Libraries in a Web 2.0 environment

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1. Introduction

In this last decade, libraries, learning resource centres and information services in general have made a great stride in being able to play a leading role in society. These, along with organisations that manage information, have had to integrate the necessary technological changes to adapt to the new challenges. For this, they have made important investments in technology, to update their infrastructure, and in training their personnel. The current online presence of information services is important and in continuous evolution, just like the Web itself.

The current web, which includes the traditional web and the so-called Web 2.0 or Social Web, is increasingly based more on the active role of its user. Users are no longer simple consumers of contents and services, but have become an active part in its development by producing and sharing all sorts of contents.

Information services play a key role in this new stage of the Web, and this opportunity should not be passed. But we must also keep in mind that this involves challenges that go beyond technology, since it mainly involves a change in attitude on behalf of the libraries. Besides the implementation of the tools and services of the Web 2.0, it involves a study and plan, since not all tools work for all units of information or type of user. Blogs, wikis, social bookmarks, social networks and RSS are just some of the possibilities for integration of these types of services into libraries and other document information centres.

The following section presents the Web 2.0 and technologies used by citing some of the most successful services amongst users. Then we focus on Libraries 2.0, where we describe its defining aspects by surveying the new focuses in library services that involve Web 2.0, citing some leading libraries in the matter. To conclude, we discuss some of the weak points libraries face when using 2.0 technologies.

2. Web 2.0

The Web 2.0 can be summarised as the natural evolution of the Web, with its foundations in the development of services that focus on users and their active participation.We are not discussing a parallel or alternative Web; we are discussing new functions that allow for greater interactivity and connections between users (O'Reilly, 2005).

The term Web 2.0 was coined by Dale Dougherty (O'Reilly Media) and Craig Cline (MediaLive) in 2004 when they performed a study on the web and confirmed that after the downfall of the dot.com companies, those that survived offered new services based on applications that created dynamic pages and interaction with the user .

Some characteristics that define the Web 2.0 include:

1. The web as a platform; many services have stopped using closed applications and now offer them online so that they can be used from any location.
2. The web as an expression of collective intelligence; users edit and publish contents that are linked from other users, creating an interlinked network.
3. The web as participative architecture; the web does not depend on large organisations to have contents, but on the user collective. A clear example is Wikipedia, which is now a competitor of other prestigious encyclopaedias like Britannica Online.
4. The web as a decentralised system, to make room for the majority of users (Long Tail) that use very specific services and websites. Collaborative management of the information allows one to access not only the contents with the greatest repercussion, but also the many contents with a smaller audience.

2.1. 2.0 Technologies

The technologies used in Web 2.0 may be classified on two levels. The 1 st level groups technological resources used to create a final product: languages, systems and other tools that allow the professional to develop or adapt applications. The 2 nd level represents the final products, created from technology based on the 1 st level.

2.1.1. Level 1 technology

1. Ajax (Asynchronous JavaScript and XML) is a combination of XML and JavaScript that allows for the creation of dynamic web applications that are executed on the client, thus reducing data traffic and the server's work load (Margaix, 07a).

2. API (Application Programming Interface) is a software communication interface, which is a set of functions and procedures that allow different software to communicate with each other. This way software can be used to generate different applications, exploiting its functions without having to reprogram everything again.

3. Mashup is a hybrid web application that uses content from other Web applications to create a new complete content. The content used on a mashup is third party, allowing for simultaneously viewing of content from different suppliers.

4. P2P (Peer-to-peer) this involves a network without fixed clients or servers. Instead it is a series of nodes that are simultaneously shared as clients and servers of the other Internet nodes. This way, the system is completely decentralised.

5. RSS (Really Simple Syndication) is a data format used to syndicate or distribute contents to subscribers of a website. This format facilitates the distribution of news on a website without the need for visiting all of the pages. The format is in XML, thus requiring an RSS feed or reader to be able to view the contents.

6. XML (Extended Markup Language) is an extensible tag meta-language developed by W3C. This is not a unique language, but a way of defining languages for different needs. XML is a standard for the exchange of information structured between different platforms. This involves simple technology that includes others that complement it and make it stronger.

