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Information Seeking and Retrieval in the Web/Library 2.0 Age

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Abstract

Information users have often been ignored in the information retrieval process, but have become active collaborators in a Web/Library 2.0 world which values online social interactions, speed, and choice. The creation of Social Online Public Access Catalogs (SOPACs), the proliferation of easy-to-use information sources, and collaborations between various partners in information retrieval means that no one group of information specialists—librarians included—has or needs to have an absolute dominant role in the field. This paper examines how Web/Library 2.0 is changing the relationship between librarians and information seekers; compares taxonomy and folksonomy as tools in information retrieval; traces the continuing (r)evolution from OPACs to SOPACs; summarizes current collaborative efforts to show how information retrieval is evolving; and shows how information seekers in a Web/Library 2.0 world combine the resources available to them to meet their information needs.

Introduction

Information users have often been ignored in the information retrieval process (Chowdhury, 2004, p. 447; Mathes, 2004, p. 2), but have become active collaborators in a Web/Library 2.0 world which values online social interactions, speed, and choice. The creation of Social Online Public Access Catalogs (SOPACs), the proliferation of easy-to-use information sources, and collaborations between various partners in information retrieval means that no one group of information specialists—librarians included—has or needs to have an absolute dominant role in the field. This paper examines how Web/Library 2.0 is changing the relationship between librarians and information seekers; compares taxonomy and folksonomy as tools in information retrieval; traces the continuing (r)evolution from OPACs to SOPACs; summarizes current collaborative efforts to show how information retrieval is evolving; and shows how information seekers in a Web/Library 2.0 world combine the resources available to them to meet their information needs.

Information Retrieval Throughout History

Information retrieval can easily be traced back at least 5,000 years, to the period when Mesopotamians catalogued clay tablets. “For ease of reference, they appended content descriptions to the edges of tablets, and they adopted systematic shelving for quick identification of related texts” (Grafton, 2007, para. 6). Dreams, collections, and information retrieval techniques grew in the ensuing centuries as the Library of Alexandria set a goal similar to what Google and other companies are trying to accomplish today: creating and organizing the largest possible collection of information available (Grafton, 2007, para. 6). Information retrieval

techniques continued to evolve when Eusebius created a library of Christian writings and developed “a system of cross-references, known as ‘canon tables,’ that enabled readers to find parallel passages in the four Gospels—a system that the scholar James O’Donnell recently described as the world’s first set of hot links” (Grafton, 2007, para. 7). Monastic libraries throughout the Middle Ages kept information retrieval alive, and librarians since then have worked to collect, organize, preserve, and make available a variety of materials.

Public libraries began in the 19th century as “street corner universities” (Chowdhury, Poulter & McMenemy, 2006, p. 454). At times, the bulk of their collections have been held in closed stacks or behind reference desks so that information seekers were required to use librarians as intermediaries. The creation of small branch libraries with Carnegie funding during the early part of the 20th century moved collections onto open shelving accessible to library patrons in main and branch libraries, and the movement toward open access to information during the middle of the century made large portions of the book collections in large urban public libraries equally accessible.

Among the tools which served information seekers well during this century-long period were the Dewey Decimal Classification and Library of Congress classification systems. The Dewey system, in fact, is still used throughout the world more than 100 years after it was created; has been translated into many other languages; and has been adopted in the United States by “95% of all public and school libraries, 25% of all college and university libraries, and 20% of special libraries” (Chowdhury, 2004, p. 60). Library of Congress bibliographic data is also widespread: “Within WorldCat, more holdings are attached to Library of Congress records

than to records from other sources” (Library of Congress Working Group on the Future of Bibliographic Control, 2007, p. 1).

This does not mean that information seekers remain at all dependent upon libraries; the roles of public libraries and those working within them are rapidly changing in response to the technological changes taking place around the world. Library leader Mary K. Chelton predicts that, “Within the next decade, wireless technology will make us ‘globally wired’” and that “this and more will result in ‘Tele Living,’ living through the intelligent Internet.” (Chelton, 2005, p. 39). This is already having an impact on libraries and those who use them: the majority of information seekers begin their search somewhere other than within a library building or its online portals, but they do continue to value what libraries offer (Calhoun, 2006, p. 5; De Rosa, Cantrell, Cellentani, Hawk, Jenkins, & Wilson, 2005, p. 2-18). Furthermore, those using libraries are turning more and more frequently to online rather than onsite library resources, so librarians are having to become equally adept at providing online information retrieval assistance as they have been at providing face-to-face help.

