SCIENCE 2.0

THE USE OF SOCIAL NETWORKING IN RESEARCH

Revised and updated version

2011

Summary

Introduction

The **REBIUN work group for research**, under Line 2 of REBIUN's Strategic Plan, agreed to set as an operational target for 2010 the *drafting of a document on Science 2.0 and the use of social networking technologies in research.* The work group decided to continue this work in 2011 and revise the original report with updated information and new resources and bibliography. The following individuals and universities were involved in preparing the original report: José Antonio Merlo Vega (dir.), University of Salamanca; Antonia Angosto Castro, University of Murcia; Tránsito Ferreras Fernández, University of Salamanca; José Pablo Gallo León, Miguel Hernández University; José Ángel Maestro, Technical University of Valencia; Inmaculada Ribes Llopes, Technical University of Valencia. The revised version was completed in September 2011. The English version has been prepared by the Instituto de Empresa (IE) and coordinated by Amada Marcos.

The main purpose of the document is to systematically detail how researchers can use the various social networking services and tools available to help them work together, to exchange resources and to share results. The report lists and briefly describes a selection of applications and resources considered to be especially useful for research purposes or for libraries in their role as providers of support for research processes.

Collective participation is the defining feature of social networks. The users of Web 2.0 technologies can easily and openly connect with other people, share resources and communicate simultaneously and in real time. Collaborative technologies that allow groups to share thoughts, methodologies, resources and results are extremely useful for research. The uses of social networking applications in research can be divided into three main groups: sharing research, sharing resources and sharing results. The first group includes collaborative tools that allow research projects to be shared, such as dedicated social networks, scientific databases linking professional profiles, platforms designed for collaborative research and support services for research processes. The second group contains Web 2.0 tools that allow researchers to share the information resources that they use: bibliographical references, bookmarked websites and citations indices. Web 2.0 services that allow bibliographical and documentary information to be collected and shared are included in this section. The final group of applications allow the results of research to be openly distributed. These are information distribution services based mainly on blogs and wikis, enabling information to be widely

disseminated using RSS technologies. Specialist scientific news services should also be included here, together with open access depositories for scientific publications.

This report includes, together with a commentary on the use of social networking in scientific research, a selection of Web 2.0 resources as used and assessed by user groups. It contains an analytical directory of social networking services which are useful for researchers, intended as a guide to the best tools in accordance with researchers' own views. In order to analyse and provide coherent information on each Web 2.0 service selected, the following information is provided:

Body responsible	The body administering the selected resource.
Presence	Extent to which the service is used by the members of the international scientific community or the researchers in a specific field.
Usefulness	General or particular benefits for researchers.
Specialisation	Disciplines which mainly use the resource.
Application in libraries	Use of the selected Web 2.0 service in libraries' activities.
Library as facilitator	Extent to which libraries are likely to be directly involved in the use of the Web 2.0 service or indirectly as an intermediary between the institution's researchers and the selected resource.
Library as trainer	Extent to which the Web 2.0 service can be used to improve the computer literacy of the library's users.
Design	Analysis of the aesthetic aspects of the Web 2.0 service.
Organisation of content	Evaluation of the usability and organisation of the contents of the Web 2.0 service.
Meta-information	Information about the Web 2.0 service provided by the website itself.

Sharing science

Technological progress is making new tools available to researchers both for methodological purposes and to disseminate their output. Such technologies support research by opening new channels that scientists use to carry out their work and to communicate their results. Collaborative technologies and open resources also encourage innovation in research. This is what we know as e-Science or Science 2.0.

Science 2.0 is the application of social networking technologies to the scientific process. The hallmark of the social or collaborative Web, Web 2.0, is the use of technologies which are open in terms of their information architecture, in terms of how they link services, and, above all, in allowing groups to work together on line for the common good.

The social web, or Web 2.0, has wrought significant changes in the scientific environment. The main feature of the social web is collaboration. Web 2.0 technologies allow people to interact easily and to share data openly. The social Web has a range of applications in research, especially for the management of bibliographical information and for relations between researchers. This open approach to science can be divided into three main areas:

1. **Sharing research.** The social Web provides the resources researchers need to share their work, whether at an initial stage or at the peer review stage. For this purpose there exists a range of open platforms for the publication of content, whether through blogs, academic portals, social networks or websites that specialise in openly posting hypotheses and experiments.

2. **Sharing resources.** Open science is characterised by the opportunity to share the resources used by researchers, such as bibliographical references, learning aids, links, reports and documents.

3. **Sharing results.** A key feature of Science 2.0 is its open attitude to the dissemination of the results of research, mainly through blogs, news services, open access reviews and open archives and repositories.

1. Sharing research

Research methodologies vary according to the field involved. Nevertheless, the scientific method always demands that a hypothesis is tested via experimentation to produce a thesis. Research teams develop experimentation techniques on the basis of established procedures. Social Web technologies are facilitating the flow of work in the scientific community and helping to break down the formal limits on the formation of research groups.

One of the main contributions of Science 2.0 is the use of platforms to link people with the same scientific interests, via which they can exchange information, resources and documents. These go beyond resources that allow the user to see a researcher's profile and read his/her output. Given that collaboration is the key feature of the Social Web, we must also include in open science resources those websites created for the effective sharing of CVs, research projects, hypotheses, etc.

Social networks are at the forefront of the new generation web. Communication between members of a network is participatory, immediate and ubiquitous. In the Science 2.0 context, social networking refers to how the scientific community uses participatory technologies to exchange information. These technologies may include blog platforms, wikis, social networking sites, virtual laboratories, on-line teaching systems, intranet management servers, or any other useful technological applications, such as content managers. Social networks, especially academic and professional networks, provide an ideal environment for researchers to interact.

The application of Web 2.0 technologies to scientific databases is another important area. These technologies allow professionals working in similar fields to link up, and researchers to follow the work of people they are interested in. Such platforms are designed to act as directories where specialists can share their membership details, areas of research and scientific output.

The most important Web 2.0 applications include scientific platforms with a global approach to research via collaboration between researchers on a project, allowing other researchers to see the results and exchange views with the authors of the research. Such Science 2.0 platforms are the best example of how collaborative technologies are contributing to progress in research, as demonstrated by the services showcased in this report.

Open science also arguably includes collaborative tools that allow geographically dispersed individuals to work together: IT applications based on interoperable technologies that allow groups of people to communicate. E-learning applications such as Moodle and videoconferencing tools such as Skype and Messenger fall under this heading. However, narrowing the field to strictly Science 2.0 tools, specialist workflow applications and other collaborative tools used in the performance of experiments and research must be included. This kind of tool includes services for creating and sharing surveys in the social sciences, mind-map managers and file sharing servers.

1.1. Scientific social networks

Social networks are the best-known aspect of Web 2.0. Individuals and entities communicate immediately and simultaneously via platforms that allow them to share all types of information and documentary resources. Social networks are by definition an excellent choice of tool for research teams working on common issues and interests, enabling them to share results, experiences, hypotheses, etc. Scientists have also been directly affected by the development of social networks, with the creation of specialised platforms for researchers that work in the same way as general networks but whose membership is restricted to people who are regularly involved in research projects. Social networks act as excellent virtual laboratories, offering all the services required by a research group: communication systems, channels for sharing resources, document storage and discussion forums.

The social networks discussed below have been selected from the many that exist throughout the world on the basis of their purely scientific focus. General-purpose social networks and those which, although useful for researchers, are not specifically designed as platforms for scientists, are not included in this discussion.

Academia http://www.academia.edu

This is a successful academic social network designed to put researchers with similar interests in touch with each other, grouping them by institution, department and field of interest. It also gives access to complete texts, specialist mailing lists and job offers. The researcher can create a home page (wall) on their work, share papers, search for colleagues and acquaintances via Facebook, LinkedIn and Gmail, and follow the work of other researchers. The user can also request news alerts

related to his/her field and journals of interest (over 10,000 titles). It is effectively a Facebook for teachers and scientists.

Body responsible	Private initiative.
Presence	Good, with around 275,000 members of all nationalities from 100,000 departments, although coverage varies according to subject area and most departments are little represented.
Usefulness	Good. It is the fastest-growing network, with an average of 10,000 new members a month.
Specialisation	None. It is aimed, in terms of concept and scope, at linking researchers from all fields.
Application in libraries	Little. Full text forms of documents can be sourced, but it offers no advantages over metadata harvesters and metasearch engines. The number of researchers working in the documentation and library sciences fields is still limited, and the number of libraries registered is even more so.
Library as facilitator	Given its success, it can be used to put researchers in touch with others. Introducing researchers to it may be a good means of publicising the library and demonstrating that it is up-to-date.
Library as trainer	Its role could be relatively important, as there are still teachers who are not aware of this tool and often appreciate being introduced to such things. Little training is required for users already familiar with the workings of social networks.
Design	The design is clear and modern, and the tool is as easy to use as any other social network. It contains an adequate, if not extensive, FAQ section and a fairly efficient search function, although only simple searches are possible. A key feature is that metasearches can be performed on all its main terms, so the results can be linked to, for example, subjects, institutions or distribution lists. Searches for key concepts can also be carried out from any page.
Organisation of content	Good. The main page is used for finding colleagues, sharing research and following other people in the researcher's field, with information locatable by researcher, field, institution, department, journal, or distribution list. Every institution and department can also be found in a tree structure that goes down to individual researcher level.
Meta-information	Scant, with no information on the development and origins of the project. It has a Twitter feed and a blog publicising new features, but these are not

very active.

Epernicus Network http://www.epernicus.com

Social network that complements the paid services offered by this company, which specialises in software and internet solutions for research, particularly in the field of biomedicine. Researchers can set up profiles allowing them to communicate with other researchers and to create networks. Institutions and companies that want access to a fuller service can buy an Epernicus Solutions package.

Body responsible	A private business initiative with links to MIT and Harvard.
Presence	Scant, only used widely in the field of biomedicine and, in particular, by researchers linked with the aforementioned institutions.
Usefulness	Very limited, given the restricted services offered and narrow presence. May be of some interest to researchers in very specific fields in the biohealth sciences.
Specialisation	In practice only used by biomedical scientists, although not expressly designed as such.
Application in libraries	Little or none.
Library as facilitator	Very little scope, except in specific cases.
Library as trainer	Very little. No specific training required, given its limited usefulness.
Design	The design is clear and modern, and the tool is as easy to use as any other social network.
Organisation of content	Good, content is organised by institution, company and field.
Meta-information	Adequate, the origins of the company and the purpose of the project can be understood without having to register as a member.

Lalisio http://www.lalisio.com

A German-based academic social network. Like other such networks, it is designed to be a meeting place for researchers from around the world, allowing them to set up a fairly complete profile, similar to a CV, organise groups and upload texts (around two million documents have been collected). Its most useful feature is the *Q-Sensei* search engine for scientific texts in English and German.

Body responsible	The company Lalisio.

Presence	Medium, although it claims to be a "leading" social knowledge network. It has not grown in recent years and its ranking according to Alexa <http:www.alexa.com> is poor.
Usefulness	Medium, as the number of documents registered is not high. However Q-Sensei is a useful tool, although it does not compete with Google Scholar in terms of absolute figures.
Specialisation	None.
Application in libraries	As a tool for recovering full text documents free of charge.
Library as facilitator	Low.
Library as trainer	Low. It is easy to use, and there are more interesting networks.
Design	Simple, but with few options.
Organisation of content	Clear.
Meta-information	Limited, the purpose of the site is explained, but little else. No membership figures available.

Methodspace http://www.methodspace.com

Free social network site created by the publishers SAGE as a discussion area on research methods. Users can set up a profile, but it is not necessary to register to access most of the services. Its most useful features, compared with other similar sites, include the chat facility, an updated events calendar, discussion forums and a question and answers service (similar to *Yahoo! Answers*) and a good selection of resources.

Body responsible	SAGE, a renowned publishing firm.
Presence	Medium, given its specific nature. Some 9,000 registered users, and growing.
Usefulness	Good, in specific cases of related subject areas.
Specialisation	Research and teaching methods.
Application in libraries	As an information and resources tool. Contains free full text documents.
Library as facilitator	Introducing researchers to it may be a good means of publicising the library and demonstrating that it is up-to-date.
Library as trainer	It may be useful to introduce users in certain fields to it. It is not complex to use, but users may need

	an introductory session to be aware of all its options.
Design	Clear and simple, but the wide range of services offered means a brief preliminary study is required.
Organisation of content	Logical, although the usefulness of the blog is questionable, when taken together with the forums, the calendar and the Q&A system.
Meta-information	Plenty of information on the service, with a certain advertising element.

