s) as well as library page(s);
 - Look for Web documents that may include such title words/ terms as "Links," "Resources," "Web Sites," etc.

MAJOR WEB RATING AND EVALUATION PORTAL SITES

Eventually, quality megasites will be accessible through portals such as the *Librarian's Index to the Internet* and *Infomine*. Specific portals that are described and compared in this article include *Librarians' Index to the Internet*, *Infomine*, *Internet Public Library*, *MEL* (*Michigan Electronic Library*), *BUBL Link 5:15*, *Internet Scout Project*, and *Academic Info*. These are described and compared in Tables 1–7.

Comparing the data in these tables, we see commonalities but also significant differences. For example, most provide at least basic keyword search capabilities and at least minimal annotations. Most also began in the early to mid-1990s and provide selected sites, though criteria are not always explicitly stated on their Web sites.

Differences among them, however, are significant, so users are advised to not limit their searches for quality resources to a single portal. Examples of major differences include: primary audience, level of detail in records, number of access points, presence or absence of controlled vocabulary and classification system numbers, degree of searchability and browsability, and comprehensiveness of annotations.

For example, primary audiences range from public library users (*Librarians' Index to the Internet*) to academics (*Infomine* and *Academic Info*) and all the Internet community (*Internet Public Library*, *MEL*).

Table 1.

Name of Web Rating and Evaluation Site:	Librarians Index to the Internet
Site URL:	http://lii.org
Mission Statement, Description, Audience:	"The mission of Librarians' Index to the Internet is to provide a well-organized point of access for reliable, trustworthy, librarian-selected Internet resources, serving California, the nation, and the world."
Year Founded:	1990
Origins/History:	Began as librarian Carol Leita's gopher bookmark file
Approximate Number of Records:	Over 10,000 as of end of 2002
Selection Criteria:	Detailed criteria described at: http://lii.org/search/file/pubcriteria . Free sites or sites that offer significant free content only are included. Evaluation criteria include authority, scope and audience, content, design, function, and shelf life.
Annotations?	YES
Sites Rated? (e.g., with graphics such as stars)	NO
Browsable?	By hierarchical terms, general to specific. By LC subject headings from advanced search screen.
Searchable?	YES, with fully-functional search engine
Classification System Used?	NO
Subject Headings/Controlled Vocabulary?	LCSH
E-Mail Announcements/ Alerts for New Sites Added?	YES
Staffing:	4 part-time staff including a cataloger, 2 editors, and a computer programmer plus more than 100 volunteer indexer librarians
Responsible Person(s)/ Institution(s):	Library of California, Karen G. Schneider
Funding and Support:	Library of California, grants such as LSTA
Hosted by:	UC Berkeley SunSITE
Prime URL for "about" information:	http://lii.org/search/file/about
COMMENTS:	Although emphasis is on public libraries, resources and annotations are useful for academics as well.

Table 2.

Name of Web Rating and Evaluation Site:	INFOMINE: Scholarly Internet Resource Collections
Site URL:	http://infomine.ucr.edu/
Mission Statement, Description, Audience:	"INFOMINE is a virtual library of Internet resources relevant to faculty, students, and research staff at the university level. It contains useful Internet resources such as databases, electronic journals, electronic books, bulletin boards, mailing lists, online library card catalogs, articles, directories of researchers, and many other types of information." Scope information available at: http://infomine.ucr.edu/about/scope.php
Year Founded:	1994
Origins/History:	Begun by librarians at the University of California, Riverside. Librarians from other academic institutions now participate as well. Infomine is now a cooperative project.
Approximate Number of Records:	Over 40,000; half selected by librarian "experts"; the other half by robot crawlers (Mitchell, 2003).
Selection Criteria:	"University level research and educational tools on the Internet."
Annotations?	YES
Sites Rated? (e.g., with graphics such as stars)	Graphical symbols used to distinguish, for example, librarian-selected records.
Browsable?	From main screen by hierarchical subject-specific database (e.g., Business & Economics). From advanced search screen by LC classification numbers.
Searchable?	YES
Classification System Used?	YES (LC)
Subject Headings/Controlled Vocabulary?	LCSH
E-Mail Announcements/ Alerts for New Sites Added?	YES
Staffing:	"Librarians from The University of California, Wake Forest University, California State University, The University of Detroit—Mercy, and other universities and colleges" (cf. http://infomine.ucr.edu/about/). Other libraries invited to participate.
Responsible Person(s)/ Institution(s):	Primarily University of California, Riverside
Funding and Support:	State, federal, and other grants
Hosted by:	University of California, Riverside
Prime URL for "about" information:	http://infomine.ucr.edu/about/
COMMENTS:	Now part of LOOK (Libraries of Organized Online Knowledge) , formerly Fiat Lux), a collaborative project of multiple portal sites.