Level 2 technology

1. Social Networks. These are "web services" that allow individuals to create a public or semi-public profile within the online platform, while also allowing for the definition of a list of users which share some form of contact" (Arroyo, 08).

2. Blogs. The Wikipedia defines a weblog, also known as blog, as a periodically updated website that compiles texts or articles from one or several authors in chronological order. In each article the readers can write their comments and the author can provide a response, so that a dialogue can be established. Blogs may be classified thematically or by use, and may be personal, journalistic, educational, technological, commercial, etc. The latest trend is microblogs that allow for communication via brief multimedia messages (140 characters max.) with personal or commercial aims.

3. Wiki. This is a type of website where users create, edit, delete or change content; this is an interactive, easy and quick way to make a webpage. All of these facilities make a wiki an effective tool for collaborative writing; a clear example is the Wikipedia.

4. Social BookMarks. These allow you to share personal lists of "favourites" via a public web page, so that other users can participate collaboratively in creating the list of common links. The incorporation of new links means the tagging with keywords that facilitate the classification of the website.

5. Podcast. This is the syndication of sound files, usually MP3, with an RSS system, allowing users to subscribe and automatically and periodically download files.

2.2. Examples of 2.0 services

Some of the most representative and successful products and services are:

1. Amazon (http://www.amazon.com/): a U.S. online sales company that started as a virtual bookshop. One of its successes arises from the use of technology to provide users with a personalised purchasing experience.

2. Delicious (http://delicious.com/): A social bookmark management service. This allows you to add bookmarks that were classically saved on your browser and categorise them with a folksonomies tag system.It also allows for sharing them with other users on the system, indicating which users have which links saved on their bookmarks.

3. Facebook (http://www.facebook.com/): This is a social network that allows you to connect with people. The idea consists in creating communities where people share their interests and contents. Its great success is due to its platform where third parties can develop applications and do business from the social network.

4. Flickr (http://www.flickr.com/): A web site to share photographs and images. Currently it is one of the main photo deposits at a non-commercial level.

5. YouTube (http://www.youtube.com/): A website allowing users to share digital videos online. It uses Adobe Flash to serve its content, making digital copying difficult.

6. Wikipedia (http://www.wikipedia.org/): The free-content encyclopaedia open for everybody to participate in its creation.

3. 2.0 Libraries

The same way in which the Web 2.0 concept arose, Library 2.0 was coined to refer to the idea of participation and interaction between users and librarians (Casey, 06 and Miller 05). The term "Library 2.0" was coined in 2005 by Michael Casey in his blog LibraryCrunch (http://www.librarycrunch.com). We use this term, Library 2.0, to not only refer to libraries as we know them, but in a more inclusive sense including all learning resource centres and

all document information services in general.

Casey's blog, along with Michael Stephens', Tame the web (http://tametheweb.com) , and ALA's, TechSource (http://www.techsource.ala.org), are three main information sources to see how this concept and new trends are being developed.

The term started to be used mainly in the field of Anglo-Saxon public libraries, even though they quickly spread throughout the academia (Habib, 2006) and internationally.

Libraries 2.0 suppose changes at various levels: in technology, processes and attitudes to reduce the barriers users face when accessing information. This idea represents a significant change in how library services are seen and administered, where concepts like usability, interoperability and flexibility of library systems are key.

The 2.0 philosophy is the great opportunity for libraries to be closer to their users, knowing their interests and their needs, and offering what they expect in the best possible way.

The key aspects of the Library 2.0 are defined by the following points:

1. a user-centered design
2. a pattern's search to make room for the majority of users
3. contents come from different sources and their integration must be facilitated.
4. attempt to use the collective intelligence
5. integration of different software is usually required
6. the use of web 2.0 applications is common
7. the use of free software is common

3.1. New focuses for library services

The development of libraries and the permanent evolution of Web applications provide an opportunity to redesign the services offered by libraries with the aim of improving their quality and fomenting user participation (Stephens, 07).

The non-profit Online Computer Library Center (OCLC) has published a report on the emerging realities on the web and what their implications are for libraries (OCLC, 07

Below we will show some of the services and ways of implementing current Web 2.0 trends into libraries.