ResearchGate http://www.researchgate.net

Scientific social network that, like others, allows users to create a profile and access interest groups and forums, connect with other scientists, find literature in related fields, and access job listings. Groups, of which there are over 1,100, can be public or private and can be created at any time. Each group can use collaborative software, including a file sharing tool that allows members to work together on writing and editing documents. Its most important features include a semantic search engine that operates on a database containing over 35 million scientific journal articles. Full text documents can be published and downloaded.

Body responsible	Private initiative with head offices in Boston and Berlin.
Presence	Strong, claims to have 900,000 users in 192 countries, with 500,000 of those active, and their number growing.
Usefulness	High, given its strong presence.
Specialisation	Multi-disciplinary, but varies across disciplines. Those with the greatest presence can be found in the quick search list by subject matter.
Application in libraries	As a resource for scientists, but not so much for the library as an institution, and with few resources for the disciplines of library science and documentation.
Library as facilitator	Good. In fact, the service provider contacts libraries to promote the site.
Library as trainer	Good, as the product, although simple to use, does require some presentation.
Design	Has improved with a recent upgrade, becoming clearer and more user-friendly. Can be accessed via users' Facebook profiles.
Organisation of content	Now improved and clearer. The search by subject

	facility makes content easier to find.
Meta-information	Plenty of information on the service, with a wiki, blog, etc.

Sciencestage http://sciencestage.com

Page with a search engine that accesses videos, audio presentations and texts from a wide range of disciplines. Users can comment, tag and vote, and can search by subject matter. It has a recommendation system based on search terms and results. It includes social networking functions such as the creation of personal and institutional profiles and a messaging system. Groups can be created, although many of them are clearly false or inactive, or not particularly 'scientific'. The site features a diverse and clearly excessive amount of advertising which detracts from its usefulness. The general impression is one of disorder.

Body responsible	Private commercial initiative.
Presence	No user figures are published, but its traffic figures, according to Alexa, are in line with those of similar services.
Usefulness	Low, but may be useful to locate videos.
Specialisation	None.
Application in libraries	Virtually none. Only useful as a tool for obtaining resources.
Library as facilitator	No, unless the library decides to create an institutional profile, which is not recommended given the site's excessively commercial nature.
Library as trainer	Unlikely to be of interest.
Design	The design is somewhat confusing and busy, although access to the basic features is very direct and intuitive, helped by users' ratings. Uses tag clouds, but they are too crowded.
Organisation of content	Somewhat complex, although the search by subject facility makes content easier to find. Groups are not validated or monitored, and there is a great deal of spam.
Meta-information	Abundant information on the service.

Other academic social networks

The social networking sites which are most widely used by researchers around the world are described above. There are, however, other scientific networks and a great many of a more general nature, which are also useful for establishing contact

between research teams. Some less well-known scientific networks and some successful general networks are described below.

Feelsynapsis **http://www.feelsynapsis.com**	Social network that is mainly of interest due to its Spanish origins, so it contains plenty of resources in Spanish as well as in English. Workspaces for research groups can be set up, through which users can access forums, share publications, resources and calendars and work as a social network. It also allows real time communication, with video-conferencing tools. Users must register to create a profile or join a group. Information can be public or restricted.
Academici **http://www.academici.com**	Social network that allows users to contact authors of resources in related fields, mainly social sciences and humanities, to publish and exchange results and manage bookmarks. Images and videos can be uploaded, and subject-based or social networks created (e.g. alumni networks). Researchers can also get together in interest groups. The site has various membership levels according to the amount of time spent on the site and the usage and search options available, ranging from *Standard membership* to *Premium (*annual membership €55 at current rates). In decline.
Scispace **http://www.scispace.com**	Social network that is not highly developed at present. Originated from a seminar organised by Cambridge University. Its main distinguishing feature is that access is by invitation only, like Tuenti, although it is possible to request an invitation. Allows the creation of profiles, communities, wikis and news services.
Facebook **http://www.facebook.com**	General social network but one which may be of interest to scientists, given its wide usage. Allows groups to be created, which may be useful for bringing together researchers from around the world. Includes communication, information and storage services.
LinkedIn **http://www.linkedin.com**	Platform designed to allow people with similar educational or professional backgrounds to exchange information and ideas. Mainly aimed at business users, but may be useful for research groups given the global nature of the service.
Ning	Platform that allows users to create their

http://www.ning.com	own social network sites. Researchers who want to have their own network can set one up using this well-known service, although the hosting is not free.
Twitter **http://twitter.com**	Although Twitter is a microblog rather than a social network, this service can be included under the social network heading as it allows users to communicate directly with the people they choose, follow the publications of people they are interested in, and share information, links, documents, etc. Contact lists can be created to group together specialists in a particular discipline.

1.2. Databases of scientists

This range of services is related to social networks in that they are designed to bring together people working in similar scientific fields and share CVs, but they are not intended to be platforms for the exchange of documents or discussion forums for research projects. Such services include databases of scientists, where researchers can post details of the institutions to which they are affiliated, their career details and their scientific publications, listed under specific branches of knowledge. Databases of scientists are useful both for publicising researchers' work and for helping them link to people working in similar fields. They also usually contain tools that allow authors to indicate the different forms in which their names may appear in publications (attribution), a useful feature for researchers who sign using two surnames. Researchers databases may also be regarded as Web 2.0 services as, in some cases, such as in the examples selected for this report, authors' profiles can be linked to those of other researchers working in similar fields, allowing users to contact authors directly, follow the profiles of selected authors or sign up to alert services when a scientist adds documents to his/her profile.

Researcher ID http://www.researcherid.com

Free service provided by Thomson-Reuters and therefore linked to its products and Web of Knowledge. Researchers can create a unique name with an identifying number, preventing errors and duplication in the attribution of authorship. It also provides information on publications, citations, h index etc., thereby acting as an attribution database, bringing together resources by the same author, irrespective of what form of his/her name they have been published under. These forms are supplied directly by the author, who is the best person to know all the different forms of his/her name under which documents have been published.

Body responsible	Thomson-Reuters.
Presence	Very good, given the status of the publishing firm and researchers' keenness to ensure that authorship is correctly attributed in the journals listed by the ISI.
Usefulness	Very high, for the same reasons.
Specialisation	None.
Application in libraries	Tool which users must be aware of, both from the point of view of individual researchers, and in order to provide support to the institution's researchers.
Library as facilitator	High, as researchers may need support in finding all the forms of their names and recommending a unique identifier for all platforms.
Library as trainer	High, although it is a well-known tool. Recommended as a resource to be presented in training sessions, as it is extremely useful for researchers.
Design	Simple and easy to use. Offers a wide range of search options, including a map and keyword cloud. Contains a detailed FAQ section.
Organisation of content	Simple, allowing certain concepts to be linked from the results, such as country, although not institutions or keywords.
Meta-information	Plentiful. The resource is fully described, with additional information and links for people looking for information on this service.

Emerald Research Connections

http://info.emeraldinsight.com/research/connections/index.htm

Emerald offers a free directory for researchers which they can sign up to in order to link with researchers in the same discipline (limited to the fields covered by the publishing group), research level and area of interest.

Body responsible	Emerald.
Presence	Poor, considering the time the tool has been in existence (since 2005) and the status of the publishing group.
Usefulness	Poor, for the same reasons.
Specialisation	Multi-disciplinary, but not universal.
Application in libraries	It contains a specific page for librarians, and is offered by a major publishing house, but is not of

	particular interest.
Library as facilitator	Little scope.
Library as trainer	Unimportant. Libraries may wish make researchers working in the main fields it covers aware of its existence, but no special training is needed to use it.
Design	Simple and easy to use and, although listing is by discipline only, search results can be ordered.
Organisation of content	Simple and clear.
Meta-information	Plentiful, with an explanatory page, FAQ and query form.

1.3. Research platforms

If we had to limit all the applications of the social Web to just one, we would have to choose the platforms for sharing research as the best example of how collaborative technologies are helping scientists throughout the entire research process. The research platforms described below include services ranging from the creation of specific subject-based networks to options for sharing data or setting up shared document depositories.

Virtual laboratory services must also be included under this heading, where hypotheses can be proposed and experiments performed collaboratively with contributions from scientists from around the world. These platforms offer a range of added value services including shared calendars, the ability to create or add blogs, generate statistics and graphics, publish results, etc.

HUBzero http://hubzero.org

NanoHUB http://nanohub.org

HUBzero is a platform used to generate web sites for research, providing an infrastructure for dedicated platforms such as *NanoHUB*, which is dedicated to nanotechnology and has over 100,000 users. The hub platform uses and combines various open source technologies (Linux, Joomla, etc.) to create an environment and package of tools which are also open source. Originally created by Purdue University to replace another, simpler infrastructure (*Punch*), the service is now developed by a consortium with other institutions. *HUBzero* is "a cloud, a content handling system and a Facebook for scientists, [...] and something else again" [Blanco, 2010]. It allows users to share information, educational resources, generate graphics and perform simulations, all of which can be tagged, queried or discussed with the author. It also offers the same functions as the best scientific

social networks, such as tag clouds, event calendars, job listings, etc. The options for developing, personalising and configuring the platform are extensive, as reflected in the wide range of hubs on different subjects already up and running.

Body responsible	A consortium led by Purdue University.
Presence	Strong, or very strong, depending on the specific hub, currently seventeen in total.
Usefulness	Very useful, the most complete tool of its kind, although if a hub does not already exist a new one must be created, involving a great deal of programming work, which is only practical for networks and institutions.
Specialisation	None
Application in libraries	May be used in any study, research or teamwork context.
Library as facilitator	Offers interesting possibilities, although developing a hub is not practical for small libraries.
Library as trainer	Very extensive, although advanced IT skills would be required to tackle the development side.
Design	Depends to an extent on each hub, but the most developed hubs are extremely intuitive, simple and complete.
Organisation of content	Very good, the desired content is easy to find.
Meta-information	Plentiful, both on the project and for developers.

MyExperiment http://www.myexperiment.org

This resource differs from other scientific social networks in that it is specifically dedicated to publishing scientific and experimental models and workflows. These process maps can be reused and modified using the site's own tool, tags added and comments addressed to the original author.

Another useful tool is the facility to create packs of resources to which users can add external links, documents and models, which can also be shared, discussed by groups, tagged, etc. Developers can also build in access to the platform from other interfaces, with information provided on how to do so.

Body responsible	Manchester and Southampton Universities, with funding from JISC and Microsoft.
Presence	Still limited and mainly UK based, in spite of its usefulness for some fields of knowledge.

Usefulness	Depending on field, may be high.
Specialisation	None, although most of the models are for the chemistry or IT fields.
Application in libraries	For obtaining difficult to locate specialised resources.
Library as facilitator	May be interesting, given the specific nature of the platform.
Library as trainer	Important, as the tool for modifying and creating models is complex.
Design	The website is relatively simple to use, although not particularly attractive. Handling the main tool is, on the other hand, a much more complex matter.
Organisation of content	Good, easy to understand and use. The service is intuitive.
Meta-information	Plentiful, with each step and the project as a whole well explained, including tutorials.

NatureNetwork http://network.nature.com

This is a platform created by *Nature*, with two specific facilities that go beyond the services provided by scientific social networks: the possibility of creating or joining local hubs for specific regions, and the possibility of creating a personalised interface with specific tools and applications, such as simulators, a tracker that alerts users to changes in contacts' pages, and an organiser.

It also offers all the usual options for creating blogs, forums, interest groups, contact lists, etc.

Body responsible	Nature journal.
Presence	Low to medium, with 25,000 researchers.
Usefulness	Medium. The tool is not bad, but there are only three local hubs, all American, and the site is not as widely used as would be desirable.
Specialisation	None, although with a logical bias towards life sciences.
Application in libraries	There is an active group for users of the publications of Nature Publishing Group.
Library as facilitator	Like other platforms, may be presented together with other options.
Library as trainer	Good, simple interface requires no significant

	training, but an initiation session may be useful.
Design	Simple, visually attractive, well-designed.
Organisation of content	Good, content is easy to find.
Meta-information	Sufficient to explain the scope of the project.

Other research platforms

The platforms described above are those which are most widely used by the international community. There are, however, other services which are worth highlighting as they are currently growing or because they are of interest to researchers in specific fields.

Arts-humanities.net **http://www.arts-humanities.net**	British platform created to enable researchers in the arts and humanities to share research and projects. It allows the exchange of information on projects, publications and conferences. Extensive information is provided on each project, with details of methodology, funding and results. Searches can be performed by discipline, methodology, content type and funding source, for example.

1.4. Collaborative tools

The Social Web offers a range of services with practical applications for research, at the planning, documentation or experimentation stages. In the pages that follow we examine a range of tools and services which can be used to share files, carry out sociological research and develop mind-maps. We have collected in a single section tools which we consider of interest to researchers as they allow certain processes to be performed on-line and, in line with the collaborative nature of Web 2.0, to be shared with other scientists.