Table 3.

Name of Web Rating and Evaluation Site:	Internet Public Library
Site URL:	http://www.ipl.org/
Mission Statement, Description, Audience:	"The first public library of and for the Internet community" (cf. http://www.ipl.org/div/about/iplfaq.html). However, audience is not "public library" users but all members of the Internet community as well as librarians. Designed on a library model, IPL provides library services and resources such as Reference and links to free online books and articles. Primary focus does not seem to be Web site evaluation
Year Founded:	1995
Origins/History:	Began in winter 1995 as a project of the School of Information and Library Studies at the University of Michigan
Approximate Number of Records:	Not found at site
Selection Criteria:	Not found at site
Annotations?	YES, but seem to appear only when browsing rather than searching. Brief and often are quoted from the site itself.
Sites Rated? (e.g., with graphics such as stars)	NO
Browsable?	Yes, by hierarchical terms general to specific. Browses do retrieve records with annotations.
Searchable?	Yes, but simple searches only. Searches do not retrieve annotated records but simply a list of links.
Classification System Used?	NO
Subject Headings/Controlled Vocabulary?	NO
E-Mail Announcements/ Alerts for New Sites Added?	Not found at site
Staffing:	Sue Davidsen, Managing Director, and two other staff members. Students at the host institution. Others invited to collaborate.
Responsible Person(s)/ Institution(s):	University of Michigan School of Information
Funding and Support:	University of Michigan School of Information. Actively seeking other funding.
Hosted by:	University of Michigan School of Information
Prime URL for "about" information:	http://www.ipl.org/div/about/
COMMENTS:	Also includes original content pathfinders and documents created for IPL. Includes records formerly in the Argus Clearinghouse which was discontinued on January 23, 2002.

Table 4.

Name of Web Rating and Evaluation Site:	MEL: Michigan Electronic Library Best of the Internet Selected by Librarians
Site URL:	Main url: http://www.michigan.gov/hal/0,1607,7-160-15481_15483--,00.html http://www.michigan.gov/hal URL for "Best of the Internet": http://mel.org/melindex.html
Mission Statement, Description, Audience:	"Michigan's virtual library will link all Michigan residents to the information they need, when they need it, where they need it, and in the format they desire."
Year Founded:	1992
Origins/History:	Began as GoMLink gopher service
Approximate Number of Records:	Over 20,000
Selection Criteria:	Sites are selected that meet the needs of Michigan's libraries and citizens. The Web site alludes to specific selection criteria followed by their selectors but does not include them. "Collection Policy for the Michigan eLibrary—Best of the Internet," http://mel.org/about/melcollection.html
Annotations?	YES, but very brief and not for all records. Some are quotes from linked sites.
Sites Rated? (e.g., with graphics such as stars)	NO
Browsable?	YES, by hierarchical terms general to specific.
Searchable?	YES, but simple search only. Seems to be keyword access only. No advanced search features (e.g., limiting).
Classification System Used?	NO
Subject Headings/Controlled Vocabulary?	NO
E-Mail Announcements/Alerts for New Sites Added?	NO
Staffing:	11 manager/selector librarians
Responsible Person(s)/Institution(s):	Michigan State Library
Funding and Support:	Michigan State Library, LSTA "via the Institute of Museum and Library Services (IMLS)," and other grants
Hosted by:	State of Michigan
Prime URL for "about" information:	http://mel.org/about/aboutmel.html
COMMENTS:	Best of the Internet is only a small part of MEL, which is a virtual library.

Table 5.