3.1.1. OPAC 2.0

Of all online services offered by the library, the catalogue is what generates the most visits to the website, and possibly what requires the most investment in time and money. OPAC 2.0 tries to take advantage of the users' potential to enrich their contributions and thus increase the catalogue's value.

The different functions of a catalogue 2.0 may be grouped into the following points:

1. Information architecture. Allows for more than just the traditional information usually included in catalogues, like the covers, the index and a summary. It also includes the organisation of the information by facets and groups.
2. Personalisation. Each user can personalise the way they view the OPAC: Organise their registries in folders and assign tags, configure the searches that they perform regularly and subscribe to a RSS to get any news on the topic.
3. Interaction between users It enables the creation of groups of users with similar interests, allowing for different levels of relationships between them by establishing different levels of privacy.
4. Interoperability and the syndication of contents. It allows for the link to external services, for example with bibliographical reference managers, purchasing books, etc. There is also the option of predefining RSS channels to disseminate the user's contents: news, topics, authors.
5. Analyse the use of information. With this the system can recommend other books that a user may be interested in, as established from other similar users' search and loan information. It is also worth noting the registries relative to the popularity by being able to see if they have been marked as favourites, or if they have been loaned or downloaded often by other users.

The majority of catalogues are built on systems that do not admit these new 2.0 characteristics. The way to implement these new characteristics in the OPAC are one of the next options:

1. Incorporating 2.0 characteristics in cataloguing systems.

Some systems have developed 2.0 applications for the catalogue within the system, allowing for comments on the registers (for example WorldCat.org), adding tags and voting.

2. Externalising OPAC's 2.0 characteristics

By recurring to systems external to OPAC. These external interfaces help the user search and interact with the catalogue and its 2.0 functions. An example of this interface is AquaBrowser (figure 1) from the Dutch company Medialab Solutions. This system is used throughout the world and is compatible with library management systems. It incorporates faceted searches, cloud tags, social recommendations and the option of commenting on registers and voting on them.

Figure 1. Example of Aquabrowser at the Dallas Independent School District, http://aqua.dallasisd.org/aquabrowser/

LibraryThing (http://www.librarything.es) (figure 2) is another system that allows externalising social characteristics on library catalogues. It has two different uses: at a personal level, it allows users to create their own bibliographic collections online by importing catalogued data from Amazon and a large number of libraries the system accesses. Each user can add tags, comment and give them a score, include book covers and create discussion groups to their own collections. On the other hand, libraries can use them to create their catalogue, like some American universities have already done (Andrews University, Danbury... you can see the complete list at http://www.librarything.com/wiki/index.php/LTFL:Libraries_using_LibraryThing_for_Libraries). In this system both the users and librarians can add tags and comments, and even comments from other LibraryThing users can be seen (even from users not belonging to the library).

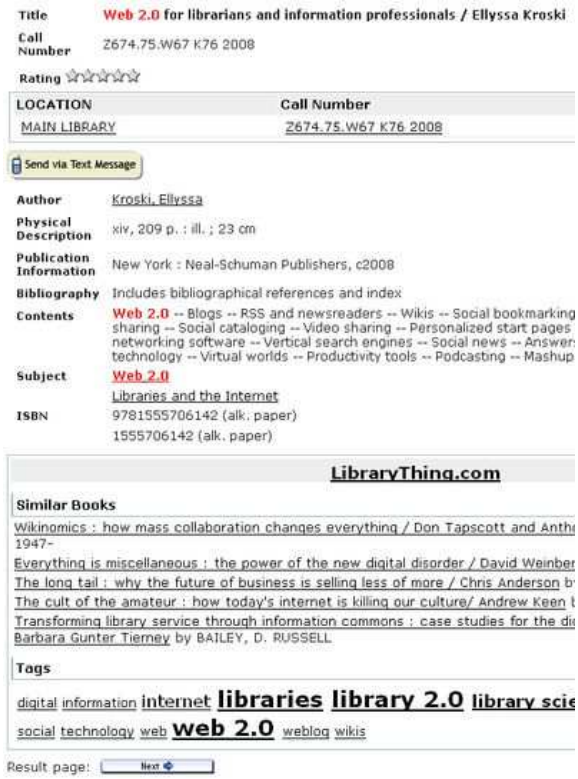

Figure 2. The University of Mississippi has included a part of LibraryThing into their catalogue. This can be seen at http://umiss.lib.olemiss.edu/