File sharing services

Researchers need to have access to servers where they can store their documents and those working files that they wish to share with their team, who can then add documents or edit existing files. Such platforms ensure that everyone in a team is working with the correct version of a file and allows them to share amendments and additions. This type of service is extremely useful for shared projects, forms for collecting data, work plans, etc. The platforms selected allow text documents, spreadsheets and presentations to be created and offer additional services such as

calendar sharing. The resources included in this section are described *en bloc*, as in the sections on other practical tools.

Google Docs http://docs.google.com

Office Live Workspaces http://workspace.officelive.com

Zoho http://docs.zoho.com

Thinkfree Online http://www.thinkfree.com

The best known office platforms offer similar services: they allow users to create text documents, spreadsheets and presentations which users can work on jointly, i.e. all the authors involved in working on a single document will work on the same version of said document. Google Docs is one of the most useful, with a questionnaire-making facility, and is totally free, as is Office Live. The others offer different versions of the same products, for which some of them charge.

Body responsible	Private companies.
Presence	High for Google Docs, less for the others.
Usefulness	High, as researchers can work together on the same version of files created for a group of users.
Specialisation	None.
Application in libraries	Useful as a system for collaborating on editing documents.
Library as facilitator	The library may help researchers to select the best tools for their projects and to create the shared spaces required.
Library as trainer	Given the usefulness of these services, libraries are offering sessions on office platforms in their training programmes.
Design	The webs are always simple and the applications tend to mimic the commonly used office tools in terms of text editing, spreadsheet design, etc.
Organisation of content	Simple, in all cases.
Meta-information	Publicity materials available in all cases, with demonstration pages provided by some services. No information provided on how these tools are being used.

Other file sharing services

There are dozens of services that allow files to be stored and shared. Such services are normally generic rather than aimed specifically at researchers. Some of the

most widely used collaborative tools for storing files, sharing presentations or publishing documents are listed below. Given the wide range of resources available related to multimedia files and the fact that these are generally well-known, the resources selected do not include services related to images, audio or video.

Box **http://www.box.net**	Server that allows all types of document and file to be stored. There are both free and paid-for versions, depending on the storage capacity required.
Skydrive **http://skydrive.live.com**	Microsoft file storage service for both individual use and for sharing with other users who have been granted access. Acts as a "cloud" service, as documents are stored on servers which can be accessed on-line.
4shared.com **http://www.4shared.com** **Mediafire** **http://www.mediafire.com** **Megaupload** **http://www.megaupload.com** **Rapidshare** **http://www.rapidshare.com**	Storage services for all types of file: documents, presentations, images, videos, etc. Both free and paid-for accounts are available. All these services allow files to be public or shared with certain users. The four internet services mentioned above are the most widely used globally for sharing and distributing files.
SlideShare **http://www.slideshare.net**	Service for storing and sharing presentations. Has become the most widely used service for storing pdf documents and all types of presentation. It is general in nature, but is widely used by teachers and researchers.
Zentation **http://www.zentation.com**	Service for storing and sharing video and PowerPoint presentations, with free and paid-for versions.
SciVee **http://www.scivee.tv**	Platform for sharing videos presenting scientific publications. The authors describe the methodology and results of their research. The videos may be accompanied by the presented articles.
Videolectures **http://videolectures.net**	Specialised portal for sharing educational lectures in video format. Talks on a wide range of subjects can be seen, mainly in English, although there are some in other languages.
Issuu **http://www.issuu.com**	Depository service for all kinds of publications, which can be read on screen, or downloaded if the author so permits. This

	is one of the most widely used document reading tools.
Prezi **http://prezi.com**	Service for creating and sharing presentations. Free and paid-for versions are available. The presentations are based on mind-maps, producing a highly visual file which can be downloaded or shared on-line for other users to both view and edit.
Scribd **http://www.scribd.com**	Widely used service for publishing and reading documents, including journals, monographs and presentations. Allows the most common document types to be uploaded and converted into an easily readable format.
Calameo **http://es.calameo.com**	Service for publishing and sharing documents and allowing them to be read on-screen in a similar format to the printed document.

Surveys and social research

Social scientists habitually use surveys in their research projects. The use of on-line questionnaires has simplified the process of using these tools to collect information and transfer the data to applications where the results can be analysed. The Social Web also offers other collaborative ways of working with on-line surveys. The examples selected allow data to be exported, although this is limited to the paid-for versions in the case of some of these services. These are the globally most widely used on-line tools for carrying out surveys.

Survey Monkey http://www.surveymonkey.com

Survey Gizmo http://www.surveygizmo.com

Free Online Surveys http://freeonlinesurveys.com

SurveysPro http://www.esurveyspro.com

Google Forms http://docs.google.com

We prefer to discuss these tools as a whole, as they are very similar to each other, and the decision to use one rather than another will be based on specific needs and the funds available. The only one which is entirely free, and sufficiently powerful for most purposes, is Free Online Surveys. All the others, except Gizmo, have a free version, with limited options for personalising questionnaires, the number of questionnaires allowed or downloading results. All these services allow surveys to be easily and instantly prepared on-line or via e-mail. Survey Monkey is the best known service, and is available in Spanish.

Google Forms, available within Google Docs (discussed under file sharing services), should also be included under this heading as it also allows on-line questionnaires to be designed and shared.

Body responsible	Private commercial initiatives. Each service is provided by a different private company.
Presence	High. *Free Online Surveys* claims to have 800,000 users, for example. These resources are widely used to design surveys both for formal research projects and for pre-research surveys or opinion polls.
Usefulness	High, but depends on field. Especially useful for social scientists.
Specialisation	None. Applicable to any research requiring opinion data.
Application in libraries	High, can be used as tools by libraries themselves.
Library as facilitator	There are interesting possibilities for the library to act as a facilitator, although researchers can use these tools independently. The library may provide assistance to researchers in selecting tools of this type and in distributing their questionnaires to the target public.
Library as trainer	Important. Researchers need to be made aware of these tools and in some cases given basic training. Many of these services are free, so libraries can show researchers and students who need this type of service how to use it.
Design	The design is usually simple and can be grasped by users with basic IT skills.
Organisation of content	Not relevant, given the type of tool.
Meta-information	Plentiful, in all cases.

Other social research services

The resources described above are the most widely used services for developing on-line surveys. There are, however, many other services of this type which merit a brief summary. These are mainly commercial platforms, although there are free versions. They allow questionnaires to be designed for distribution via specific websites and the data obtained to be professionally analysed.

Limesurvey
http://www.limesurvey.org

Zoomerang
http://www.zoomerang.com

E-surveys Pro
http://www.esurveyspro.com

Kwik surveys
http://www.kwiksurveys.com

These services can also be used by researchers to carry out surveys. There are free versions with limits on the number of questions, and extended versions with more options depending on the package selected. Also depending on the package, the options for analysing and exporting data are more or less limited. A wide range of services are available on-line for carrying out surveys. Many of these are in fact systems for surveying the users of a particular website. The tools shown here, however, comply with sociological methodology requirements.

Mind-mapping tools

Mind-mapping tools are extremely useful for the design phase of a research project, and are especially important for teams that need to plan a research methodology that will involve a large number of people. A range of platforms are available to researchers for creating and jointly editing mind-maps. We have selected the services we consider to be of the greatest interest for researchers.

Compendium http://compendium.open.ac.uk

FreeMind http://freemind.sourceforge.net

Mindomo http://www.mindomo.com

Mindmapping tools allow ideas to be linked to whatever level of detail is required. There are IT programs whose efficacy has been demonstrated, but there are also on-line tools that allow mind-maps to be developed collaboratively by a dispersed group of people, i.e. Web 2.0 services.

As they are very similar, we will review these three tools together, as we did for the survey tools. The tools allow mind-maps to be designed on-line (Mindomo) or using downloaded software (Compendium and FreeMind). They are all free, although Mindomo has paid versions that offer a much wider range of options.

| Body responsible | *Compendium* is provided by the Open University, although it was originally developed in the mid-90s by Ninex, now part of the Verizon telecommunications group; *Mindomo*, is a private initiative by Expert Software Solutions (Romania); and *Freemind* is open source software developed by a number of programmers. |

Presence	High. e.g. *Freemind* reports 4,000 downloads a day.
Usefulness	High, although they may be more useful for teachers and managers.
Specialisation	None.
Application in libraries	High, may be used as library management tools, in the preparation of projects, etc.
Library as facilitator	Good potential, although researchers usually find the application through necessity.
Library as trainer	Important, as basic training is required.
Design	All three require some time to learn. *FreeMind* is the easiest but produces the worst graphic results. *Compendium* is more complex, but very powerful.
Organisation of content	Not relevant.
Meta-information	Plentiful, especially for the two free applications, with examples, tutorials and even the source code, and the possibility of contributing as a developer.

2. Sharing resources

The resources used by scientists in their work may be useful for team members or other researchers working in the same field. Open science allows bibliographic references and links to other on-line documents to be shared via bibliography and social favourite management.

Bibliographic references have normally been managed by means of closed programs which act as document databases. However, the new versions of some of these programs allow references to be shared and work to be done on line.

Moreover, social networking allows users to share links via general social bookmarking systems such as Delicious and Mister Wong, although for Science 2.0 the interest lies in those services in which documents and bibliographic references are shared. 2.0 technology is also applicable to indices of citations, which include references to printed and electronic documents and allow for the inclusion of comments and assessments.

2.1. Bibliographical reference management tools

The growing difficulty of efficiently managing information which is available in dozens of databases and other sources of information, thousands of websites,

repositories, blogs, full-text documents and digital files of all types may be resolved by using bibliographical reference management tools, programs which facilitate the work of compilation, systematic recording and integration of resources and research work. Bibliographical reference management tools are applications designed to handle bibliographical reference databases produced from different sources (Medline, Mla, EconLit, LISA, catalogues, etc.) and able to create, maintain, organise and design bibliographical references according to different standards (Vancouver, Ansi, etc.). The different tools all share the same basic characteristics: storage of bibliographical references, description of references, organisation of references, retrieval of references, creation of bibliographical records and citation building.

Because of their quality, performance and the improvements introduced in recent years, the tools most widely used by the scientific community in Spain are Zotero, RefWorks and EndNote Web. The first two have been translated into Spanish, which encourages many researchers to use them, as it is sometimes difficult for users to master the working of a system when it is in a language other than their own.

Zotero, RefWorks and EndNote Web provide similar functions, although they perform to different standards. Only RefWorks can read RSS feeds and it has the best system for recording bibliographical sources.   Zotero works well with sources of information based on new technology. And EndNote Web is well organised and easy to use.

The use of these tools is not exclusive. On the contrary, they complement each other. Aspects not covered by one may be covered by another and data can be exported from one to another. It would be advisable for the library to offer these tools to researchers. Zotero is free and there is no problem in the library providing a link to the relevant page and the tutorials available there. EndNote Web is free with the ISI Web of Knowledge licence, and, although RefWorks must be paid for, it would be useful to offer the product to researchers and an effort should be made to do so.

Zotero http://www.zotero.org

Zotero is a reference management tool which runs in website environments and allows users to compile, administer, cite and share research work from any source anywhere via the user's browser. It also allows data to be used in different types of citation, report, and bibliographic record. Zotero is free software, with an open licence. It is an extension of Mozilla Firefox and only works with this browser. It

has been translated into 30 languages, including Spanish. The program is web-integrated and installs its own toolbar, which works with the Firefox browser. It exists in web and local versions. It is not essential to be on line to use Zotero; functions such as annotating, searching and organising are available without going on line, using the local version. Version 2 is able to automatically update local versions on different computers, using the web version. Another interesting feature is that Zotero can create images of HTML documents. This means that, even when you are not on line, you can view the whole document if you have previously generated this image. Another possibility with Zotero is that it allows you to incorporate documents (Word, PDF, PPT, etc.) in records. Version 2 also includes a very useful new feature, the automatic detection of PDF metadata. This means that if you have a number of PDF documents on your computer you can drag them to the manager and it will look for the metadata in each document using Google Scholar.

Zotero can export data to various formats: BibText, EndNote/Ref Man, RIS, RDF and others. One of the basic functions of a reference manager is to facilitate the inclusion of bibliographical citations in the standardised formats used in research work. This can be done in two ways: citations can be included in the main body of the text or a bibliography can be added at the end of the document. Zotero has extensions or add-on programs which can be incorporated in word processors, using a toolbar with different icons to facilitate the task of citing a document in the format one prefers. As is appropriate for free software, Zotero can add a plug-in (*Write & Cite*) to word processors such as Open Office and Word to facilitate the addition of citations in the text and format them for inclusion in the final bibliography. Hundreds of styles are available, including APA, MLA, Chicago and ISO, and others can be suggested.

The first version of Zotero appeared in 2006 and since 2009 version 2.0 has been publicly available as a beta program. It incorporates a shared area with all the options of social networking, allowing users to share content and create their own working groups.