In this situation, librarians and information seekers are working at two parallel levels. Librarians are examining the way bibliographic records are being created and asking themselves and their non-librarian collaborators how they might best meet their customers’ needs in a Web/Library 2.0 world (Bibliographic Services Task Force, 2005; Calhoun, 2006; Library of Congress Working Group on the Future of Bibliographic Control, 2007). Information seekers are turning to a variety of search engines including Google; online aggregators such as Netvibes to help them organize their own online information sources; Web 2.0 tools including LibraryThing; and resources including Second Life and Wikipedia.

First, however, the information seekers and information providers need to decide how they are going to organize the information.

Taxonomy and Folksonomy

Nowhere is the division between information providers and information seekers in the Web/Library 2.0 world more obvious than in comparisons between taxonomy—a highly structured and consistent form of subject classification—and folksonomy—a user-driven and fluid form of subject classification. Taxonomies are “hierarchical and exclusive” (Golder & Huberman, 2005, para. 8); folksonomies and the tagging which produces them are “neither exclusive nor hierarchical” (Golder & Huberman, 2005, para. 9). Taxonomies are meant to be precise and unambiguous; folksonomies can become confusing as users “apply the same tag in different ways” (Mathes, 2004, p. 5).

Librarians, particularly those who catalog collections, have long maintained that the controlled vocabularies they employ and the consistent application of the Dewey and Library of Congress classifications work to everyone’s advantage. Because they are created by the information providers, they are comfortable to those providers; information seekers who are familiar with the systems can, at least in theory, easily locate materials through an OPAC, and those who are using print collections can physically browse collections of related materials.

Those who see value in folksonomies see them as natural extensions of the Web/Library 2.0 world in which an information source—a document, an online journal article, a website, an audio file, or a photograph, for example—does not physically reside in one place and does not, therefore, need to be classified in only one way. The same source can be tagged in any number of ways by any number of users, and the users themselves help determine which tags are most

useful to them. Because folksonomies are created by the users, folksonomies employ vocabulary familiar to and comfortable for those users (Mathes, 2004, p. 7).

While it would be easy to become bogged down in an argument as to which best serves an information seeker's needs—taxonomies, which have resulted from careful and long-term deliberations, or folksonomies, which result from communities of users quickly contributing their own tags—it turns out that both systems develop a level of stability which assists users. Just as taxonomies produce systems which are consistent among their users, tagging, within brief periods of time, also results in a “stable pattern in which the proportions of each tag are nearly fixed” (Golder, 2005, para. 60). Users, in other words, reach a level of agreement among themselves as to which tags are most effective in helping them locate what they need, and these are the tags they most frequently use.

There is a potentially rewarding opportunity for those who refuse to make an absolute and irrevocable choice between taxonomies and folksonomies: paying attention to the folksonomies created by information seekers can help catalogers make taxonomies more useful; this hybrid of taxonomies and folksonomies updates and enriches the information-seeking experience (Pu & Yang, 2003, p. 139) and reflects the collaborative and community-building spirit of the Web/Library 2.0 world.

This is exactly the direction proposed by a Library of Congress working group which is comprised of librarians and information professionals from Google, OCLC, Microsoft, and the Coalition for Networked Information. They suggest that bibliographic control “will be collaborative, decentralized, international in scope and Web-based. Its realization will occur in

cooperation with the private sector, and with the active collaboration of library users” (Library of Congress Working Group on the Future of Bibliographic Control, 2007, p. 1).

They also see Machine-Readable Cataloging (MARC) records as an old system which “is out of step with programming styles of today” and call for a new format (Library of Congress Working Group on the Future of Bibliographic Control, 2007, p. 21). Their goal is to create a system which recognizes that “people are not the only users of the data we produce in the name of bibliographic control, but so too are machine applications that interact with those data in a variety of ways” (Library of Congress Working Group on the Future of Bibliographic Control, 2007, p. 2).

One final advantage to incorporating folksonomies into information retrieval is the potentially lower cost. Creating and using taxonomies to produce bibliographic records is a time-consuming and labor-intensive effort. The cost of cataloging at this level is going to increase for organizations including the Library of Congress as large numbers of catalogers near the age of retirement; to replace them requires a “major investment in recruitment and training” (Library of Congress Working Group on the Future of Bibliographic Control, 2007, p. 4). Employing folksonomies reduces the time and effort necessary to help information seekers reach their goal while still capturing “non-trivial and important metadata” (Mathes, 2004, p. 8) to help those who are using OPACs and SOPACs.