Name of Web Rating and Evaluation Site:	BUBL / Link 5:15, catalog of Internet resources (part of BUBL)
Site URL:	http://bubl.ac.uk/link/ddc.html (Dewey) http://bubl.ac.uk/link/(alternative subject interface)
Mission Statement, Description, Audience:	"Aimed towards the UK higher education academic and research community" and librarians; "a catalogue of selected Internet resources covering all academic subject areas and catalogued according to DDC."
Year Founded:	BUBL 5:15 began in March 1997. Original BUBL began in 1990.
Origins/History:	BUBL founded as BULLETIN Board for Libraries, aimed at librarians. LINK stands for Libraries of Networked Knowledge.
Approximate Number of Records:	Over 11,000 resources
Selection Criteria:	"Academic relevance, up-to-date information and completeness" (cf. Williamson, 2000). Williamson also lists specific types of resources that are given priority, e.g., online books and book collections.
Annotations?	YES, descriptive
Sites Rated? (e.g., with graphics such as stars)	NO
Browsable?	By BUBL subject tree (hierarchical subjects, from general to specific) and by Dewey classification numbers
Searchable?	Fully cataloged with multiple access points. Simple and advanced search available. Fielded searching and sophisticated search features (e.g., Boolean, truncation, etc.) are available.
Classification System Used?	Dewey Decimal
Subject Headings/Controlled Vocabulary?	Enhanced LCSH
E-Mail Announcements/Alerts for New Sites Added?	Update information available on "lis-link" mailing list (archive and subscription instructions available at http://www.jiscmail.ac.uk/lists/LIS-LINK.html). Update bulletins also available at http://bubl.ac.uk/news/updates/
Staffing:	2 full-time staff and 1 part-time staff member
Responsible Person(s)/Institution(s):	Andersonian Library, Strathclyde University, 101 St. James Road, Glasgow G4 0NS, Scotland
Funding and Support:	Joint Information Systems Committee (JISC) of the Higher Education Funding Councils of England, Scotland and Wales and the Department of Education for Northern Ireland

Table 5. (continued)

Hosted by:	BUBL has own server
Prime URL for "about" information:	http://bubl.ac.uk/admin/
COMMENTS:	Can also limit search by file type, e.g., sound

Some are stand-alone portals (e.g., Librarians' Index to the Internet) while others are part of larger virtual libraries (e.g., Internet Public Library). It appears that the stand-alone portals are more likely to provide in-depth records, multiple access points, and more sophisticated search options than those that are only part of a virtual library. This is true, for example, when one compares Librarians' Index to the Internet to the Internet Public Library.

CURRENT TRENDS

It is well documented that search engines cover only a small fraction of resources available on the Web (cf. Lawrence & Giles, n.d.). Portals cover even a smaller percentage of resources. Internet users are less aware of the portals discussed in this article and if they are aware may use them less frequently than search engines because they retrieve fewer records with each search. It is easy to confuse volume with quality of search results. The portals can offer quality that search engines, even those that increasingly use "intelligent" search algorithms, are less able to provide. Still, portal leadership has recognized the need to cover more resources. This has resulted in many trends and developments that are both current and developing. These current and developing trends are discussed below.

AUTOMATION AND SOFTWARE

Creation and development of sophisticated software has allowed portal sites to automate almost every aspect of their sites from collection development to record creation, search, and retrieval of information. For example, Infomine uses crawlers to find, evaluate, and select resources for inclusion. Half of their database consists of resources that are machine-selected. Other tasks increasingly automated include record creation, indexing, and even brief descriptive annotations. Automation has played a major role in virtually all of the trends that follow.

GROWTH

Portals such as Infomine and Librarians' Index to the Internet have been rapidly increasing the number of resources included. Consistent with increased diversity of Internet resources, portals now cover not only HTML

Table 6.

Name of Web Rating and Evaluation Site:	Internet Scout Project (offering access to weekly Scout Report, Scout Report Archives, and NSDL Scout Reports)
Site URL:	http://scout.wisc.edu/ http://scout.wisc.edu/report/sr/current/ (Scout Report, current issue) http://scout.wisc.edu/archives/ (Scout Report, archives) http://scout.wisc.edu/nsdl-reports/ (NSDL Scout Reports—National Science Digital Library)
Mission Statement, Description, Audience:	"To provide timely information to the education community about valuable Internet resources." Audience: "K-12 and higher education faculty, staff, and students, as well as interested members of the general public" (cf. http://scout.wisc.edu/about/).
Year Founded:	1994
Origins/History:	Subject-specific scout reports for Business & Economics, Social Sciences & Humanities, and Science & Engineering discontinued in 2001 due to lack of funding (cf. Search engines, 2001).
Approximate Number of Records:	Over 11,000
Selection Criteria:	Content, Authority, Information Maintenance, Presentation, Availability, and Cost. Detailed criteria listed at http://scout.wisc.edu/report/sr/criteria.html
Annotations?	YES, critical annotations (cf. http://scout.wisc.edu/archives/)
Sites Rated? (e.g., with graphics such as stars)	NO
Browsable?	By LCSH
Searchable?	Fully cataloged with multiple access points. Simple and advanced search available. Fielded searching and sophisticated search features (e.g., Boolean, truncation, phrase searching, etc.) are available.
Classification System Used?	Broad LC class only, e.g., Z, RG, etc. Not searchable or browsable.
Subject Headings/Controlled Vocabulary?	LCSH
E-Mail Announcements/ Alerts for New Sites Added?	YES. Can subscribe by going to http://scout.wisc.edu/report/sr/srsubscribe.html
Staffing:	17 staff including 2 librarian catalogers. Sites selected by "professional librarians, educators, and content specialists."