Body responsible	The program was developed by the Center for History and New Media at George Mason University.
Presence	Because of its quality, performance and the improvements introduced in recent years, it is one of the tools most widely used by the scientific community in Spain. The fact that it has been translated into Spanish encourages many

	researchers to use it, as it is sometimes difficult for users to master the working of a system when it is in a language other than their own.
Usefulness	There is no doubt that these management tools have many advantages and are very useful for researchers. Zotero has great capacity to interact with sources of information and is compatible with commercial sources of information such as Amazon, Youtube, Wikipedia and Google Scholar, an advantage not shared by any other tool. It can import data in a range of formats: ISI, Ovid, PubMed, RIS, Marc, RDF, Arxiv, CiteSeer. Its compatibility with other websites is constantly increasing,as can be seen from the list of sites at **http://www.zotero.org/translators**. Users can suggest other websites which they think should be made compatible with Zotero.
Specialisation	None.
Application in libraries	In the library environment we can use this tool to draw up lists of new bibliography, bibliography recommended by teaching staff, book orders, lists for special collections, etc. Everything related to the listing of bibliographical material, not only books, but also journals, articles, websites, etc., which can then be shared with all users.
Library as facilitator	Clearly indicated. As this is a free product, there is no reason why the library should not provide a link to the relevant page and the tutorials to be found there.
Library as trainer	There is a considerable likelihood of the library acting as trainer and propagator for this tool, as many researchers use the ISI Web of Knowledge database.
Design	Very clear and simple. One of the outstanding features of Zotero is its usability, the incorporation of data being very easy. The fact that an icon appears in the address bar identifying the product (book, document, film, folder) makes using it especially easy. As a result, it has been possible for information from databases (ISBN) and commercial sites such as Amazon and YouTube, which have no output format, to be automatically compiled. However, a problem arises when it does not identify a source. There is an extensive FAQ section and a website in Spanish has been set up (http://www.zotero.org/support/es/start) to support users with documentation and training.
Organisation of content	Clear and simple. The Zotero window contains everything in your collection: bibliographical references and all your documents and files,

	together with notes and other items such as images and screenshots of website pages. When you open it, you have a window with all your citations, collections and notes. The Zotero window is divided into three columns. The left-hand column contains our complete library (My library) and your own collections, which are subsections of your library; the centre column shows the items in the collection you have chosen from the column on the left; the column on the right shows information on the item we have selected in the centre column.
Meta-information	Extensive. There is a wide range of material developed by Zotero and by users who have decided to share their resources. The type of material is varied and includes items such as quick-start guides, tutorials, etc. There is not much information about the history of the project but there is a discussion forum.

Refworks http://www.refworks.com

RefWorks is a web-based multilingual application which allows researchers to import references from multiple information sources, include citations when writing a document, create bibliography in a wide range of formats and share information with colleagues, students and anyone else, whether they have RefWorks or not. RefWorks is a web-based application, so no software needs to be downloaded or updated; individual accounts can be accessed from any PC connected to the internet by entering a user name and password. This has advantages, in that it is always available from different sites or work stations, and disadvantages, in that if you have no internet connection you cannot access your bibliography, as there is no local version of RefWorks.

RefWorks is the tool which deals most effectively with recording sources. It generates hypertext indices of authors, descriptors and journals, with the number of occurrences of each item, allowing individual items to be edited or deleted from the index. RefWorks allows the *Write-N-Cite* plug-in to be added to word processors such as Word and Open Office to facilitate the inclusion of citations in the text and format them for inclusion in the final bibliography. An interesting feature for researchers working on European projects is that RefWorks can automatically generate citations in ISO format.

It includes an RSS reader and allows material to be syndicated using RefShare, so that individuals sharing folders can know at any time that new entries have been added. The RefShare module allows users to share folders containing bibliographical references with colleagues, both within their own and in other institutions, and to

publish them on the web. This is an interesting feature when working with colleagues from the same department or in other locations, as a common bibliography can be made available to be used by all; the only problem is that all the researchers must use RefWorks/RefShare and have an account in the system. When permission is granted by the RefWorks user, others may see, print, export and generate lists of references using RefShare. The fact that groups can be created and reference lists shared justifies including this service among the social networking tools used for research, as a useful e-Science resource.

Body responsible	RefWorks is produced by ProQuest, which has been operating since 2001.
Presence	RefWorks and Zotero are the most extensively used citation managers worldwide. RefWorks was the first to offer a Spanish version, which has encouraged its use by many Spanish-speaking researchers.
Usefulness	Very useful. It is the most comprehensive manager.
Specialisation	None.
Application in libraries	This tool can be used to draw up lists of new bibliography, lists of texts recommended by teaching staff, lists of books to be purchased, lists of special collections, etc.
Library as facilitator	Very important. The library considers it is a very useful product. Although RefWorks is a subscriber product and an annual licence fee is payable, it is available in a free trial version for 30 days. A good number of Spanish universities pay for an annual institutional licence.
Library as trainer	Very important. If the library pays for this software, researchers will be very keen for it to organise training courses.
Design	One of the pending issues with RefWorks is that its organisation is not clear and sometimes includes redundant information. The same features may appear in different pull-down menus without any apparent justification.
Organisation of content	Clear and simple. The site also provides a wide range of material developed by RefWorks and by subscribing institutions which have decided to share their resources. The material is varied and includes items such as quick-start guides, tutorials, help files in Spanish, Galician, Catalan, etc. and a schedule for webinars. RefWorks offers free training webinars in various languages, including Spanish. The sessions deal with basic issues and

	advanced features. The RefWorks home page gives a complete list of the sessions.
Meta-information	There is abundant information describing this product. RefWorks has set up a website in Spanish (http://www.refworks.com/es/) to provide supporting documentation and training for users. Extensive training material is available, as mentioned above.

EndNote Web http://www.endnote.com

EndNote Web is a web-based citation manager developed by Thomson Reuters. It is designed to help students and researchers to write up projects. ISI Web of Knowledge, EndNote and EndNote Web are designed to function simultaneously and simplify research work. Their use is free but there is a limit to the number of references that can be entered. EndNote Web is a tool that allows researchers to retrieve references quickly from a wide variety of on-line data sources such as PubMed and ISI Web of Knowledge via direct export, on-line searches or importing text files. They can create a private library protected by a password to store these references (up to 10,000 entries), which can be accessed anywhere with an internet connection. References can be shared with other users of EndNote Web.

The functions available and compatibility are similar to those of the other managers. However, its internal organisation is very clear, making all the basic functions (compiling, organising, exporting) easy to understand. One major advantage is that it is available in on-line and local versions (the latter has to be purchased). They can be perfectly synchronised, giving users the advantages of working in either mode. As a Thompson product, it is perfectly compatible with all ISI Web of Knowledge products. EndNote Web allows the *Cite While You Write* plug-in to be added to Microsoft Word so that references can be added instantaneously and documents formatted. It also offers hundreds of different formats for bibliographical references, using APA, Chicago, Harvard, MLA and many other standards. Data can be imported from an enormous range of databases and other sources.

Body responsible	EndNote Web is a program developed in 2002 by Thomson Reuters. The latest version is 2.4.
Presence	It is quite well known to researchers, as it forms part of the ISI Web of Knowledge platform.
Usefulness	There is no doubt that this management tool has many advantages and is very useful for researchers. EndNote Web is very well organised and easy to use. It can import data in a range of formats: CSA,

	ISI, Ovid, PubMed, RIS, etc.
Specialisation	None.
Application in libraries	In libraries we can use this tool to produce all kinds of list (new bibliography, recommended reading, acquisitions, special collections, etc.) and share them with colleagues and other users.
Library as facilitator	As this is a free product included in the ISI Web of Knowledge database, there is no problem in libraries making it available to researchers.
Library as trainer	There is a considerable likelihood of the library acting as trainer and propagator for this tool, as many researchers use the ISI Web of Knowledge database.
Design	One of the outstanding features of EndNote Web is its usability. Data is very easily incorporated using a toolbar that can be added to the most widely used browsers. It uses tabs which are simple and intuitive.
Organisation of content	Clear and simple. The "Quick List" facilitates work. This tool is in English and has not been translated into Spanish.
Meta-information	EndNote's website includes FAQs, general information on its products, and on-line tutorials on the use of its tools. There is also a page of information about EndNote Web (http://www.endnote.com/enwebinfo.asp). An introductory tutorial to EndNote Web in Spanish is available at: https://www.brainshark.com/thomsonscientific/vu?pi=329036890

Other bibliographical reference management tools

The programs described above are the most widely used of those that allow researchers to work as part of a network and share bibliography. Scientists also work locally with widely used applications such as ProCite and Endnote, which cannot be considered 2.0 programs. There are other less extensively used bibliographical reference management services which should be included, as they also use social networking technology.

RefBase **http://www.refbase.net**	This is a downloadable program for managing bibliographical references. It is an open source application which is maintained by its user community. It allows references and citations to be exported in the commonest formats.

Bibme **http://www.bibme.org**	This is a web-based generator of bibliographical references. Records of bibliography can be stored. Data can be imported from a publication using the ISBN or other data. References can be formatted using the commonest standards and exported to RTF.

2.2. Bookmarking resources and bibliographical references

The internet environment has become a standard way of obtaining and sharing scientific information. There is no longer any doubt about the value of bibliographical reference management tools in research work. The bookmarking of resources and bibliographical references, also known as social bookmarking, is a tool which combines the potential of traditional managers with the possibilities of sharing provided by social networking, allowing researchers to share links to references.

Thanks to social networking, libraries can use social bookmarking of bibliographical references to help teaching staff and researchers to draw up the bibliography of documents and bibliographical references for subjects of interest and share this information with them. Social bookmarks are also a way of managing references and it is easy for researchers to include these references in their documents.

Libraries can use groups, a characteristic feature of these tools, to create centralised bibliography of resources, which can be shared easily by the members of research teams. The library needs to be part of these groups and to work with them to update bibliography.

Using Web 2.0 technology to facilitate the researcher's task of compiling documents and bibliographical references from databases and managing them appropriately, the main publishers have created tools to manage bibliographical references as an integral part of their databases. The social bookmarking applications most extensively used by the scientific community are CiteUlike, developed by Springer, and Connotea, produced by Nature Publishing group.

Researchers need to be familiar with the functioning of these tools, as they will have to use one or another, depending on the source of the information. Consequently, it is important for libraries to organise sessions to train researchers in their use.

Making research data openly available creates opportunities for other research groups to analyse it and make their own scientific discoveries. The benefits of openly available data are many: it can be the key to establishing cooperation with other research groups, increasing the likelihood of new material being published. Sharing research data publicly may have a positive effect on the citation, increasing productivity and the impact of a research group. The most popular tool for sharing data among researchers is Mendeley. This application combines the services of bibliographical reference managers and social bookmarking and allows users to share the data obtained in their research.

CiteUlike http://www.citeulike.org

CiteUlike is a free on-line service, with which bibliographical references can be stored and managed. It was the first web-based social bookmarking application, designed specially for the needs of scientists and academics who work in shared environments and need to know what their colleagues are reading and want to recommend material for others to read. CiteULike has become one of the largest and most popular social bookmarking reference websites, helping users to optimise their procedures for storing and administering academic references. Currently it stores over five million citations of scientific articles and has over 900,000 visits a month.

With this service, references are captured by means of a bookmark. This is easily attached to the browser using the "Post to CiteULike" button and extracts the bibliographical data appearing in a web page. When incorporating them the user classifies them by thematic area and assigns an indexing term or tag to them. The system saves them as the user's own but they are visible to everyone via a public profile and a private one: MyCiteUlike. With CiteUlike references can be captured from external sources such as Archiv and Amazon and they can also be captured and integrated from other accepted sources, including a list of major publishers and distributors of open and commercial content. References may also be added from blogs and newsletters, using services such as *addtoany*, which allow information to be posted by any user who consults a source and then sent to a reference manager.

An important utility is the CiteGeist service, which allows users to track the most popular references. The popularity index measures how many writers have read the article or included it in their personal managers. This is not exactly an indication of quality but, if an article has been identified by a large number of users, it is one

that researchers should know about. The "Watchlist" option allows users to contact others with similar interests and know which new documents they are reading, so that they can keep up to date at all times.

CiteULike allows users to create research groups related to a subject or a department with the aim of sharing references among members. A group blog can also be set up. Users are grouped according to their areas of research and they can locate other researchers with the same interests using the "Research Field" option. For users who have Netvibes there are two APIs available from CiteULike, one for searches and one for RSS channels.

Other interesting options provided by CiteULike include adding comments and including reviews of an article. The CiteULike-Delicious Synchronization option (Beta) allows references to be transferred automatically from delicious.com.