The (R)evolution from OPACs to SOPACs

Library catalogs are facing two simultaneous revolutions which may ultimately benefit information seekers: the OPAC’s declining role as a heavily used resource for information retrieval, and the (r)evolution from OPACs into SOPACs. Some librarians are among the first to

concede that their library catalog “is poorly designed for the tasks of finding, discovering, and selecting the growing set of resources available in our libraries” (Bibliographic Services Task Force, 2005, p. 2). Information seekers agree, and “routinely bypass library catalogs in favor of other discovery tools” (Calhoun, 2006, p. 5). Proposed solutions to the catalog’s diminishing use include a major revision to the *Anglo-American Cataloging Rules* scheduled for release in 2009 (Krause, 2007, pp. 66-67); efforts to make library metadata accessible to any search engine which is seeking it (Bibliographic Services Task Force, 2005, p. 16); and Web/Library 2.0 user-centered systems which would help users of library catalogues locate what they want regardless of whether it is in the library, available for purchase in a campus bookstore or other community retail outlet, accessible through intra- or interlibrary loans, or retrievable online (Bibliographic Services Task Force, 2005, p. 12).

Underlying the various solutions is librarians’ willingness to embrace some of the social networking collaborations encouraged through Web/Library 2.0 tools. The Ann Arbor District Library in Ann Arbor, Michigan, for example, was among those taking the lead in incorporating user tagging systems into their OPAC displays this year. John Blyberg and his colleagues in Ann Arbor created a Social OPAC ([SOPAC](#)) capable of displaying lists or visually appealing “clouds” of the search terms similar to those created by users of del.icio.us.

Innovative Interfaces, Inc. has also joined the (r)evolution through its release of Encore, a SOPAC which includes federated and faceted searching; tag clouds drawn both from a library’s own catalog and from tags suggested by library users; and patron ratings and reviews. The slowness of online catalog searching is disappearing, through Encore, with the use of AJAX (Asynchronous JavaScript and XML) technology so that the information seekers does not have

to wait for a search to be finished before any results are displayed; AJAX displays whatever is immediately available and continues very quickly providing results while the user reviews what is immediately visible. Encore also incorporates features which information seekers have grown to expect from Amazon and other online information sources: graphic reproductions of book covers, access to reviews, and context-sensitive linking so that information seekers do not reach dead ends in their searching (Innovative Interfaces, Inc, 2006, pp. 1-8).

It does not take much to see how libraries throughout the world stand to gain from the (r)evolution which Blyberg, Innovative Interfaces staff, and many others are helping to foster. The University of California Libraries group, in its massive report, has suggested ways of “Rethinking How We Provide Bibliographic Services for the University of California” (University of California Libraries, 2005). Cornell University Library issued a final report for the Library of Congress to document “The Changing Nature of the Catalog and its Integration with Other Discovery Tools” (Calhoun, 2006). Monash University provided a report on “Directors’ Views on the Future of Cataloging in Australia/New Zealand” (Warren, 2007). Numerous bloggers are posting news on an ongoing basis to document the latest innovations in OPACs and SOPACs—those systems using social software under the Web 2.0 umbrella (Blyberg, 2007; Houghton-Jan, 2007; Signorelli, 2007).

And librarians are right there, with their users, to explore the possibilities in an effort to maintain the key roles libraries and librarians continue to play as community centers for information retrieval in the global community.

