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# Library 2.0 Theory: Web 2.0 and Its Implications for Libraries

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## Abstract

This article posits a definition and theory for "Library 2.0". It suggests that recent thinking describing the changing Web as "Web 2.0" will have substantial implications for libraries, and recognizes that while these implications keep very close to the history and mission of libraries, they still necessitate a new paradigm for librarianship. The paper applies the theory and definition to the practice of librarianship, specifically addressing how Web 2.0 technologies such as synchronous messaging and streaming media, blogs, wikis, social networks, tagging, RSS feeds, and mashups might intimate changes in how libraries provide access to their collections and user support for that access.

## Keywords

Web 2.0, Library 2.0, Blog, Wiki, Streaming media, Social network, Tagging, RSS, Mashup

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## Introduction

While the term is widely defined and interpreted, "Web 2.0" was reportedly first conceptualized and made popular by Tim O'Reilly and Dale Dougherty of O'Reilly Media in 2004 to describe the trends and business models that survived the technology sector market crash of the 1990s (O'Reilly, 2005). The companies, services and technologies that survived, they argued, all had certain characteristics in common; they were collaborative in nature, interactive, dynamic, and the line between the creation and consumption of content in these environments was blurred (users created the content in these sites as much as they consumed it). The term is now widely used and interpreted, but Web 2.0, essentially, is not a web of textual publication, but a web of multi-sensory communication. It is a matrix of dialogues, not a collection of monologues. It is a user-centered Web in ways it has not been thus far.

This characterization of the current state of the Web is at times contended, and though the clear delineation between the first and second Webs is here admitted to be rather arbitrary, it still must be recognized that the Web is indeed evolving into a more interactive, multi-media driven technological space, and this understanding of the term is used in this paper. As [O'Reilly](#) (2005) observes in what is often cited as the seminal work on Web 2.0, personal web-pages are evolving into blogs, encyclopedias into [Wikipedia](#), text-based tutorials into streaming media applications, taxonomies into "folksonomies," and question-answer/email customer support infrastructures into instant messaging (IM) services.

The implications of this revolution in the Web are enormous. Librarians are only beginning to acknowledge and write about it, primarily in the "biblioblogosphere" (weblogs written by librarians). Journals and other more traditional literatures have yet to fully address the concept, but the application of Web 2.0 thinking and technologies to library services and collections has been widely framed as "Library 2.0" ([Miller](#) 2005a; 2005b; 2006a; 2006b; [Notess](#), 2006).

Most writers on Library 2.0 would agree that much of what libraries adopted in the first Web revolution are static. For example, online public access catalogs (OPACs) require users to search for information, and though many are beginning to incorporate Web 2.0 techniques by gathering data regarding a user (checked-out items, preferred searches, search alerts), they do not respond with recommendations, as does Amazon.com, a more dynamic, Web 2.0 service. Similarly, the first generation of online library instruction was provided via text-based tutorials that are static and do not respond to users' needs nor allow users to interact with one another. These, however, have begun evolving into more interactive, media-rich tutorials, using animation programming and more sophisticated database quizzes. Libraries are already moving into Web 2.0, but the move has only just begun.

## Library 2.0

According to [Miller](#) (2005a), "Library 2.0" is a term coined by Michael Casey on his [LibraryCrunch](#) blog. Though his writings on Library 2.0 are groundbreaking and in many ways authoritative, [Casey](#) (2006a) defines the term very broadly, arguing it applies beyond technological innovation and service. In addition to Casey, other blogging librarians have begun conceptually exploring what Library 2.0 might mean, and because of this disparate discussion with very wide parameters, there is some controversy over the definition and relative importance of the term. The nature of this controversy [Lawson](#) (2006), [Peek](#) (2005), and [Tebbutt](#) (2006) explore and begin to adequately rectify, and [Crawford](#) (2006) provides a very thorough account of the ambiguity and confusion surrounding the term, partially suggesting that there is nothing inherently novel about the idea.

This paper attempts to resolve some of this controversy by suggesting a definition and theory for Library 2.0, as well as providing examples of its substantial implications for librarianship. A more exact definition and theory for Library 2.0 is necessary to focus discussion and experimentation within the community, and will be valuable in the implementation of new web-based services in the next several years (it is at this point important to note, as [Breeding](#) (2006) does, that many libraries are still struggling to adopt simple, static web-based services;

interestingly, there are Web 2.0 services, such as the [Public Library Interface Kit](#), or "Plinkit", that could assist in this struggle).