Body responsible	Springer was created in 2004, by Richard Cameron at the University of Manchester.
Presence	High, over 900,000 visits a month.
Usefulness	High.
Specialisation	Multidisciplinary
Application in libraries	CiteULike is a good support tool for librarians, enabling them to develop information services which reuse content. We have already mentioned the possibility of importing and exporting data easily, when its content may be useful to us for our own reference manager, to carry out citation work with the Write&Cite systems of the reference managers and to generate bibliography.
Library as facilitator	Important, as it is a free application.
Library as trainer	Important. Researchers are very grateful if the library provides training in the use of these tools. This is a service which deserves to be publicised, so that it can be used and content added.
Design	Simple.
Organisation of content	Indexed by subject.
Meta-information	There is a page dealing with FAQs.

Connotea http://www.connotea.org

Connotea is an on-line open source reference management service for scientists and researchers. It is one of a new generation of social bookmarking tools which

allow users to save and share references. Connotea was the first tool to use a social bookmarking system combined with a reference manager. It recognises scientific websites and automatically compiles metadata for the article or page it is visiting. It allows this information to be retrieved via the digital object identifier (DOI). When an article is saved on Connotea, users can tag the article with the keywords they consider most appropriate to the content, which they can then use to retrieve it.

An increasing number of sites are compatible with Connotea (http://www.connotea.org/ guide#autocollection). Another way to add information is to use the "Add to Connotea" button, which can be installed on the browser toolbar. When we want to record the information we see on a web page we simply click on "Add to Connotea", and a pop-up window appears asking us to tag the document. Connotea also allows users to add information by copying the folders of other users who share their information. The "Add bookmark" option allows us to add information simply by entering the URL reference for the document. In all cases, when the information is tagged, Connotea lets us add a description and say whether the reference we are adding is going to be imported into our library, our working group or groups, and whether we want to make it public or keep it private, in which case we can only see it ourselves.

Connotea also provides options for us to make contact with other users and to locate tags which are similar to our own. These will appear in our personal library on the right, under the toolbar, so that we can use these links to navigate and view the content of others. If the information we access is of interest, we can include it in our library. The "Popular Links" option (http://www.connotea.org/popular) allows users to see which links have been included most often by other users, while the "Recent Activity" option (http://www.connotea.org/recent) lets them see the latest references posted by other researchers. From the shared area any user can add comments to the references they find and subscribe to an RSS feed to receive alerts about articles of interest.

Body responsible	Created in 2004 by Nature Publishing Group.
Presence	High.
Usefulness	High.
Specialisation	Multidisciplinary
Application in libraries	Generation of bibliography.
Library as facilitator	Important, as it is a free application.
Library as trainer	Important.

Design	Clear and simple. There is a page for FAQ and tutorials to help with installation, and building and managing a library, making the application much easier to use.
Organisation of content	Information is mainly located via the search engine. As it is bibliographical information, it can be retrieved using different fields and tags.
Meta-information	There are pages giving information about the service and tutorials showing how it works.

Diigo http://www.diigo.com

Diigo is the most complete and versatile social bookmarking tool currently available. The tool has to be purchased, although the favourites manager is available free. This platform goes beyond the philosophy of social bookmarking: as well as allowing users to select websites, it enables them to share files, documents, notes and text selections. It combines social networking with social bookmarking and servers which allow users to share files. It could even be included with specific platforms for research and teaching, as it can be a simple way to conduct peer assessment and for teaching staff to comment on specific aspects of students' work published on the internet. One great advantage is that the application is accessible using practically any browser. It has been tested with Explorer, Firefox, Flock and Chrome and works with any operating system that allows internet navigation.

The most notable features include the following:

- It can create lists of links dealing with a particular subject and facilitates access to them in presentation format. It allows the sequence and duration of the presentation to be personalised and music added.
- It classifies links using tags.
- It creates groups where members can share links and comments.
- It creates articles and website pages, in case the pages disappear in the future.
- Web pages can be marked and commented on.
- Images from pages visited can be uploaded to the user's library.
- You can publish articles in your blog and add markers automatically.
- You can see your library of links from any device that has access to the internet, including an iPhone or similar device.
- Users can obtain a cloud of the most popular tags.
- "Tweet" links can be stored and shared.

The most interesting feature is the use teaching staff can make of Diigo as a search engine, to organise internet resources and update teaching materials, or as a tool to use in the classroom to pass on selections of websites to students, and, above all, as a tool for students to use actively, both as a tool to select sources, annotate them and share the results and as a way to jointly assess work published by the group.

Body responsible	Diigo, Digest of Internet Information, Groups and Other staff, is based in Reno / Tahoe, Nevada, USA. The application was created in 2006 and the latest version is 5.0.
Presence	The Spanish Ministry of Education, via its Technological Observatory, is recommending this tool for academic use. Social bookmarks have become indispensable for information management and their use as a teaching tool is constantly growing.
Usefulness	High.
Specialisation	Multidisciplinary
Application in libraries	Generation of bibliography and user training.
Library as facilitator	Medium importance.
Library as trainer	Important.
Design	Clear and simple with abundant information to help users.
Organisation of content	Content is well organized and information can be located easily, despite the fact that there is no Spanish version.
Meta-information	There are pages with plenty of well structured information on the service and tutorials showing how the tool works. There is a blog and a discussion forum.

Mendeley http://www.mendeley.com

Mendeley is free software, created to help researchers to manage the libraries of research documents they have on their computers and share them, find new data and work together on line. Mendeley combines Mendeley Desktop, an application to manage PDFs and references (available for Windows, Mac and Linux), with Mendeley web, an on-line social network for researchers. It is compatible with different browsers and platforms. It successfully combines the features of conventional reference management with social bookmarking managers. It has one

unique feature: it has an advanced statistics tool where users can keep statistics on documents, authors, the most extensively used material in an area and shared references.

The importance of this tool for researchers can be seen from the increase in the number of users over the past year from 500,000 to over 900,000, while the number of documents in individual libraries has grown from 38,500,000 to 84,900,000.

The most notable features include the following:

- It allows users to work locally and on line, synchronising their work.
- Citations and bibliographical references can be extracted automatically. Mendeley Desktop automatically extracts bibliographical data, key words, and references to PDF files, and converts them into a full text database.
- There is a PDF document viewer which allows users to add notes, select text and read with a full screen view.
- The search option allows text to be located in any part of the PDF library.
- PDF files can be intelligently sorted, tagged and renamed.
- Citations and bibliography can be added in Microsoft Word and Open Office. Lists can be generated in over 1,000 styles.
- Documents and research references can be imported from over
- 50 academic databases, including PubMed, Google Scholar and Arxiv, using the browser marker.
- With Mendeley users can import and export files in formats such as BibTeX, RIS, XML, EndNoteTM, etc. It also imports documents and references from other applications like Zotero, CiteULike and 2Collab.
- Mendeley Web allows users to access the library from working documents in any location, share documents in closed groups, and work together on on-line research projects and add notes to documents.

- Features of social networking (tracking researchers with similar ideas, news).

Body responsible	The team is formed by researchers, graduates, and open source code developers from a wide variety of academic institutions. It is financed by some of those behind companies such as Skype, Last.fm and Warner Music. Mendeley was founded in November 2007 and is based in London. The first beta version was released in August 2008.
Presence	There are 23,509 research institutions using Mendeley, over 900,000 researchers and there are

over 84,900,000 documents in individual libraries.

Usefulness	High.
Specialisation	None. It is aimed, in terms of concept and scope, at linking researchers from all fields.
Application in libraries	Managing personal digital libraries, creating groups with whom documentation can be shared.
Library as facilitator	Important, as it is free software.
Library as trainer	Important.
Design	Clear and simple, with plenty of information to help users, FAQs, quick-start guide, installation guide, etc.
Organisation of content	The interface is intuitive and logically organised. It has subject indices for the location of references selected by scientific field and search systems using search engines.
Meta-information	It provides specific information and maintains a blog to help users.

Other social bookmarking services

The previous paragraphs focus on shared bibliographical reference services. This is a specific application of social bookmarks, which are normally used to share internet resources. As well as the social bookmarking services described, other more general applications are used to select links, which can then be described and shared, allowing a group to select their favourite web resources and present them on a single page.

As in the case of the services described above, the resources bookmarked show the number of people who have also chosen them, indicating the level of interest in a particular resource. Leading browsers such as Google and Yahoo have bookmarking options. To access these services users must first register and can then create a selection of favourite resources to share with other users. The utilities available are similar to those provided by classic services such as Delicious, on which they are based.

Social news services can also be considered as social bookmarking, as they bring together information selected by internet users and sent to a website where other users can assess the interest of the item. Resources and news selected by a wide range of users can thus be viewed and opinions given on the interest of these items and comments and assessments posted.

Bibsonomy
http://www.bibsonomy.org

System to share links and bibliography, functioning like those described in the preceding paragraphs. User groups can be created and selections made by participants. The references and resources selected can be exported to standard bibliographical formats.

Delicious
http://www.delicious.com

The world's leading social bookmarking service. Links can be selected, described and tagged. The resources of those who use this service are publicly available by default, though they can also opt to mark them as private. As a 2.0 application it allows selected links to be shared with others.

Mister Wong
http://www.mister-wong.es

This free service is available in Spanish. Mister Wong allows users to save interesting websites in a personal account which can be accessed anywhere. Using your own keywords, you can save favourites simply and organise them according to your own preferences. You can decide whether you want to save a site for private use or to make it public. The Mister Wong search engine accesses public websites.

H2O Playlist
http://h2obeta.law.harvard.edu

This is a tool developed by the Berkman Center for Internet & Society at Harvard Law School, allowing on-line collections of multimedia resources to be created. It is especially useful for managing supplementary material for teaching.

StumbleUpon
http://www.stumbleupon.com

A service created to share links, which are tagged and assessed by users. Unlike other bookmarking applications, users need to be registered before they can view resources which have been assessed by others. Searches for resources will only reflect sites that have been chosen by other users.

Digg
http://digg.com

The world's best known international news service. The news items selected can be viewed on their website but you need to register (free) to send pages to others. It includes a science news channel which, like other topics, is based on the items most highly valued by other readers.

AddThis
http://www.addthis.com

An application that can be incorporated in a website so that visitors can recommend items on the page they are viewing. It enables users to add a website to a social bookmarking site or recommend it in a social network. It also indicates how many people have recommended the website.

2.3. Citation indices

The impact of scientific work is often measured by the number of citations it receives. There are various services to determine the number of citations a scientific article receives. Web of Knowledge and Scopus are among the leading international applications. However, 2.0 technology is also offering a series of products which tell users how many citations a publication has received on the web.

Using the electronic information available on the internet they give details of the number of citations and where these have been made. The citations are indexed in the traditional way but using web resources.

From the portals of Google Scholar, Microsoft Academic Search and CiteSeer users can locate texts and authors, find out how many citations they receive in on-line documents, see the list of documents containing the citations and, in most cases, access the full text of the document, if it is available.

Google Scholar http://scholar.google.es

Google Scholar provides a search engine for scientific publications and an index of citations which helps users to assess the impact of publications. Google Scholar thus competes with other citation indices such as Web of Science (WoS), from Thomson Reuters, and Scopus, from Elsevier. Google Scholar is an ideal application for at least three tasks: looking for the complete text of a paper, looking for bibliography for a writer or a journal, or dealing with a topic, and looking for citations of a publication (book, journal article, thesis, report, etc.)

Google Scholar covers a wide range of documents: books, articles in journals, scientific and technical reports, pre-prints, talks and presentations at congresses, seminars and conferences, dissertations and theses, government and institutional websites, etc. It does not include non-scientific documents such as book reviews, textbooks, newspapers and commercial magazines. Searches are conducted in a wide range of information sources: repositories, databases, scientific societies, on-line library catalogues, research institutes, and Google products (Google Patents and Google Books). They return three different types of result:

- Links to the full text of the document. This type of result provides a direct link to the full text of the original publication. It will be identified by a green arrow and the format of the document will be shown in brackets.

- Citations from indexed documents. The results are tagged with the word [CITATION] and no link is shown.
- Links to the original source document. The link takes you to one of the platforms (repositories and other databases) that Google Scholar searches. Access to the document depends on the platform. Access is direct if the library has an agreement for this.

Only the first 1,000 results from the search can be viewed. The algorithm ranking them is based on the same thinking as PageRank, applying the principle that the items most frequently cited are also the most important.   Results are ordered according to the total number of citations, the availability of the complete text, the author and the publication. Results are presented in this order and there is no option to sort them by other criteria.

Google Scholar has certain disadvantages:

- There is no quality control for the scientific information presented, as it indiscriminately lists all the references it can find in any document. However, its documentary coverage produces a range of citations which is different from that produced by other databases, with a series of references which are exclusive to it. This makes it a valuable complement to traditional citation indices.
- The data in the results is not standardised.
- Results may be duplicated, which causes confusion.
- There is no tool to analyse bibliometric results (like Citation Report in WoS).