Information Retrieval in a Web/Library 2.0 World

Information seekers, including the writer of this paper, have myriad options including, but not limited to, physical and digital libraries. A typical day might begin with the flow of information through email messages retrieved and sent; among the messages received on one recent day were the latest edition of the American Library Association's weekly e-newsletter, *American Libraries Direct*, which provided links to full-text newspaper and magazine articles. A review of email was followed by a session in Netvibes, an online aggregator which allows users to personally set up, view, and access links to a variety of online information sources including newspaper websites, blogs, a weather report, and even an online service providing current currency rates for countries throughout the world. Within moments, I had skimmed headlines from the online versions of *The New York Times*, *The Los Angeles Times*, *The Jerusalem Post*, *The Japan Times*, and *Il corriere della sera*, and viewed full-text versions of any articles which were immediately of interest to me. I had also used Netvibes to skim RSS feeds from writers including Sarah Houghton-Jan (the Librarian in Black) and Char Booth (the "infomational" blog covering a variety of library-related topics) as well as from a website dedicated to articles of interest to those interested in learning more about currently available "tools, models and ideas for building a better future" (Worldchanging.com Website, para. 1). Print media were far from absent during that typical day: while sitting in a neighborhood coffee shop, I skimmed *The New York Times* and articles obtained from online databases available through the San Francisco Public Library and the San Jose State University Library, and returned to sections of Fritjof Capra's latest book, *The Science of Leonardo*, Richard Florida's *The Flight of the Creative*

Class, and Beppe Severgnini's latest book of essays, *L'italiano: Lezioni semiserie (Italian: Semiserious Lessons)* in an original Italian-language version mailed to me by a friend in Italy.

Other information sources and tools to organize information were also available and useful throughout the day: personal acquaintances available by telephone, email, and Skype; online library catalogs; books and articles from my own personal library; websites to which colleagues referred me for other material which I need; and del.icio.us, an online bookmarking function which in some ways provides an online parallel to information seekers' personal libraries of books, magazines, phonograph records, videocassettes, DVDs, and CDs.

This summary of information sources accessed during a single day raises a question with a readily apparent answer: What does it mean to seek information in a Web 2.0 world? The same that it does at any other time in our history: use all available resources; decide which of them are most appropriate for any given task; be grateful for the options available through personal contacts, access to online resources, and the libraries and librarians who continue to provide assistance in information retrieval; and be willing to take an ever-expanding view of what a library is and can be.

The online bookmarking capabilities of del.icio.us serve as one source of inspiration for those willing to expand the definition of the word "library." While at first glance del.icio.us is little more than a convenient expansion of the bookmarking function of Internet browsers, it can also be seen as the contemporary equivalent to a traditional home library in that the individual links bookmarked through del.icio.us provide content: online books; full-text access to newspapers and magazines published throughout the world; music; and information sources such as online instructional materials which are beyond the scope of most pre-Web/Library 2.0 home

libraries. It might also, for exactly the same reason, be seen either as a virtual library or even a digital library in the sense that a user's account/library is accessible anywhere regardless of geography—as long as the user has access to the Internet.

Even more expansive definitions of the word “library” are becoming apparent to Web/Library 2.0 information seekers, as visits to four online sites (the San Francisco State University J. Paul Leonard Library Social OPAC, which incorporates LibraryThing into the online catalog displays seen by Library users; the Internet Public Library; the Second Life Library; and Wikipedia) in October and November 2007 showed. There are obvious consistencies between these sites and what brick and mortar library buildings offer: in their own ways, they are dedicated to collecting, preserving, and making information available to library users, and they incorporate the Web/Library 2.0 philosophy of encouraging user interactions at various levels.

J. Paul Leonard Library Electronic Resources Coordinator John Wenzler provides an overview of how the incorporation of LibraryThing into displays on the Library's SOPAC can combine the expertise of librarians' taxonomies with “the wisdom of library patrons” folksonomies (Wenzler, 2007, p. 1). It begins by providing Library users with a higher degree of interactivity with each other than is possible in a traditional OPAC. Users' recommendations and tags drawn from their LibraryThing accounts augment what librarians provide through their own cataloging efforts, the cost at this point is only \$1,800 per year, and the combination of LibraryThing with the Library's catalog connects customers' recommendations to Library holdings .

Moving from brick-and-mortar into less tangible worlds, information seekers and librarians are finding common virtual ground through places like the Internet Public Library (IPL). It offers a well designed gateway page, a clear listing of links to its various resources from its gateway page, and links designed to help users contact Library representatives for help. Visitors to the site's homepage find an easy-to-navigate list of subjects from which to choose, a list of pathfinders to help users find what they are seeking, and help on how to search the site. Links quickly lead users to statements about IPL's mission statement, collection policy, and even information about copyright and reproduction of the Library's resources. Users can find dictionaries, encyclopedias, and almanacs as well as links to a site which has the official minutes of the United States Supreme Court. There are resources specifically designed for children and teens, and there is a "Reading Room" of books and magazines. Choosing a link for something as familiar as "Business" provides links to subtopics including, but not limited to, accounting, agriculture, banking, e-commerce, employment, finance, and other topics an information seeker would expect to find within a physical branch library. The IPL also offers information about how accessible it is to those with disabilities, offers guidance on how teachers and students can effectively use the Library, and offers tours in audio and video formats. There are special collections to explore, and even exhibitions to be viewed.