On the other hand, VuFind (http://www.vufind.org) (figure 3) allows to create a catalogue with an external module. In this case it involves open and free software that functions on the system that the library already operates with. It includes the most popular 2.0 functions: commenting, tagging and bookmarking items as favourites. There is a Vu Find demo available at: http://www.vufind.org/demo/

Figure 3. The Illinois, Consortium of Academic & Research Libraries in Illinois is using this system. It can be seen at http://umiss.lib.olemiss.edu/.

3. Creating a software catalogue with 2.0 applications

To conclude with these options developed for 2.0 OPACs we must highlight the possibility of building OPACs directly with 2.0 applications. Scriblio (http://about.scriblio.net/) (figure 4), previously called WPOPAC since it was a Word Press platform, is an open content manager system designed to build OPACs. You can see the end-result in the Plymouth State University's library catalogue (http://library.plymouth.edu), amongst many others.

Figure 4. Hong Kong's Science and Technology University has implemented Scriblio, as seen at http://catalog.ust.hk/catalog/smartcat.php

3.1.2. Social Networks

The use of Social networks have shown an great increase in this last year. They can be classified following different criteria in accordance to their audience and purpose. The many existing networks make it difficult to maintain an updated the profile in each of them, and this is why the libraries usually choose just one. Currently the trend (Margaix, 08) in university libraries is to choose Facebook, while public libraries use more MySpace.

The use that the library may make of them varies; below we cite some examples:

1. integrate RSS channels in web pages.
2. include instant messaging in web pages, useful for offering online reference services.
3. recommend and highlight books in web pages.
4. facilitate content updates on web pages with FMBL.
5. facilitate the organisation of events: announcing activities, inviting contacts to participate, etc.

Some libraries with a strong social network presence on Facebook are:

1. Spain's National Library (http://www.facebook.com/bne) (figure 5)
2. The British Library (http://www.facebook.com/pages/The-British-Library/8579062138)

Figure 5. Spain's National Library on FaceBook

3.1.3. Blogs

The use of blogs in libraries can be extensive and is only limited by the type of library and the audience of users. Some possibilities include:

1. The diffusion of library activities.
2. Involving users by creating communities of their interests.
3. Providing resources and information for users.
4. Allowing users to share ideas, opinions and contents.

At Liswiki (http://liswiki.org/wiki/Weblogs) an extensive list of Library Blogs can be accessed.

3.1.4. WIKIs

Some potential uses of Wikis in libraries include:

1. Creating collaborative spaces for users to generate and update information.
2. Promotimg professional development with the creation of forums to exchange ideas on specific areas.
3. An internal communication medium for sharing information amongst the library's staff.
4. Managing the library's web content, even though this is not the most effective and efficient medium
5. Document the activities held.

At http://library2.usask.ca/~fichter/wiki you can see some examples of wikis in libraries. At LibraryWikis (http://librarywikis.pbwiki.com) you can see more information on the implementation of wikis in libraries.

3.1.5. RSS

Some possible uses for RSS include:

1. providing a selection of RSS services related to the users' topics of interests
2. implementing RSS for OPAC with the aim of automatically seeing the latest books in the catalogue.
3. a tool to broadcast the library's activities.
4. dissemination of the contents of new journals issues arrived to the library.

For more information on the syndication of contents in libraries see http://www.rss4lib.com/.

3.1.6. Social bookmarks

The success of social software may also be transferred to libraries via different formats:

1. simplifying bibliographic distribution lists, users can describe them by providing specialised knowledge.
2. Elaborating link services recommended from specific fields of knowledge.
3. Sharing resources with other users who are using them for research.
4. Promoting participation and interactive with users.

See http://groups.diigo.com/groups/bookmarking_libraries for more information.

3.2. Weakness of Library 2.0

Finally, it is also worth discussing some of the weaknesses of Library 2.0 (Castillo, 07):

1. An excessive dependence on external resources. Many applications used to develop 2.0 tools with online services are initially free of charge, but run the risk of becoming pay services or requiring advertising in the future.