Body responsible	Google. The beta version was released in 2004.
Presence	Extensive, as it is freely accessible and there is no charge.
Usefulness	Important.
Specialisation	None.
Application in libraries	Analysis of citations. The library should include this service among the sources it uses, to inform researchers of the impact of their publications.
Library as facilitator	Important, as it is a free tool.
Library as trainer	Important, as there is great interest in this tool among researchers.
Design	One of the outstanding features of Google Scholar

is its usability. The interface follows the simple Google style so that it is very easy to use: the main screen simply shows a box in which the term you wish to search for has to be entered. Although we are dealing with scientific information, the search options are quite limited, especially if we compare them with other bibliography databases, as only three search fields are available (author, journal and year of publication). The texts can be limited to a particular language. There is a page explaining how to use the application.

Organisation of content	Good.
Meta-information	Little information about the project.

Microsoft Academic Search http://academic.research.microsoft.com

Microsoft Academic Search is an alternative to Google Scholar. Like the latter, it searches scientific publications and indexes citations. Developed by Microsoft Research's Asian team, it has been running since late 2009. This year (2011) has seen a great increase in its use and it now covers 15,751,487 publications and 11,144,282 authors. At first it specialised in IT but it has gradually incorporated other disciplines: chemistry, engineering, mathematics, physics, biology, pharmacology, psychology. art and the humanities, economics and social sciences. They are classified in three groups: "Natural Science", "Life Science" and "Others".

Microsoft Academic Search is notable for its "Timeline" function for author's citations, indicating their centre of work, publications, citations, G-index and H-index. The 2D graphic showing co-authorship is visually very attractive. The use of Microsoft Academic Search and the functions described above can be seen in a video available from Youtube:

http://www.youtube.com/watch?v=3XkQ8a9jgxg&feature=player_embedded.

Body responsible	Microsoft Academic Search is a Microsoft Research product.
Presence	Limited. Until 2011 it specialised in IT and covered few publications.
Usefulness	Low
Specialisation	Multidisciplinary
Application in libraries	Analysis of citations.
Library as facilitator	Important, as it is a free tool.
Library as trainer	Important.

Design	Clear and simple. Searches are easy, with simple and advanced options available. Searches can be made for authors, conferences, journals and years and limited to certain domains.
Organisation of content	Very clear. Content is grouped into three main categories: natural sciences, life sciences and other. And then by discipline. Within each discipline it is grouped by authors, publications, conferences, journals, institutions and sub-domains.
Meta-information	There is a help page with information about working with this tool and a discussion forum.

CiteSeer^x http://citeseerx.ist.psu.edu

CiteSeer^x is a public search engine and digital library focusing on academic and scientific publications, with special emphasis on computer science, IT and engineering. CiteSeer^x searches for and captures academic and scientific documents on the internet and indexes them using its own method of citation analysis, allowing searches to be made by citation or from the classification of documents based on this analysis. CiteSeer^x is intended to provide resources such as algorithms, data, metadata, services, techniques and software that can be used to promote the development and use of new digital libraries.

It is important to bear in mind that applications like CiteSeer only obtain documents from public websites and do not search in publishers' websites. Documents which are freely available on the internet are thus more likely to be stored in the index.

The application's most notable features are:

- Autonomous Citation Indexing (ACI): CiteSeer uses ACI to create indices of citations automatically, which can be used to search literature and assess citations. Compared with traditional citation indices, ACI offers improvements in cost, availability, integrity, efficiency and scope for use.
- Citation statistics: CiteSeer calculates statistics for citations and related documents for all the articles referred to in the database, not just indexed articles.
- Links to references: As with many on-line editors, CiteSeer allows users to navigate through the database using the links in citations.
- Context of the citation: CiteSeer can show the context of citations in a document, allowing a researcher to view quickly and easily what other researchers have said about an article of interest.

- Alerts: CiteSeer provides automatic notification of new citations of documents and of new documents indexed in the database which match the user's profile.

- Searching for documents: CiteSeer uses search engines to locate documents and retrieve them from websites.

- Related documents: CiteSeer constantly searches for related documents to keep the bibliography for each of the indexed documents updated. The searches are based on the citations entered and words taken from the documents themselves.

- Inclusion of the complete text in the index: CiteSeer indexes the complete text of articles and citations. It allows Boolean searches, by phrase and proximity.

- The application's capacity for carrying out searches is considerable. It even allows users to enter the initials of an author to make searching for names more flexible.

- Updates: The program is updated at regular intervals.

- Metadata: CiteSeer extracts metadata for all articles indexed automatically and makes it available to users.

- MyCiteSeerX: As well as indexing citations, CiteSeer provides a personal portal for users who register, where they can save personal collections, receive RSS notifications, use social bookmarking and other social networking functions, and personalise their search options.

Body responsible	Developed in the Information and Technology Sciences Faculty of Pennsylvania State University by researchers Dr. Isaac Councill and Dr. Lee Giles.
Presence	Medium, as it specialises in IT and related areas.
Usefulness	High.
Specialisation	Computer Science, IT and Engineering.
Application in libraries	Analysis of citations.
Library as facilitator	Important, it is a free product.
Library as trainer	Important, training researchers in IT and related fields.
Design	Searches are easy, with simple and advanced options to locate documents, authors and citations.
Organisation of content	The design is very clear and simple. The application's simplicity is one of its advantages and its use is largely intuitive.

| Meta-information | There is a good amount of information about the project and there is a blog to keep users up to date. |

GetCITED http://www.getcited.org

GetCITED is an open source on-line database containing bibliographical information about academic articles. Content is entered and edited by members of the academic community. The database contains over 3,000,000 publications and over 300,000 authors.

GetCITED allows members to enter and search for information about publications of all kinds. As well as books and articles from journals, chapters of books, talks, working documents, reports, records of conferences, and pre-prints can be entered and searched for. It also allows researchers to link a publication with all the publications in their bibliographies, enabling them to produce a wide range of citation and publication reports.

The most notable features of GetCITED include the following:

- GetCITED is a website which aims to facilitate the dissemination and discussion of academic research. To achieve this it uses its database and a discussion forum. A distinguishing feature of the GetCITED database is that it allows researchers to decide what its content is to be. One feature of the discussion forum is that the comments published can include links to publications and items in the GetCITED database.
- GetCITED allows researchers to put links in their publications, linking their documents with the documents referred to in their bibliography and with publications that cite them. These will appear in GetCITED CV CITATIONS as links, allowing instant access to reference information about the work the researchers have cited.
- GetCITED allows users to cite and search for all kinds of publication, including chapter listings, talks, doctoral theses and manuscripts not published as working documents.
- Researchers have the "Bookstacks" option to create bibliography, which may be public or private. If they are public, they can be shared with other members of GetCITED. Searches can be made in Bookstacks previously created by other members.

- GetCITED generates detailed statistics on works in the database, including the number of visits per page, comments and citations in other work.

- Users can create, join and contribute to discussion groups (DGroups) dealing with any subject of interest.

Body responsible	GetCITED.
Presence	Medium. 300,000 authors have decided to include their documents and references in GetCITED.
Usefulness	Medium.
Specialisation	Multidisciplinary.
Application in libraries	Limited. Only for bibliometric studies of authors belonging to the GetCITED community.
Library as facilitator	Not very interesting unless more users in our academic communities register.
Library as trainer	Only moderately important. The interest of researchers in this type of product would have to grow.
Design	Not clear. There is a page with FAQ but the answers are not especially helpful.
Organisation of content	Not very user-friendly.
Meta-information	Little information about the project on the website.

Other citation indices

Although the resources described above are the main 2.0 resources for citation currently existing, other similar tools and applications can also be used. They are described below.

Scholarometer **http://scholarometer.indiana.edu**	Social software allowing users to analyse citations and assess the impact of publications. It functions as a graphic interface, using data obtained from Google Scholar. Users can add data to the information retrieved from Google. This is an extension that can be added to browsers.
Publish or Perish **http://www.harzing.com/pop.htm**	This application works with Google Scholar and allows various indicators of impact to be calculated. The software can be downloaded. It

	allows simple and advanced searches to be made by author, title and subject, the result being the documents by an author in Google Scholar and their degree of impact
Citation gadget **http://code.google.com/p/citations-gadget**	A tool for determining the number of citations and the h index for an author based on the documents in Google Scholar. It may be consulted on line or the source code may be added to a page.
Scholar H-Index Calculator **https://addons.mozilla.org/es-eS/firefox/addon/scholar-h-index-calculator**	An extension of the Mozilla Firefox browser which allows users to determine the H index for an author while using Google Scholar.

3. Sharing results

Participative and social networking technology allows users to publish information that can be shared, by the addition of comments, syndicating content or integrating material from other sources in a website. In Science 2.0 platforms with scientific blogs and wikis are used, through which new developments in research are published and comments are posted from people working in the same fields. In the case of wikis content is developed on a cooperative basis.

There are also different services specialising in scientific news, whose content can be disseminated by means of the different options for syndication provided by 2.0 technology. These services can be integrated in open science, as they allow comments, assessments and dissemination of content. We can also include in this category services for adding blogs and disseminating news, such as Digg and Menéame, as they often include sections dealing with scientific information.

The results of research appear in scientific articles, doctoral theses and presentations at congresses. Often journals, repositories and databases providing access to scientific production also use 2.0 technology and can thus be considered Science 2.0 tools.

3.1. Blogs and wikis

Blogs and wikis are outstanding 2.0 tools. The development of blogs has been highly successful and they became so popular that some writers suggested that they had entered into a decline. However, after the boom period, blogs have

continued to be an excellent tool for disseminating the results of research work. They use traditional blog platforms such as Blogger and Wordpress but there are also new platforms and portals dealing with science, specialising in certain exchanges. The scientific publishing sector has been among the last to join this trend, seeing in these sites a way of maintaining its market share in the face of the new 2.0 tools and open access publication.

Science Blogs http://scienceblogs.com

This is a portal which hosts blogs with scientific content. It attempts to maintain a minimum standard in content by a prior selection of bloggers, allowing them to post their content on the portal when they have been accepted. Currently there are about fifty blogs dealing with very varied topics.

Body responsible	Science Blogs SLL.
Presence	Medium, but less in the Spanish-speaking area. According to Alexa the largest concentration of users is in Ireland.
Usefulness	Pre-existing blogs can be imported.
Specialisation	Multidisciplinary
Application in libraries	Little. The fields of knowledge include a section on Information Science which is interesting but the number of blogs is small.
Library as facilitator	It can be used as a good example of this type of portal.
Library as trainer	Little scope. Little more than dissemination of the resource.
Design	The appearance is somewhat like an on-line newspaper. The advertising is conspicuous but not excessive. The main page may disappear depending on how the user scrolls the text, but the top menu bar and the search window facilitate use.
Organisation of content	Blogs are divided into 10 thematic channels which are intended to cover all the major areas of knowledge. The "Last 24 hours" channel allows users to keep abreast of new developments. There is also a channel for postings whose content is mainly video, and a book club, where comments can be posted. Clear access to latest posts, thematic channels and search facility. Also to RSS channels, one for each subject area. Can be followed via Facebook.
Meta-information	Almost non-existent. There is only a title and a

very brief description consisting of a publicity slogan.

MADRI+D http://www.madrimasd.org/blogs

This portal provides hosting for the blogs of researchers and companies based in the Autonomous Community of Madrid. Despite this wide variety of users, it is currently hosting only around 100 blogs.

Body responsible	Madri+d Foundation for Knowledge
Presence	Low, bearing in mind the strength of the institutions behind the platform.
Usefulness	Little scope. Researchers normally use their own institutions' platforms or the major general platforms (Wordpress, Blogger, etc.) in order to best maintain their blogs.
Specialisation	None. The only limitation, according to the site itself, is the legality of the content.
Application in libraries	In practice there are only 2 or 3 blogs with indirect relevance for the field of library sciences and documentation.
Library as facilitator	Very little scope. The geographical limitation makes this tool of limited use. It offers a free and stable platform for libraries or librarians who do not wish to or cannot invest resources in a blog.
Library as trainer	It can be used as a good example of this type of portal, but it is not the best of its kind.
Design	Simple and easy to use. The search facility is also simple, perhaps too much so.
Organisation of content	Main page showing latest updates, lists of blogs and a search tool classifying the results (from the portal itself) under blogs, news, videos and images. There is not, however, a simple classification of blogs by field.
Meta-information	Information on the content and key word fields is well developed.

PLoS Blog http://www.plos.org/cms/blog

Portal designed to encourage the open access culture in all its forms: blogs, journals, news, events, etc. Its twenty or so collaborative blogs (PLoS Blogosphere) are intended to allow a selection of specialists to express themselves. These are linked to an official blog (PLoS Blog) and two official thematic blogs (PLoS One y PLoS Medicine). Material is posted under a Creative Commons Licence.