This paper defines "Library 2.0" as "the application of interactive, collaborative, and multi-media web-based technologies to web-based library services and collections," and suggests this definition be adopted by the library science community. Limiting the definition to web-based services, and not library services more generally, avoids potential confusion and sufficiently allows the term to be researched, further theorized, and renders it more useful in professional discourse. The application of Library 2.0 theory to aspects of librarianship reaching beyond Web 2.0 technology is welcome, of course, but should very likely be framed by a different vocabulary. Indeed, [Casey](#) (2006a) recognizes the recurrence of similar ideas throughout library history, and [Hale](#) (1991) provides a landmark discussion of this user-centered philosophy external to web-services. There is simply no need to use the term "Library 2.0" in these environments. It is a much more useful theory if it is focused on web-services, much as [Abrams](#) (2005) has defined it.

A theory for Library 2.0 could be understood to have these four essential elements:

- **It is user-centered.** Users participate in the creation of the content and services they view within the library's web-presence, OPAC, etc. The consumption and creation of content is dynamic, and thus the roles of librarian and user are not always clear.
- **It provides a multi-media experience .** Both the collections and services of Library 2.0 contain video and audio components. While this is not often cited as a function of Library 2.0, it is here suggested that it should be.
- **It is socially rich .** The library's web-presence includes users' presences. There are both synchronous (e.g. IM) and asynchronous (e.g. wikis) ways for users to communicate with one another and with librarians.
- **It is communally innovative.** This is perhaps the single most important aspect of Library 2.0. It rests on the foundation of libraries as a community service, but understands that as communities change, libraries must not only change with them, they must allow users to change the library. It seeks to continually change its services, to find new ways to allow communities, not just individuals to seek, find, and utilize information.

Library 2.0 is a user-centered virtual community. It is a socially rich, often egalitarian electronic space. While Librarian 2.0 might act as a facilitator and provide support, he or she is not necessarily primarily responsible for the creation of the content. Users interact with and create resources with one another and with librarians. In some ways, it is a virtual reality for libraries, a Web manifestation of the library as place. A library's presence on the Web in Library 2.0 includes the presence of that library's constituency and utilizes the same applications and technologies as its community, a concept [Habib](#) (2006) recognizes in a very useful model for Library 2.0 in regards to academic libraries.

While these conceptual tenets of Library 2.0 might be rather dependable, envisioning the technological specifics of the next generation of electronic library services is at once both fraught with inevitable error and absolutely necessary. The details of how the applications so common to Web 2.0 will continue to evolve, and how libraries might utilize and leverage them for their

patrons, are inherently hidden--they are wholly about innovation. But the conceptual underpinning of a library's web-presence and how it must evolve into a multi-media presence that allows users to be present as well, both with the library or librarian and with one another, are clearly in need of development. The following prognostications are, then, more speculative than predictive. They are meant to conceptually explore and provide context to the relationship between the evolving Web and the evolving library, as outlined above, as a means to facilitate innovation and experimentation in library electronic services, and this list is by no means comprehensive.

## **Synchronous Messaging**

This technology has already been embraced quite rapidly by the library community. More widely known as instant messaging (IM), it allows real-time text communication between individuals. Libraries have begun employing it to provide "chat reference" services, where patrons can synchronously communicate with librarians much as they would in a face-to-face reference context.

Many might consider IM a Web 1.0 technology, as its inception predates the technology market crash and it often requires the downloading of software, whereas most 2.0 applications are wholly web-based. It is here considered 2.0 as it is consistent with the tenets of Library 2.0: it allows a user presence within the library web-presence; it allows collaboration between patrons and librarians; and it allows a more dynamic experience than the fundamentally static, created-then-consume nature of 1.0 services. It is also considered 2.0 as it is becoming a more web-based application, and the software used by chat reference services is usually much more robust than the simplistic IM applications that are so popular (they often allow co-browsing, file-sharing, screen-capturing, and data sharing and mining of previous transcripts).

The future of these technologies in the library arena is interesting. By providing this interactive Web service, libraries have positioned themselves to adopt its successors quickly and expertly. Already the text-based nature of IM applications is changing into a more multi-media experience, where audio and video messaging is becoming more common. Even as they provide more multi-sensory experiences, they will become ubiquitous, available throughout the library's web-presence. Already libraries are placing links to their chat reference services within resources themselves, such as at the article level in subscription databases. Much as a patron in a physical library is almost by definition never far from a librarian, chat reference becoming more pervasive could provide a similar circumstance in the world of the Web. The time is perhaps not far away when chat reference can take place within the framework of the library network, providing a more seamless experience.

Further, it is conceivable that should a user allow such a service, these chat reference services can be prompted when certain user seeking behaviors are detected. For instance, as a user browses through certain resources, repeating steps and moving cyclically through a classification scheme or series of resources, a synchronous messaging service could be prompted to offer assistance. The physical counterpart to this is of course a patron wandering in book stacks, and a librarian, sensing their aimlessness, offering help. Library 2.0 will know when users are lost, and will offer immediate, real-time assistance.

Libraries may do well to continue adopting this technology as it evolves, as it allows reference services in an online media to closely approximate the more traditional services of the physical library. The time will almost certainly soon come when Web reference is nearly indistinguishable from face-to-face reference; librarians and patrons will see and hear each other, and will share screens and files. In addition, the transcripts these sessions already provide will serve library science in ways that face-to-face reference never did. For the first time in the history of libraries, there will be a continuously collected transcription of the reference transaction, always awaiting evaluation, analysis, cataloging, and retrieval for future reference.

## **Streaming Media**

The streaming of video and audio media is another application that many might consider Web 1.0, as it also predates Web 2.0 thinking and was widely employed before many of the following technologies had even been invented. But for reasons similar to synchronous messaging, it is here considered 2.0. Certainly, for libraries to begin maximizing streaming media's usefulness for their patrons, 2.0 thinking will be necessary.

As mentioned, library instruction delivered online has begun incorporating more interactive, media-rich facets. The static, text-based explanation coupled with a handout to be downloaded is being supplanted by more experiential tutorials. The Association of College and Research Libraries' Instruction Section provides a database of tutorials, many of which are Web 2.0 in their nature, called [Peer Reviewed Instructional Materials Online](#) (PRIMO).

Many of these tutorials use Flash programming, screen-cast software, or streaming audio or video, and couple the media presentation with interactive quizzing; users respond to questions and the system responds in kind. These tutorials are perhaps the first of library services to migrate into more the more socially rich Web 2.0. Most, if not all, however, do not generally provide a means by which users can interact with one another, nor directly with librarians. This fact marks a possible potential for the continued development of these tutorials. These could take the form of multi-media chat rooms or wikis, and users will interact with one another and the learning object at hand, much as they would in a classroom or instruction lab.

Another implication of streaming media for libraries is more along the lines of collections instead of services. As media is created, libraries will inevitably be the institutions responsible for archiving and providing access to them. It will not be enough to simply create "hard-copies" of these objects and allow users to access them within the confines of the library's physical space, however. Media created by the Web on the Web belongs on the Web, and libraries are already beginning to explore providing such through digital repository applications and digital asset management technologies. Yet these applications are generally separate from the library's catalog, and this fracture will need to be mended. Library 2.0 will show no distinction between or among formats and the points at which they may be accessed.

## **Blogs and Wikis**

Blogs and wikis are fundamentally 2.0, and their global proliferation has enormous implications for libraries. Blogs may indeed be an even greater milestone in the history of publishing than

web-pages. They enable the rapid production and consumption of Web-based publications. In some ways, the copying of printed material is to web-pages as the printing press is to blogs. Blogs are HTML for the masses.

The most obvious implication of blogs for libraries is that they are another form of publication and need to be treated as such. They lack editorial governance and the security this provides, but many are nonetheless integral productions in a body of knowledge, and the absence of them in a library collection could soon become unthinkable. This will, of course, greatly complicate collection development processes, and the librarian will need to exercise a great deal of expertise and fastidiousness when adding a blog to a collection (or, perhaps, an automated blog-collection development system). Or, perhaps the very notions of "reliable" and "authoritative", so important to collection development, will need to be rethought in the wake of this innovation.

Wikis are essentially open web-pages, where anyone registered with the wiki can publish to it, amend it, and change it. Much as blogs, they are not of the same reliability as traditional resources, as the frequent discussions of [Wikipedia](#) (an online encyclopedia where any registered user can write, amend or otherwise edit articles) in the library world well note; but this of course does not eliminate their value, it merely changes librarianship, complicates collection development and information literacy instruction. The lack of peer review and editorship is a challenge to librarians, not in that users should avoid wikis, but only in that they should understand and be critical in depending on them. Wikis as items in a collection, and the associated instruction of users in the evaluation of them, are almost certainly part of the future of libraries.

In addition, a library wiki as a service can enable social interaction among librarians and patrons, essentially moving the study group room online. As users share information and ask questions, answer questions, and librarians do the same within a wiki, a record of these transactions is archived perhaps for perpetuity. And these transcripts are in turn resources for the library to provide as reference. Furthermore, wikis and blogs will almost certainly evolve into a more multi-media environment as well, where both synchronous and asynchronous audio and video collaborations will take place. Blogs are new forms of publication, and wikis are new forms of group study rooms.

Ultimately, blogs and wikis are relatively quick solutions for moving library collections and services into Web 2.0. This beginning of Library 2.0 makes collections and services more interactive and user-centered, enable information consumers to contact information producers and become co-producers themselves. It could be that Library 2.0 blurs the line between librarian and patron, creator and consumer, authority and novice. The potential for this dramatic change is very real and immediate, a fact that places an incredible amount of importance on information literacy. In a world where no information is inherently authoritative and valid, the critical thinking skills of information literacy are paramount to all other forms of learning.

## **Social Networks**

Social networks are perhaps the most promising and embracing technology discussed here. They enable messaging, blogging, streaming media, and tagging, discussed later. [MySpace](#), [FaceBook](#),



[Del.icio.us](#), [Frappr](#), and [Flickr](#) are networks that have enjoyed massive popularity in Web 2.0. While MySpace and FaceBook enable users to share themselves with one another (detailed profiles of users' lives and personalities), Del.icio.us enables users to share Web resources and Flickr enables the sharing of pictures. Frappr is a bit of a blended network, using maps, chat rooms, and pictures to connect individuals.

Other social networks are noteworthy as well. [LibraryThing](#) enables users to catalog their books and view what other users share those books. The implications of this site on how librarians recommend reading to users are apparent. LibraryThing enables users, thousands of them potentially, to recommend books to one another simply by viewing one another's collections. It also enables them to communicate asynchronously, blog, and "tag" their books.

It does not require much imagination to begin seeing a library as a social network itself. In fact, much of libraries' role throughout history has been as a communal gathering place, one of shared identity, communication, and action. Social networking could enable librarians and patrons not only to interact, but to share and change resources dynamically in an electronic medium. Users can create accounts with the library network, see what other users have in common to their information needs, recommend resources to one another, and the network recommends resources to users, based on similar profiles, demographics, previously-accessed sources, and a host of data that users provide. And, of course, these networks would enable users to choose what is public and what is not, a notion that could help circumvent the privacy issues Library 2.0 raises and which [Litwin](#) (2006) well enumerates.

Of all the social aspects of Web 2.0, it could be that the social network and its successors most greatly mirror that of the traditional library. Social networks, in some sense, are Library 2.0. The face of the library's web-presence in the future may look very much like a social network interface.

## **Tagging**

Tagging essentially enables users to create subject headings for the object at hand. As [Shanhi](#) (2006) describes, tagging is essentially Web 2.0 because it allows users to add and change not only content (data), but content describing content (metadata). In Flickr, users tag pictures. In LibraryThing, they tag books. In Library 2.0, users could tag the library's collection and thereby participate in the cataloging process.

Tagging simply makes lateral searching easier. The often-cited example of the U.S. Library of Congress's Subject Heading "cookery," which no English speaker would use when referring to "cookbooks," illustrates the problem of standardized classification. Tagging would turn the useless "cookery" to the useful "cookbooks" instantaneously, and lateral searching would be greatly facilitated.

Of course, tags and standardized subjects are not mutually exclusive. The catalog of Library 2.0 would enable users to follow both standardized and user-tagged subjects; whichever makes most sense to them. In turn, they can add tags to resources. The user responds to the system, the

system to the user. This tagged catalog is an open catalog, a customized, user-centered catalog. It is library science at its best.

## **RSS Feeds**

[RSS feeds](#) and other related technologies provide users a way to syndicate and republish content on the Web. Users republish content from other sites or blogs on their sites or blogs, aggregate content on other sites in a single place, and ostensibly distill the Web for their personal use. Such syndication of content is another Web 2.0 application that is already having an impact on libraries, and could continue to do so in remarkable ways.

Already libraries are creating RSS feeds for users to subscribe to, including updates on new items in a collection, new services, and new content in subscription databases. They are also republishing content on their sites. [Varnum](#) (2006) provides a blog that details how libraries use RSS feeds for patron use.

But libraries have yet to explore ways of using RSS more pervasively. A new product from a company called BlogBridge, [BlogBridge: Library](#) (BBL), "is a piece of software that you can install on your own server, inside your firewall. It's not the content of the library (the books), it's the software to organize the library (the building)." While BBL's potential for libraries has yet to be determined due to its being brand new, it is conceivable that this syndication will replace browsing and searching through library websites for content. BBL and similar RSS aggregator applications, installed in a library's system and coupled with the social network of the library, will enable users to have a single, customized, personal library page that syndicates all the library content of interest to them and their research, eliminating irrelevant information. And users will, of course, control that page and that content.

## **Mashups**

[Mashups](#) are perhaps the single conceptual underpinning to all the technologies discussed in this article. They are ostensibly hybrid applications, where two or more technologies or services are conflated into a completely new, novel service. [Retrivr](#), for example, conflates Flickr's image database and an experimental information architecture algorithm to enable users to search images not by metadata, but by the data itself. Users search for images by sketching images. In some ways, many of the technologies discussed above are mashups in their very nature. Another example is [WikiBios](#), a site where users create online biographies of one another, essentially blending blogs with social networks.

Library 2.0 is a mashup. It is a hybrid of blogs, wikis, streaming media, content aggregators, instant messaging, and social networks. Library 2.0 remembers a user when they log in. It allows the user to edit OPAC data and metadata, saves the user's tags, IM conversations with librarians, wiki entries with other users (and catalogs all of these for others to use), and the user is able to make all or part of their profile public; users can see what other users have similar items checked-out, borrow and lend tags, and a giant user-driven catalog is created and mashed with the traditional catalog.

Library 2.0 is completely user-centered and user-driven. It is a mashup of traditional library services and innovative Web 2.0 services. It is a library for the 21st century, rich in content, interactivity, and social activity.

## Conclusion

All together, the use of these Web 2.0 technologies and applications, along with others not here mentioned and others not yet invented, will constitute a meaningful and substantive change in the history of libraries. The library's collection will change, becoming more interactive and fully accessible. The library's services will change, focusing more on the facilitation of information transfer and information literacy rather than providing controlled access to it. This paper posits four conceptual underpinnings to Library 2.0: it is user-centered; a multi-media experience; socially rich; and communally innovative. It also espouses a focused definition for the term: "The application of interactive, collaborative, and multi-media web-based technologies to web-based library services and collections."

The best conception of Library 2.0 at this point in time would be a social network interface that the user designs. It is a personalized OPAC that includes access to IM, RSS feeds, blogs, wikis, tags, and public and private profiles within the library's network. It is virtual reality of the library, a place where one can not only search for books and journals, but interact with a community, a librarian, and share knowledge and understanding with them. Library 1.0 moved collections and sparse services into the online environment, and Library 2.0 will move the full suite of library services into this electronic medium. The library has had a web-presence for many years, and with Library 2.0, its patrons will be joining it.

While Library 2.0 is a change, it is of a nature close to the tradition and mission of libraries. It enables the access to information across society, the sharing of that information, and the utilization of it for the progress of the society. Library 2.0, really, is merely a description of the latest instance of a long-standing and time-tested institution in a democratic society. Web 2.0 and libraries are well suited for marriage, and many librarians have recognized so.

Despite this change fitting so well with the history of libraries and their mission, it is still a major paradigmatic shift for librarianship to open not just access to their catalogs and collections, but access to their control. Library 2.0 demands libraries focus less on secured inventory systems and more on collaborative discovery systems. There is perhaps a great synchronicity between librarianship and Web 2.0, but viewed holistically, Library 2.0 will revolutionize the profession. Rather than creating systems and services for patrons, librarians will enable users to create them for themselves. A profession steeped in decades of a culture of control and predictability will need to continue moving toward embracing facilitation and ambiguity. This shift corresponds to similar changes in library history, including the opening of book stacks and the inclusion of fiction and paperbacks in the early 20<sup>th</sup> century.

Library 2.0 is not about searching, but finding; not about access, but sharing. Library 2.0 recognizes that human beings do not seek and utilize information as individuals, but as communities. Some examples of the move from Library 1.0 to Library 2.0 include:

- Email reference/Q&A pages ---> Chat reference
- Text-based tutorials ---> Streaming media tutorials with interactive databases
- Email mailing lists, webmasters ---> Blogs, wikis, RSS feeds
- Controlled classification schemes ---> Tagging coupled with controlled schemes
- OPAC ---> Personalized social network interface
- Catalog of largely reliable print and electronic holdings ---> Catalog of reliable and suspect holdings, web-pages, blogs, wikis, etc.

It is, finally, also necessary to consider that the Web will continue to change rapidly for some time. Web 2.0 is an early one of many. Libraries must adapt to it, much as they did the Web originally, and must continually adapt for the foreseeable future. In this "perpetual beta" (O'Reilly, 2005), any stability other than the acceptance of instability is insufficient.

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