Table 6. (continued)

Responsible Person(s)/ Institution(s):	Department of Computer Science, University of Wisconsin-Madison
Funding and Support:	National Science Foundation
Hosted by:	University of Wisconsin
Prime URL for "about" information:	http://scout.wisc.edu/about/
COMMENTS:	Links regularly checked and updated. Scout Portal Toolkit software information available at http://scout.wisc.edu/research/SPT/ .

but other file types as well, including PDF, images, and multimedia. Half of Infomine's 40,000 records are machine generated, with the other half created by librarian experts.

Static Files to Databases

As content has increased, most portals have converted from static files to databases with multiple access points and sophisticated searching capabilities to facilitate searching and retrieval of records.

ORGANIZATION AND STRUCTURE

Portals have developed into highly organized and structured projects increasingly supported by government and philanthropic agencies. Many have become independent organizations financed separately from any particular library. They now consist of paid staff as well as volunteers from not one but multiple libraries. Policies and procedures have become increasingly detailed and complex.

Collection Development Policies and Criteria

Portals have created, developed, and refined specific collection development policies and selection criteria. This information may be available on their sites. Site selectors and reviewers often have access to additional and even more detailed guidelines and criteria.

STANDARDIZATION

Site Design, Record Content, Indexing, and Abstracting

Overall design of portal sites is becoming more uniform. Initial screens usually display top hierarchical subjects and a search box. Simple and advanced search screens are available in most portals. Increasingly, they resemble the interfaces of subscription databases.

Table 7.

Name of Web Rating and Evaluation Site:	Academic Info
Site URL:	http://www.academicinfo.net/
Mission Statement, Description, Audience:	"To provide students, educators, and librarians with an easy to use online subject directory to access quality, relevant, and current Internet resources on each academic discipline" (cf. http://www.academicinfo.net/). Focus is on students in high school and above.
Year Founded:	1998
Origins/History:	Began as a for-profit site. In 2002, it was registered in the State of Washington as a non-profit organization.
Approximate Number of Records:	Not found on site
Selection Criteria:	Specific collection development policy with criteria is available on-site, currently at http://www.academicinfo.net/cdp.html .
Annotations?	Mostly quotes from sites themselves
Sites Rated? (e.g., with graphics such as stars)	NO
Browsable?	YES, by hierarchical classification, general to specific
Searchable?	YES, by keyword only. Boolean operators supported Default operator is "or."
Classification System Used?	NO
Subject Headings/Controlled Vocabulary?	NO
E-Mail Announcements/Alerts for New Sites Added?	YES, monthly list.
Staffing:	Mike Madin, President of Academic Info
Responsible Person(s)/Institution(s):	Mike Madin
Funding and Support:	Corporate and individual sponsors
Hosted by:	Site has its own server
Prime URL for "about" information:	http://www.academicinfo.net/cdp.html
COMMENTS:	"Academic Info relies on donations and sponsors to fulfill its mission."

Indexable Fields

Standardization of indexable fields in database records will allow portals to exchange information more freely and, if Z39.50 compliant, to facilitate searches across multiple portals. Standardization is important whether existing portals merge to form a single large database resource or whether they continue to exist separately.

BIBLIOGRAPHIC CONTENT AND CONTROL

Enhanced Record Content with Multiple Access Points

Increasingly, database records include distinct fields that provide multiple access points including personal or corporate author, title, description, subject headings, and in some cases even classification numbers (usually Dewey or LC).

Sophisticated Search Features

Most portals now offer sophisticated browse and search capabilities. Increasingly, complex searches are available utilizing Boolean operators, phrase searching, truncation, and more. Previously, such features were found primarily in subscription databases.

INTERACTIVITY

Features now commonly available—including e-mail alerts, comment and feedback buttons, and forms to suggest resources for inclusion—allow users to both contribute to and provide feedback to portals.

COOPERATION

Recruitment of Libraries and Librarian Contributors

Some portal sites, such as Infomine, are actively recruiting libraries and librarians to contribute records. This is an extension of interactivity, noted earlier.

CURRENT ISSUES AND FUTURE TRENDS

Many library groups and professional associations including the Library of Congress, Association of Research Libraries, the American Library Association's LITA Internet Portals Interest Group, and "Libraries of Organized Online Knowledge" (or LOOK, formerly FIAT LUX) are actively involved in encouraging and sponsoring research and planning for future portal development (cf. Library of Congress, 2003; American Library Association Library and Information Technology Association, n.d.; Association of Research Libraries 2003; Infomine, n.d.).

Mary E. Jackson, ARL Senior Program Office for Access Services, describes an intriguing vision of a "dream portal":

Imagine one web site that can combine the powerful searching of web resources with the searching of local catalogs, online journals, or locally digitized resources. Add to this the ability to initiate a reference question, submit an interlibrary loan (ILL) request, and transfer into course management systems a citation or portion of a journal article, all without leaving that web site. (Jackson, 2002)

Jackson also shares the vision of Sarah Michalak, director of the University of Utah Libraries and a member of the ARL Scholars Portal Working Group, of a dream portal as

a super discovery tool that specializes in high-quality content. The dream portal is fast and powerful. It searches across formats and resources and returns results that are deduped and relevancy ranked. It is more than a discovery tool because it delivers full text or information objects whenever available. The dream portal integrates appropriate applications such as course management software. Finally, the dream portal supports authentication and permits customization and personalization, e.g., alerts, saved hits or searches, and custom views of resources. (Jackson, 2002)

Key elements in these visions include a single point of access to high quality resources and databases (something commercial search engines and portals are less equipped to offer), integration of information in multiple formats, integration with other portals and software, interactivity including access to library services such as reference and interlibrary loan, provision of full-text whenever possible, and customization by users.

Towards these ends ARL, LC, LITA/IPIG, and other groups are developing or promoting "best practices," standards, cooperative projects, and sophisticated software to aid libraries and library groups in creating their own portals. They have met at ALA conferences and hope to chart the future course of librarian-created portals. Additional trends are noted and discussed below.

Content Access to Content Production

Initially, portals sought to index resources available externally. Many portals now either produce their own content or make content available on site. These include Internet Public Library and MEL. In the case of MEL, it provides significant amounts of copyrighted materials available only to Michigan constituents and so now are also, in a sense, subscription databases. Some, like IPL, MEL, and BUBL are now virtual libraries in addition to portals. This trend will continue.

Single Portal or Multiple Portals

Mason (2000) outlines several possible future directions for portals. Choices that are yet to be made include whether or not portals will merge

into a single resource or whether they will continue existing separately with increased cooperation and even interconnectivity. However, efforts by ARL, LC, and LITA definitely point not only to continuation of interconnected multiple portals but even to creation of new ones.

Resource Sharing

Some portals (notably Infomine) have developed open software made available to libraries and consortia who may wish to create their own portals. LC lists vendors of portal software on its Web site (Library of Congress, 2003). Some, like MEL, are considering making broad-based non—Michigan oriented content available to regional MELs, which would then provide their own local content.

Full-Text Capture

In an article about Librarians' Index to the Internet, Buchwald (2002) talks about LII and by implication other portals being able to "have some type of crawler like a regular search engine . . . [which] would need to capture the text of the selected homepage, and any meta tags and other keywords to build a useful fulltext index." These may include invisible information added to Web pages using "the Dublin Core, a means of building catalogue information into Web pages by using metatags, labels which exist in the unseen 'head' area of every online page" (Ansdell, 2000). Buchwald (2002) points out this may be more difficult, "since more and more, university, library, and newspaper sites are having areas of their sites blocked off from search engines' robots and crawlers." If such information could be captured, it would allow for more precise indexing, searching, and retrieval of Internet resources.

Broad vs. Highly Selective Resource Coverage

Infomine is seeking more comprehensive coverage of resources while BUBL:Link focuses more on including fewer yet highly selective resources (Dawson, 1997, p.18).

CONCLUSION

In less than a decade, librarian-created portals have changed dramatically in terms of growth, content, accessibility, interactivity, and organization. Many serve as virtual libraries, in some cases providing copyrighted content like subscription databases to specific clientele/constituents. Some have focused on substantially increasing resource coverage to compete more with commercial directories and search engines while others are less focused on growth and more on highly relevant resources.

Major issues include:

- Single, cooperatively produced and maintained portal vs. multiple portals increasing their interconnectivity and standardizing their content;

- Dramatic increase in the number of resources vs. a limited number of resources but of high quality;
- Development and sharing of sophisticated software to find, select, evaluate, index, and describe Web content as well as to provide bibliographic control within portals (cf. Schneider 2002a);
- Cooperative efforts to fund portal development (cf. Schneider 2002a);
- Increased efforts to globalize content.

As Schneider (2002a) aptly states: "We aren't going to blow the commercial portals out of the water. But we can be to the Internet what public radio and television are for these other media: a single place for local and global content that our public can trust."

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