Body responsible	Public Library of Science
Presence	The prestige of the PLoS makes this a blog worthy of note, although the strict control over quality limits participation.
Usefulness	Very high, but only for health-related subjects. The quick news pages are particularly useful.
Specialisation	Focuses on medicine and health, although incidentally touches on related subjects.
Application in libraries	Raises awareness of research, based on selected notes.
Library as facilitator	Interesting for libraries specialising in medicine or health-related fields in general.
Library as trainer	Should be publicised as a leader in promoting open access.
Design	Clean, but a little crowded. The structure may be a little deceptive, as the search feature only allows simple searches, with no additional filtering.
Organisation of content	As there are only a dozen, "non-official" blogs, there is no particular classification. The blogs' titles are not always self-explanatory, obliging users to click on them to find out what they are about.
Meta-information	There is an information page about the blogs.

Open Wet Ware http://openwetware.org/wiki

This wiki was set up to share information and know-how in the field of biology. It provides a space where laboratories, individuals and groups can organise their own information and collaborate with others. Like most wikis, its usefulness depends on the number of specialists that use it. It is designed using Media-Wiki, the most widely used open source software for this type of service.

Body responsible	Open Wet Ware
Presence	Medium. The site claims to have over 8,000 registered users (who can contribute information).
Usefulness	High, provided involvement is maintained.
Specialisation	Biology and biological engineering, and it may therefore be of interest for other fields, e.g. chemistry.
Application in libraries	None.
Library as facilitator	Libraries cannot provide anything that users cannot

find for themselves.

Library as trainer	Interesting for specialist libraries and, in general, useful for training activities on scientific and specialist resources.
Design	The layout of any wiki can be confusing to users who are not accustomed to the concept. This becomes clearer with use. Navigation works correctly and the main page takes users where they would expect to go using the icons available.
Organisation of content	The wikis are categorised under materials, protocols and resources. There are also sections on sharing courses, and a directory of laboratories and research groups, together with access to OWW's scientific blogs.
Meta-information	Little. The key words do not include subjects, just some author names.

Other blogs and scientific wikis

A full description of all the blogs and wiki services dedicated to promoting science would not be feasible here. There are, however, a number of blog platforms that merit attention:

Nature blogs **http://blogs.nature.com** **OpenWetWare blogs** **http://openwetware.org/wiki/Blogs** **Hypotheses.org** **http://hypotheses.org**	Blog platforms hosted on the servers of institutions involved in promoting science, such as Nature journal, and which have networks of scientists, many of whom have created their own blogs. The OWW initiative described above also hosts members' blogs on its network. Hypotheses is a good example of a service that brings together the news published on its members' blogs.
Wiki Urfist **http://wiki-urfist.unice.fr**	Example of a wiki set up for the publication of scientific content. Urfist uses this technology in the form of an open intranet for sharing resources, documents, tutorials, etc.

3.2. Scientific news services

Scientific news services are, like the general news media, working on adding Web 2.0 tools to their sites. Tools to access and share news information via RSS feeds and social networks, and to comment on and rank items, are now extremely common. Nevertheless, options for users to participate, adding their own content

and news, are only offered by a limited number of services, such as Wikio. In this section we review those services that offer media for publishing scientific output.

Servicio de Información y Noticias Científicas http://www.agenciasinc.es

News portal that acts as a specialist information agency for the fields of science, technology and innovation. It belongs to the Spanish Foundation for Science and Technology (FECYT) and may therefore be considered the most important news portal in Spain. News stories are grouped under major field headings, which are in turn broken down by discipline. The website also provides news alerts, reports, interviews and special investigations. It has a multimedia gallery, a calendar listing major scientific events, and an "on this day in history" section.

Body responsible	Spanish Foundation for Science and Technology (FECYT)
Presence	Fairly broad, as the main Spanish scientific news service.
Usefulness	High, helps researchers keep up to date with research being carried out in other centres. The content has a journalistic, and thus educational, focus, but it is an excellent source of general information.
Specialisation	Multidisciplinary, covering a range of disciplines but in particular life and health sciences.
Application in libraries	Useful as a source of information on scientific data which can be redistributed using the library's own media.
Library as facilitator	The library may recommend this resource, and also link to it and receive alerts via its RSS feeds.
Library as trainer	Recommended for information sessions on access to information.
Design	Well structured portal both in visual terms and in terms of the organisation of resources. No annoying advertising, as it is a public service.
Organisation of content	The content architecture is well focused, with clearly differentiated subject areas, additional services and querying facilities. The design of the site and that of the content are perfectly matched.
Meta-information	Contains information page and style guide.

SciTopics http://www.scitopics.com

This is a highly specialised scientific news site, where authors are invited to publish short works on their areas of research, with a form and style similar to that of the letters published in science journals. This helps researchers keep up to date on colleagues' work and new developments in their discipline, or to learn about new disciplines. Although the articles are published by invitation, they are not peer reviewed and this cannot therefore be regarded as an e-journal. Users can comment on papers in a social network-like interface.

Body responsible	The Elsevier publishing house.
Presence	Traffic and user figures are not given, but estimated to be high, given the activity of the site, the news items generated and the company behind it.
Usefulness	High, especially for learning about a new subject area.
Specialisation	Multi-disciplinary, within the fields covered by Elsevier.
Application in libraries	To complement news bulletins and other similar services. Can be used as a source of news feeds that the library may want to distribute.
Library as facilitator	Little scope. Users only need to know of the site's existence, although the articles may provide highly specialised news.
Library as trainer	No training required. This resource may be mentioned in sessions on sources of information on science.
Design	Simple and clear, very easy to use.
Organisation of content	Very clear.
Meta-information	Sufficient for understanding the resource, although no basic statistics are provided.

Wikio http://www.wikio.es

Wikio is a "news portal based on a semantic search engine that filters news items from media sites and blogs and classifies them under thousands of subject headings". Users can create personalised pages to enable them to follow subjects that interest them. Its includes Web 2.0 style collaborative tools such as options to add user generated content or comment on existing articles, vote, share, follow via RSS feeds, etc.

Body responsible	Wikio SARL.
Presence	Limited. The information is filtered from journalistic sources and blogs and is therefore unlikely to be scientifically rigorous.
Usefulness	Good, with the above caveat. May be a useful means of gathering and classifying news items from sources which are normally dispersed. The subscribe and personalise options are also useful in this respect.
Specialisation	Multidisciplinary
Application in libraries	May be a useful tool for finding news of interest to the librarian or the user.
Library as facilitator	The option to personalise pages according to areas of interest, the ease with which news items can be categorised and the use of RSS feeds, combined with other Web 2.0 tools, make it easy for teaching centres or interest groups to selectively distribute news.
Library as trainer	May be useful to train users to help them access science news stories more effectively. A useful resource to show users, as a source of scientific information, especially news.
Design	Adequate, although less advertising would be preferable. It would also help if the subject areas were more visible without the need to scroll. However, the option to personalise pages with the desired subject areas is helpful. This is very clearly a Science 2.0 tool.
Organisation of content	Ignoring the tabs which are not of interest, it is clear. News items are grouped under 14 main pre-determined headings. This organisation can be improved by personalising pages. Search results can be ordered by date, relevance or popularity. Its gadgets are also practical for accessing content of interest and filtering out the rest.
Meta-information	Not very detailed, just this description: Wikio is a "news portal based on a semantic search engine that filters news items from media sites and blogs and classifies them under thousands of subject headings".

ScienceDaily http://www.sciencedaily.com

This is a scientific information website, with the appearance of a general news site but one which focuses on the scientific information published on the internet. Its

articles are based on, and link to, the scientific articles that constantly appear on-line. Researchers cannot publish their own content here, making this a limited resource from a Web 2.0 perspective.

Body responsible	ScienceDaily SLL.
Presence	Very good, the top ranking website in Alexa's Science: News and Media category.
Usefulness	Researchers may find it useful to subscribe for subject areas of particular interest.
Specialisation	Science and technology.
Application in libraries	Limited.
Library as facilitator	May be useful as a resource for information of interest to users of specialist libraries.
Library as trainer	Specialist libraries may wish to subscribe to some of its news feeds and share material via its social networks.
Design	A lot of information is squashed into a little space: the impression is jumbled and lacking in clarity. Its Web 2.0 features are somewhat limited: sharing is possible, but not participating.
Organisation of content	The content is categorised under eight main headings which are in turn divided into five sections (news, articles, videos, images and books).
Meta-information	Very detailed, including headings and, in particular, key words which are adapted to each section.

Science News http://www.sciencemag.org

A constantly updated science news resource, developed by the publishers of Science journal. The quality of the content is guaranteed by this connection, although the site suffers from being too focused on its own publications to the exclusion of others. As stated, users may not add their own content, limiting the usefulness of the resource for disseminating information from researchers.

Body responsible	Association for the Advancement of Science.
Presence	Good.
Usefulness	As for other similar resources. A very good search tool compensates for the lack of categorisation of content by subject area.
Specialisation	Science and technology in general.

Application in libraries	Limited.
Library as facilitator	Like other sites, as a source of information for redistribution.
Library as trainer	Little scope.
Design	Fairly simple, given the lack of categorisation. A little too simple for specialised researchers who may prefer to focus on particular categories.
Organisation of content	The news items are not classified but can be filtered using the well designed advanced search facility.
Meta-information	The description, key words and copyright are provided (the latter is not usual in the resources reviewed).

Other scientific news services

There are a great many scientific news portals, almost all of which offer RSS feeds and can be therefore regarded as Web 2.0 tools. We have not included local news agency websites or education portals, as these are extremely numerous and only of partial interest to researchers.

The best known services we have already mentioned. Some other services which may also be of interest are detailed below.

Science 2.0 **http://www.science20.com**	Portal specialising in science news that employs a number of social networking applications. As well as RSS feeds, users can communicate directly with the authors, registered users who have become members of the platform's social network in order to participate.
Research information **http://www.researchinformation.** **info**	Electronic publishing and news service of interest to researchers, specialising in electronic resources, both open and commercial.
Agencia DICYT **http://www.dicyt.com**	The Agencia de Noticias para la divulgación de la Ciencia y Tecnología (DICYT) covers news stories on scientific publications and research and publishes the Tribuna de la Ciencia bulletin, which can be read in full on its website.

3.3. Open access

Open access resources, given the spirit of the movement itself, should be at the forefront in using and distributing the collaborative tools that are the key feature of Web 2.0. However, this does not appear to be happening on any significant scale. We thus find resources that differ little from traditional websites that just access or link to information, and others that try to make much more intensive use of new ways to distribute information. An example of each type is discussed below,

Web 2.0 technologies also open the possibility of creating new websites that allow users to share publications while avoiding the traditional commercial channels. Not all the documents and output of a research project can be published in the traditional sense, with the resulting commercial implications. However, much of this information may be useful, and there are excellent Web 2.0 tools for raising the profile of research projects, sharing, commenting on and re-using results. This section also includes, therefore, a number of resources for on-line publishing and editing, selected from the wide range that now exists.

This section covers some of the main open access document locating services, mainly harvesters that collect metadata from scientific repositories and make it available to interested parties via specialised search engines. Services for reading and downloading full text documents, generally under "copyleft" licences that cede partial rights to the content, are also listed and described in this section.

BASE - Bielefeld Academic Search Engine http://www.base-search.net

International harvester that searches open access document repositories around the world. It collects metadata from virtually all the world's harvestable open access scientific repositories. The technology used by this harvester has progressively improved and it now offers advanced searches by subject area, even using a thesaurus, which no other similar service offers. It provides access to over 30 million full text documents, mainly scientific in nature. It searches over 2,000 repositories and its interface is available in several languages, including Spanish. It offers some collaborative features, such as the option to add an RSS feed to a query in order to receive alerts on new documents or to share the search results via a selection of collaborative channels such as blogs and social networks.

Body responsible	Bielefeld University Library (Germany)
Presence	Although it is the most voluminous tool for finding open access scientific information, it is not widely

	known, being essentially a German tool, albeit one with global scope.
Usefulness	High, providing full access to a large volume of documentation and a file recovery system that allows queries to be fine tuned.
Specialisation	Multidisciplinary
Application in libraries	Libraries can employ this tool as users, as it offers access to documents on any subject, but also as distributors of information, as it is an excellent source of information on full text documents.
Library as facilitator	Libraries can play a role in ensuring that the repositories maintained by the institutions to which they are attached are included in the harvesting process, in order to raise the profile of the scientific output of their universities and research centres. BASE provides contact systems and detailed information on how to request that an institution's repository be added to its searches.
Library as trainer	Given the importance of this resource, it should be included in training sessions on examples of open access document locating services. It is a good example of an internationally useful initiative by a library. It is recommended as a link and resource for training sessions on bibliographical and documentary research.
Design	The new version, discussed here, is attractively designed, with each section clearly defined. The design of the interface is simple in order to facilitate querying and the reading of content.
Organisation of content	The information architecture is exemplary. The content is well structured and available in several languages. The simple and advanced search systems are intuitive and effective. The option to search using a thesaurus is extremely helpful. The search results are easy to filter, and can be e-mailed or added to an RSS feed.
Meta-information	There is a page explaining how the site works, plus a content sources list and statistics page.