2. The possibility that the 2.0 service dies from its success, since it may require an inaccessible infrastructure. The opposite may also occur, the death of the service due to a lack of users, since these systems require users to provide content.

3. Too much importance on user participation. This may seem like an inadequate statement, but a catalogue based on user contributions may become incomplete and /or incoherent since the principle of collective intelligence is only meaningful with high user participation, but currently it is very limited, possibly providing a biased view of reality. We must also understand that the option of allowing users to carry out comments in bibliographic registers may need to be moderated to avoid abuse.

4. Few information retrieval options. Most services (blogs, social bookmarks, repositories) are based on the use of relational data base management systems (MySql and PHP for the presentation of dynamic pages), which does not help to the information retrieval. For example, most blogs, due to their design, heavily penalise outdated information, while offering few precise search options.

5. The application of few usability and accessibility criteria may pose problems for users when they access information.

Celaya's article is quite interesting (Celaya, 07). The author presents six scenarios of Web 2.0 with aspects that endure beyond the initial phase of euphoria when implementing 2.0 services. This analysis attempts to understand and separate the reality from the hype.

3.3. Reference Libraries

Some of the leading reference libraries include:

1. Muskiz Municipality Library (http://www.muskiz-liburutegia.org/index.html). This library implements many web 2.0 technologies, innovating both in services and resources offered, while also boosting content syndication. They also offer literacy on these tools (Juárez, 07) (figure 6).

2. Universidad de Sevilla 's Library (http://bib.us.es/index-ides-idweb.html) is one of the libraries at a national and university level that has most experimented with 2.0 tools. They use blogs, RSS and wikis, with different management and educational aims. They have implemented a chat to facilitate the virtual reference. They contextualise the following libraries: Amazon, Google (books and scholar), LibraryThing, commercial databases and encyclopaedias (Gonzalez, 07).

3. The Biblioteca Universitaria de Sabadell de la Universitat Autònoma de Barcelona (http://blogs.uab.cat/busempresarials/). This library uses its blog to disseminate library information and offer recommended links via Delicious.

4. Ann Arbor District Library (http://www.aadl.org/). An interesting use of blogs to disseminate news, library activities, loan suggestions, etc.The catalogue includes permanent links and the chance of including comments on documents, where the other users can respond to these comments. The RSS channels are distributed throughout the catalogue.

5. University of Pennsylvania (http://www.library.upenn.edu/). Their use of social bookmarks is noteworthy (http://tags.library.upenn.edu). In the OPAC they also show the information in PennTags. It also has many other 2.0 tools to foment user participation (figure 7).

6. St. Joseph County Public Library's (http://sjcpl.lib.in.us/) contents focus on the user type and context. The

catalogue has a very simple and effective interface that facilitates usage, while also contextualised with other tools that facilitate the management of information at an individual level, including purchasing the book. It intensely uses wikis and blogs as a mode of communication with the users.

Figure 6. Microblogging at the Muskiz municipal library

Figure 7. Tags at the University of Pennsylvania's library

4. Conclusions

In conclusion, with this article we would like to incite reflection on the changes that the Web 2.0 has brought to the information retrieval on the web, and therefore on libraries.

As we have already commented in this article, in recent years the biggest innovation in terms of online information retrieval relative to prior methods has been the use of tags. Unlike description controlling systems where an expert (a library or information professional) assign a key word to documents, in 2.0 systems the document's author does this task (whoever uploads a picture on Flickr, a video on Youtube or favourites on Delicious). The success of tags between users of 2.0 systems lies in thei simplicity and spontaneity of tagging, along with the usefulness of sharing information with other users with similar interests; however, the weakness of using an uncontrolled language lead to gaps in information retrieval.

Libraries, unlike other information systems, enjoy being able to implement both systems simultaneously. That is, while a specialised person assigns metadata with a controlled language, providing the documents a structure, users participate by adding their own tags to these documents, their comments and opinions, votes, bookmarks as favourite, etc., thus making the meta-information a great value added which couldn't have been offered before.

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