It is only one more step from this level of digital library to the Second Life Library. Alliance Library System, comprised of more than 250 libraries, established main and medical libraries on Second Life's Info Island in 2006 and already has "attracted eager and enthusiastic librarian volunteers from libraries worldwide" (Grassian & Trueman, 2007, p. 86). Users find that the Library collects digital objects, points to anything that is on the web, and uses a visual

way of representing the collections—providing information seekers with yet another avenue for finding what they want and need. The Second Life Library contains information about Second Life itself—similar to how a town or city library, in its local history section, would have special collections of interest to those who live in the community it serves—as well as many web sites, electronic databases, and open-source texts. The system works with minimal effort and expenditures, and users have the same free and equal access as they do to public library collections. There is even an unfortunate parallel between the virtual library and its more traditional siblings: users face a digital divide in the sense that those who do not have equipment capable of accessing Second Life are at a disadvantage in accessing what is available to them.

A final expansion of the definition of the word “library” might lead from the Second Life Library to Wikipedia as a valuable information retrieval resource. This online encyclopedia can be seen as a virtual library in that it collects, organizes, preserves, and provides information to its users; has subject specialists (Wikipedians); and mirrors the Web/Library 2.0 elements of LibraryThing and Second Life as a medium for the development of communities and the sharing of information in new, innovative ways. Its articles are its collections, and they cover every imaginable topic, in a variety of languages, with continual updating. As Wikipedians and other users create communities where those with similar interests can meet and exchange information, they provide yet another example of a (virtual) place dedicated to free and equal access to information just as traditional brick and mortar libraries are, but in a much larger, global community; they also may well help those in physical libraries to reexamine their definitions of community and information resources as they realize that their patrons include online visitors from all over the world.

Digital libraries such as the Internet Public Library and the New York Public Library's have also become an integral part of information seekers' experience, but there is no reason to believe that they must replace library buildings. Information seekers still find value in returning to print collections to meet some of their needs, and there is little evidence at this point to suggest that significant numbers of information seekers are reading entire books online. What this means for librarians is that they must continue honing their face-to-face reference skills while also becoming adept at meeting online information seekers' needs; they are now helping their customers through email, instant messaging, and even videoconferencing technology such as that provided via Skype at the Ohio University Libraries system since July 2007.

What remains consistent is the need for simplicity and strong attention to usability (Chowdhury, Landoni & Gibb, 2006, p. 668). Serving a more global community of users also dictates that electronic libraries be designed to take into account the cultural and linguistic differences of this large and varied group of patrons (Chowdhury, Landoni & Gibb, 2006, pp. 671-672).

Summary and Conclusions

Libraries and the information seekers they serve are experiencing one of the most significant periods of (r)evolution they have faced in more than a century. Library catalogs are only one of many resources available to information seekers, and those catalogs are not seen as a starting point by the majority of those trying to locate books, periodicals, or other information resources. Even the definition of what libraries are and what they provide is evolving, and all of this may work to the advantage of libraries and those retrieving information throughout the world.

The way libraries process and provide information is changing to reflect the availability of Web/Library 2.0 tools and the needs and desires of those in search of information sources. OPACs are evolving into SOPACs. Information seekers are becoming collaborators in cataloging through their use of tagging in del.icio.us, LibraryThing, and SOPACs such as those available in the Ann Arbor District Library, the San Francisco State University adaptation of LibraryThing, and the rapidly growing number of libraries purchasing Innovative Interfaces' Encore. Large organizations such as University of California and the Library of Congress are listening to their users and considering options which were not under consideration a decade ago, and the usability of basic information retrieval tools including MARC records is being reexamined to find ways to make those tools accessible to larger numbers of web-based information searchers.

The result, for those who work in libraries and for those whom they are serving, is frankly exciting. The collaborations which are underway and the proliferation of easy-to-use information sources mean that libraries and those who staff them still have important roles to play in a Web/Library 2.0 world: the best of the cataloging systems they have been using can be incorporated into users' tags, and tagging itself can help library catalogers simplify access to the treasures which libraries currently house onsite and online.

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