Scientific Commons http://www.scientificcommons.org

Although unrelated, this project is designed along the same lines as the Creative Commons initiative. It is a harvester, currently in the beta phase, that finds scientific documents stored in repositories based on the OAI-PMH protocol, and links to the full text when this is available.

Body responsible	University of St. Gallen (Switzerland)
Presence	Limited. Partly because researchers cannot actively participate.
Usefulness	Limited. Has no obvious advantages over other harvesters.
Specialisation	Multidisciplinary
Application in libraries	Not especially applicable. It is just another harvester among so many.
Library as facilitator	It is not necessary for the library to be involved as a mediator or facilitator.
Library as trainer	A useful example for training activities on open access.
Design	Very plain and practical, similar to Google in style. The home page simply shows the most recent search results and a simple search field. However, the right hand menu is difficult to scroll, making information on the resources selected for harvesting inaccessible. Although the search engine is in German and English, all the information on the initiative is in German.
Organisation of content	Standard. Right-hand menu for search options and main frame showing the results. Search results can be easily filtered by year and language, and ordered by relevance or date.
Meta-information	Information page on the service.

Public Library of Science (PLoS) http://www.plos.org

This is a website to promote the open access publication of scientific materials, based mainly on Creative Commons licenses. It is dedicated to disseminating existing resources and creating its own, in the form of journals, blogs and other formats. It is effectively the flagship for the open access movement in the area of scientific information, and is likely to be a model for the development of parallel or similar projects for other fields of knowledge. It should, however, be pointed out that, although PLOS uses an open access model, authors are charged to publish in the site's journals, and their articles must be approved by its scientific committees.

Body responsible	Public Library of Science (nonprofit organisation).
Presence	Very good. The PLoS is a prestigious institution, renowned for both its content and its leadership in open access to science.

Usefulness	Very useful, depending on field. It should be noted that the PLoS is supported by a partnership with MedLine.
Specialisation	Medicine, biology, genetics and other general health-related fields.
Application in libraries	Useful for specialist libraries.
Library as facilitator	Promotion of service
Library as trainer	Providing information on the resource and redistributing its content.
Design	Users may take some time to get used to the content structure, but then the site is simple to use. The search facility could be better (a basic search is offered initially, with the advanced search facility only appearing with the search results).
Organisation of content	Not well developed. Categorises open access content in journals and other resources, plus some of its own blogs.
Meta-information	Information page on the service.

Sciyo http://sciyo.com

On-line publication service for open access documents published under Creative Commons 3.0 licenses. Published works must pass through a review process and the quality is therefore good. Includes not only books but also journals and video content is planned. On the down side, the volume of content available is still limited It is included here as an example of a site for publishing scientific content, but the service is developing very slowly.

Body responsible	Sciyo.
Presence	Low, and much more limited than other similar resources.
Usefulness	Medium. Its main advantage over other on-line publishing resources is the review process, which guarantees the quality of the content. This is at the cost of the speed with which other commercial and free publishing resources can distribute new content.
Specialisation	Various engineering fields.
Application in libraries	Interesting channel for accessing free, quality work. Not the best route for libraries' own publications, given the specialist fields covered.

Library as facilitator	Not required, as the works are freely accessible. The library may, however, add this resource as a link for accessing scientific books in electronic format.
Library as trainer	Raising awareness of the resource and promoting its use as an alternative medium for publishing quality scientific work.
Design	Clear and effective. Only a basic search facility is available, but it is fairly efficient, given the extent of the collection. The results also distinguish between complete works and chapters. The books can be easily read on-line, or rapidly downloaded (entire works or individual chapters). Very well linked to the main social networks.
Organisation of content	The books are classified under 15 engineering fields with further sub-categories. There are currently only a few journals and these are not categorised. The video section is not yet working and appears to be only a plan at present.
Meta-information	Key words and description are well developed. Very little information on the project.

Bubok http://www.bubok.com

There are other on-line publishing and editing services which, although commercial, allow users to benefit from the open access principle. Bubok is a Spanish commercial publishing and printing program that makes intensive use of Web 2.0 tools. Registered users can edit a book and choose to sell it in electronic format, charging for downloads, and/or in paper format. Authors can select print quality and format, and the printed books are sent to customers. Books can be printed to order as sold, with financial savings and environmental benefits.

Body responsible	Bubok Publishing SL.
Presence	It is being used by reputable publishing institutions.
Usefulness	It can be used to publish anything from research works to notes for students, making them more accessible to end readers, who can choose the format and quality they prefer. There are additional (paid-for) services.
Specialisation	Multidisciplinary
Application in libraries	Used by the Spanish National Library and the Miguel de Cervantes Virtual Library, among others.
Library as facilitator	The library may act as an intermediary, when

authors do not want to publish commercially.

Library as trainer	Training should be given in the use of this type of resource as an alternative to traditional commercial publishing channels.
Design	Although it offers a wide range of services, it remains clear and simple. It is fairly intuitive and the interface is available in several languages including Spanish and English. The books' pages are very clear, with descriptive information on the book (including category and sub-category), publishing and purchase conditions, and Web 2.0 sharing tools.
Organisation of content	As well as making the published works available, the site provides a help blog and forum. The search facility is simple but effective, although the advanced search is limited to some basic filters.
Meta-information	The information necessary to use the service is available.

Other open access services

Open access and the Social Web meet when document depository services offer collaborative features, including the possibility of adding content, harvesting data, ranking documents, using content feeds, etc. The majority of institutional repositories can, therefore, be regarded as Web 2.0 tools, as they are designed using technologies that nowadays feature collaborative functions as a matter of course. As the number of repositories is constantly growing, we focus on those tools that simultaneously search a range of repositories, i.e., harvesters, which carry out metadata searches of repositories all around the world, in specific regions or covering specific content types. The main international harvesters are described below, together with the Spanish tools that may be of greatest use to scientists whose research work involves gathering documentation.

OAIster Worldcat **http://oaister.worldcat.org**	OAIster was an open access documents harvester which can now be accessed via Worldcat. It collects data from over a thousand repositories around the world, giving access to millions of documents with full text versions available.
DRIVER **http://search.driver.research-infrastructures.eu**	European repositories harvester which allows simultaneous searches of dozens of European institutional and cultural repositories.
Hispana **http://hispana.mcu.es**	Harvests data from digital libraries and institutional repositories in Spain. Features a metadata search engine that trawls through all the repositories and digital libraries,

	together with a directory of the digital collections created in Spain.
Recolecta **http://www.recolecta.net**	Harvests from academic and research repositories. Allows the documents stored in university repositories and research centres, plus on-line journals, to be queried from a single interface.
OpenDOArt **http://www.opendoar.org**	International directory of repositories that enables users to locate open access document servers using a range of search criteria, such as subject matter, country of origin or the type of document listed and distributed.

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Selected Science 2.0 Services

This report by REBIUN, Science 2.0: the use of social networking in research, has focused on describing collaborative resources that are of particular interest for researchers. The social Web services covered are listed below for easy reference purposes.

1. Sharing research

1.1. Scientific social networks

01	Academia	http://www.academia.edu
02	Epernicus Network	http://www.epernicus.com
03	Lalisio	http://www.lalisio.com
04	Methodspace	http://www.methodspace.com
05	ResearchGate	http://www.researchgate.net
06	Sciencestage	http://sciencestage.com
07	Academici	http://www.academici.com
08	Feelsynapsis	http://www.feelsynapsis.com
09	Scispace	http://www.scispace.com
10	Facebook	http://www.facebook.com
11	LinkedIn	http://www.linkedin.com
12	Ning	http://www.ning.com
13	Twitter	http://twitter.com

1.2. Databases of scientists

14	Researcher ID	http://www.researcherid.com
15	Emerald Research Connections	http://info.emeraldinsight.com/research/connections/index.htm

1.3. Research platforms

16	HUBzero	http://hubzero.org
17	NanoHUB	http://nanohub.org
18	MyExperiment	http://www.myexperiment.org
19	NatureNetwork	http://network.nature.com
20	Arts-humanities.net	http://www.arts-humanities.net

1.4. Collaborative tools

21	Google Docs	http://docs.google.com
22	Office Live Workspaces	http://workspace.officelive.com
23	Zoho	http://docs.zoho.com
24	Thinkfree Online	http://www.thinkfree.com
25	Box	http://www.box.net
26	Skydrive	http://skydrive.live.com
27	4shared.com	http://www.4shared.com
28	Mediafire	http://www.mediafire.com
29	Megaupload	http://www.megaupload.com
30	Rapidshare	http://www.rapidshare.com
31	SlideShare	http://www.slideshare.net

32	Zentation	http://www.zentation.com
33	SciVee	http://www.scivee.tv
34	Videolectures	http://videolectures.net
35	Issuu	http://www.issuu.com
36	Prezi	http://prezi.com
37	Scribd	http://www.scribd.com
38	Calameo	http://es.calameo.com
39	Survey Monkey	http://www.surveymonkey.com
40	Survey Gizmo	http://www.surveygizmo.com
41	Free Online Surveys	http://freeonlinesurveys.com
42	SurveysPro	http://www.esurveyspro.com
43	Google Forms	http://docs.google.com
44	Limesurvey	http://www.limesurvey.org
45	Zoomerang	http://www.zoomerang.com
46	E-surveys Pro	http://www.esurveyspro.com
47	Kwik surveys	http://www.kwiksurveys.com
48	Compendium	http://compendium.open.ac.uk
49	FreeMind	http://freemind.sourceforge.net
50	Mindomo	http://www.mindomo.com

2. Sharing resources

2.1. Bibliographical reference management tools

51	Zotero	http://www.zotero.org
52	Refworks	http://www.refworks.com
53	EndNote Web	http://www.endnote.com
54	RefBase	http://www.refbase.net
55	Bibme	http://www.bibme.org

2.2. Bookmarking resources and bibliographical references

55	CiteUlike	http://www.citeulike.org
56	Connotea	http://www.connotea.org
57	Mendeley	http://www.mendeley.com
58	Diigo	http://www.diigo.com
59	Bibsonomy	http://www.bibsonomy.org
60	Delicious	http://www.delicious.com
61	Mister Wong	http://www.mister-wong.es
62	H2O Playlist	http://h2obeta.law.harvard.edu
63	StumbleUpon	http://www.stumbleupon.com
64	Digg	http://digg.com
65	AddThis	http://www.addthis.com

2.3. Citation indices

66	Google Scholar	http://scholar.google.es
67	Microsoft Academic Search	http://academic.research.microsoft.com
68	CiteSeer^x	http://citeseerx.ist.psu.edu
69	GetCITED	http://www.getcited.org
70	Scholarometer	http://scholarometer.indiana.edu
71	Publish or Perish	http://www.harzing.com/pop.htm
72	Citation gadget	http://code.google.com/p/citations-gadget
73	Scholar H-Index Calculator	https://addons.mozilla.org/es-eS/firefox/addon/scholar-h-index-calculator

3. Sharing results

3.1. Blogs and wikis

74	Science Blogs	http://scienceblogs.com
75	MADRI+D	http://www.madrimasd.org/blogs
76	PLoS Blog	http://www.plos.org/cms/blog
77	Open Wet Ware	http://openwetware.org/wiki
78	Nature blogs	http://blogs.nature.com
79	OpenWetWare blogs	http://openwetware.org/wiki/Blogs
80	Hypotheses.org	http://hypotheses.org
81	Wiki Urfist	http://wiki-urfist.unice.fr

3.2. Scientific news services

82	Servicio de Información y Noticias Científicas	http://www.agenciasinc.es
83	SciTopics	http://www.scitopics.com
84	Wikio	http://www.wikio.es
85	ScienceDaily	http://www.sciencedaily.com
86	Science News	http://www.sciencemag.org
87	Science 2.0	http://www.science20.com
88	Research information	http://www.researchinformation.info
89	Agencia DICYT	http://www.dicyt.com

3.3. Open access

90	BASE - Bielefeld Academic Search Engine	http://www.base-search.net
91	Scientific Commons	http://www.scientificcommons.org
92	Public Library of Science	http://www.plos.org
93	Sciyo	http://sciyo.com
94	BUBOK	http://www.bubok.com
95	OAIster Worldcat	http://oaister.worldcat.org
96	DRIVER	http://search.driver.research-infrastructures.eu
97	Hispana	http://hispana.mcu.es
98	Recolecta	http://www.recolecta.net
99	OpenDOAR	http://www.opendoar.org

Recommended reference: