

Module Five - Management of Information

Introduction

“Where did I read this information?”, “I know that I printed a copy of this article, but I don't remember where I kept it.” These are very common situations among researchers, students or anybody whose works involve using documents. In the course of learning, teaching and research, information accessed from diverse sources accumulates. Without a proper information management practice; such information may be difficult to find and later locate. In certain instance some people may print the same documents again and again, or search for the same information every time they need it. As a consequence there is a need for this information to be organized so that it becomes easily accessible. Managing this information properly will save time, energy and lead to increased productivity. This module discusses tools and techniques for collecting, storing, organizing and using information. Special attention will be given to the management of the following categories of information: bibliographic references, primary documents such as books or articles, user's notes and manuscripts.

Learning Objectives

In this module we will:

- Explain the benefits of good organization of information,
- Present referenced management tools,
- present bookmark management tools,
- Discuss information management techniques.

Learning Outcomes

At the end of the module, one should be able to:

- Understand the importance of managing information,
- Use a reference management software for storing bibliographic references,
- Cite and reference documents used to produce an intellectual work,
- Use web browser bookmarking functionality in a more effective way.

Summary of Content

Content	Methods	Mode of Assessment
5.1 Importance of Managing Information	Brainstorming Discussion Lecture	Pre and post Question and Answer
5.2 Management of bibliographic references	Lecture Discussion	Questions and answers
5.3 Using Reference Manager software to manage bibliographic references	Lecture Demonstration	Assignment
5.4 Managing Bookmarks/ Favorites	Lecture Demonstration	Assignment

Pre-Evaluation

1. What are the elements required to identify a book you need?
2. What tools do you use to store the documents you would like to read later?
3. What elements do you remember about a very interesting web resource you read a month ago?
4. What is the most appropriate order to organize your notes?

Importance of Managing Information

Organizing the information you work with or you will probably need later has many advantages: it helps save time, energy and has a positive impact on productivity.

Having a good management system prevents loss of information. The information is lost when it is not kept properly and a person forgets about its existence. Sometimes it is lost because the person cannot find it again. Storing information prevents from losing and organizing it makes it easier to retrieve.

Good organization of information saves time and effort. Retrieving information requires time and energy. A good organization of information saves a lot of time and energy in trying to search and retrieve the same documents or information later. Taking notes while or after reading helps remember the topic of a document or one's opinion about it. Improperly managing information and documents usually finds himself going into circles or being chaotic in his work: searching for the same information more than once, reading the same documents more than once, unable to have clear views of where it is heading. A good organization of information ensures that a person will be looking for new information, finding new documents, asking new questions, exploring new perspectives.

Management of Bibliographic References

A bibliographic reference is a set of elements that describe a document in order to identify it in a unique way. In online library catalogs, bibliographic databases, and reference management software each bibliographic reference is stored as a record. In addition to the document description, a record may provide information about the content and the location of the document.

The description of the document itself generally consists of the title of the document, authors' names, the source of the document, the place of publication, the date of publication, the size of the document. In reference management software each element is stored in a field. The nature of elements that compose a bibliographic reference depends on the type of document being described. See the example in Box 1.

BOX 1: Examples of bibliographic references or citations

- **Sample list of references.**

The first citation describes a journal articles, the second describe an web page and the third is a book description

- Teklehaimanot A, McCord GC, Sachs JD. Scaling up malaria control in Africa: an economic and epidemiological assessment. Am J Trop Med Hyg. 2007 Dec; 77(6Suppl):138-44.
- Malaria Consortium (2007) Malaria: a handbook for health professionals, Macmillan Publishers Limited. Available from TALC at <http://www.talcuk.org/books/malaria-a-handbook-for-health-professionals.htm>
- Breman, J., Alilio, M & Mills, A. Eds. (2004) the intolerable burden of malaria: II what's new, what's needed.
- **A PubMed record**

With abstract (AB) and keywords (MH). Note that the record reproduced is not a complete. (*It was shortened by the author of this chapter*).

PMID- 20387743
OWN - NLM
STAT - MEDLINE
DA - 20100414

DCOM- 20100430
 IS - 1028-8880 (Print)
 IS - 1028-8880 (Linking)
 VI - 12
 IP - 19
 DP - 2009 Oct 1
 TI - Medicinal plants used in traditional medicine in the centre east region of Burkina Faso.
 PG - 1287-98
 AB - The present research focused on the inventory and the use of plants in traditional medicine for the treatment of diseases in this area. The method was based on ethnobotanical surveys with semi-directing interview, conducted from [...]
 AD - University of Ouagadougou, 07 BP 5252 Ouagadougou, Burkina Faso.
 FAU - Ky, J M K
 AU - Ky JM
 FAU - Zerbo, P
 AU - Zerbo P
 FAU - Gnoula,
 C AU - Gnoula C
 FAU - Simpore, J
 AU - Simpore J
 [...]
 JT - Pakistan journal of biological sciences: PJBS
 JID - 101247723
 RN - 0 (Plant Extracts)
 MH - Burkina Faso
 MH - Herbal Medicine
 MH - Humans
 MH - Medicine, African Traditional/*methods
 [...]
 SO - Pak J Biol Sci. 2009 Oct 1;12(19):1287-98

Content description is achieved by keywords or abstract. Keywords are terms that designate the topics, the geographical locations, the people and other aspects of the document. An abstract is a short text that summarizes the content of a scholarly publication. An abstract may have different purposes but in general it highlights the key concepts, objectives, methods, findings and recommendations.

The information about the location of the document helps retrieve the original when it is needed. In a personal collection of references it is a good idea to indicate in which office, closet and folders the document is stored.

5.7.1 Bibliography Management Tools

Bibliography management tools, also called reference management software, citation management software, and personal bibliography software are computer programs that allow users to collect, store, organize references and use them in different ways. They also help annotate documents and generate list of references.

Reference management systems can be categorized by the operating system they run on, where they store data and also their functionalities. There are reference management systems for Windows, Linux, MacOS and other operating systems. Reference management systems can store the information locally (on user desktop) or online (on a remote server). In addition, reference management systems provide functionalities such as the ability to import from external sources, the possibility to add notes and attach files, the capability of sharing information with colleagues, the possibility to generate a list of references, etc.

There are many reference management software including: Zotero, EndNote, RefWorks, ProCite, CiteUlike, Connotea, Mendeley among others. When choosing a bibliographic management software you may consider the following: the price, storage mode, source from which it can import information, the output, the ease of use, the integration with text processing software.

Box 2 : Quick overview of some reference management software

Zotero : is an open source reference management software available as an add on for Firefox web browser. With zotero users can collect, organize, share and cite bibliographic references. It enables users to create references manually or import them while searching online bibliographic databases, library catalogs and a growing number of online research tools. In zotero, references are grouped in collections. Users can add keywords to references and annotate them as well. It is also possible to attach Portable Document Files (PDF) and other types of materials to a reference. The software extensions can be used with Microsoft Office Word and OpenOffice.org Writer to generate bibliographies and lists of references. More information about zotero can be found on the official web <http://www.zotero.org/>.

Connotea: is a free online reference management system that enables users to store, organize and share bibliographic references and web links. With Connotea users can save links to any online resource: scientific articles, bibliographic references, books, etc. New records can be created by filling forms on connotea website or using addon buttons on users' web browser. Saved links can be organized using tags and shared with colleagues. Connotea is accessible at <http://www.connotea.org/>

EndNote is commercial desktop software for managing references and citations. It runs on Windows and Mac Os operating systems. It allows users to create, import, organize, cite, and share citations. In Endnote, citations are stored in libraries. Within libraries citations can be organized using groups and subgroups. Endnote offers several features such as searching online collections, importing citations, generating lists of references in OpenOffice.org and Microsoft Office Word text processing software. For more information and a 30 day free trial version go to: <http://www.endnote.com/> . Endnote Web is free through HINARI <http://www.who.int/hinari/>.

Mendeley is a free desktop application for reference management. It runs on different operating

systems including GNU/Linux and Windows. Mendeley allows users to create collections of bibliographic citations, organize references, share documents and generate lists of references. Data can be collected in different ways: manual editing, importing from other reference management systems, extracting references from PDF documents, etc. Mendeley also allows users to store and annotate pdf documents; and generate a list of references using text processing software. To find more information about Mendeley download the software, visit <http://www.mendeley.com/>.

5.7.2 Managing Bibliographic References

Once installed, a reference management system allows its user to create collections, add citations, edit, and comment and annotate citations, generate a list of references.

▪ Collecting bibliographic references

A collection of bibliographic references is built by creating citations manually one by one or by importing them from external sources such as bibliographic databases.

Importing allows user to add many records at once in the collection. The most common external sources of citations are bibliographic databases or library catalogs. Collecting references from these sources includes three main steps.

- Retrieving relevant citations in search tools,
- Saving them in a file,
- Importing the file in a reference management tool.

Users need to manually create citations when they work with documents that are not referenced or the bibliographic references are not available for import. In other situations, the bibliographic database or library catalog searched by the reader does not provide a way to import references into the reference management software. Records are then manually created by using “add new” or “create new” function of the reference management software. It opens up a new blank form, where users fill up elements that describe a document as per the example below.

Box 3 : Adding Data Into Zotero

References in Zotero can be created by the user or imported from online search tools. To import PubMed records into Zotero :

- go <http://www.pubmed.gov>
- Enter keywords to search for your topic. Example: malaria treatment clinical trials
- when the results are being displayed an [] icon appears on the location bar
- click on it,
- select the references you want to save

To create new records in zotero.

- Launch Zotero when a Firefox window is active,
- Open your collection
- click on the new element icon,
- choose the type of document you want to describe,
- Enter descriptive elements.

Illustration 1: Importing PubMed citations into zotero

The small icon (circle 1) on the address bar indicates the presence of records that can be imported into Zotero. After clicking on the icon, the list of available records is displayed in box (circle 2). The User can select the citations he wants to store in his Zotero library. An icon (circle 3) is displayed on the status bar to remind the users that Zotero is enabled for this computer.

• Storing bibliographic records

It is now common to store citations in reference management software. Reference management systems store data on local drives, online, or both. Each of these storage modes has its advantages and limitations.



Storage mode	Advantages	Limitations
<ul style="list-style-type: none"> Local 	<ul style="list-style-type: none"> are fast* does not require access to the Internet, stored information is private, integrate well with office suites 	<ul style="list-style-type: none"> risk of destruction in case of problems with the PC (viral infection or hard drive failure for examples), inaccessible if the computers is broken, usually not shared, accessible on one computer, thus reducing the user's mobility.
<ul style="list-style-type: none"> online 	<ul style="list-style-type: none"> easy to share, helps collaboration, available from multiple locations, can be accessed by multiple users. 	<ul style="list-style-type: none"> Requires Internet connectivity not integrated with office suites

* the speed depends on the characteristics of user PC.

Some tools like Zotero can store information both locally and online. A collection built on a user desktop can be synchronized with a copy on a remote server. This feature combines the advantages of the two storage modes: the collection become available from different locations and the duplication reduces the risk of losing data.

Organizing References

In reference management software, citations are grouped into collections. A collection or library is the equivalent of a folder into which references are stored according to some shared characteristics. A

collection can be related to a topic, a project, an assignment, etc. Within collections, references are assigned keywords whose primary function is to list the topics discussed in a document. To be useful, the choice of keywords must be consistent by using nouns, avoiding synonyms and avoiding abbreviations.

In addition to collections and keywords, it is a good idea to add to each record information about the its "status" (users' relation to the document). Attaching tags like "to be read", "relevant to chapter one", "order a print copy", "forward to Mr Joe", etc helps the collection owner to know what he's been doing with documents.

Using bibliographic references

Citations stored in a reference management system can be used in different ways. They can be searched, commented and annotated, cited, shared and included in bibliographies. Retrieving References: A reference management system has a search functionality that can be used to easily retrieve citations matching a certain criteria: authors, keywords, publication dates, etc.

Taking notes: Stored citations can be edited to add personal comments and notes. This feature is a convenient way for a user to keep track of what parts in the document are relevant and also to remember what the overall opinion about the document or how the information in the document will be used. Citing: One of the great features of a reference management system is the capability to generate and format lists of references. When installed on a workstation some reference management systems add new functionalities to the word-processing software like Open Office writer or Microsoft word. Usually the new functionalities are materialized buttons on the toolbar of the authoring software. Clicking on a button while writing allows the user to retrieve a citation from the reference management system collection and insert it in the document being edited. Another button is available to generate and format the list of references at the end of a document and format the reference according to different citation styles.

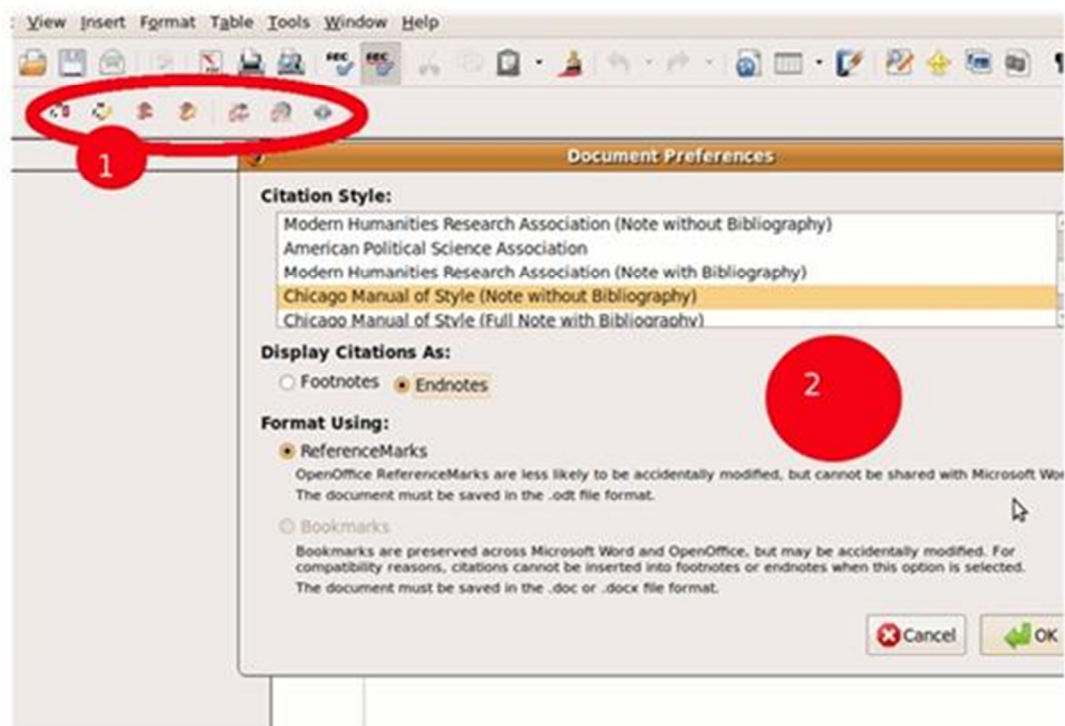


Illustration 2: Zotero and OpenOffice integration

While writing document users can cite documents and generate list of reference. The Zotero extension for OpenOffice.org add new buttons on the toolbar (circle 1). Clicking on the insert button for the first time prompts a list of citation styles user can choose from (circle 2). Citation style: is the way the reference is presented in a list of references. A citation style defines what

elements must be included in the citation, the position of each element in the citation, its appearance and what punctuation marks precede and follow it. There are many citation styles. In the biomedical and health sciences field the “Uniform requirements for manuscripts submitted to biomedical journals” (1) and the “the National Library of Medicine (NLM) style guide for authors, editors, and publishers” (2) are widely used. When writing a journal article it is recommended to refer to the instructions for authors to know what citation style is accepted by the journal you plan to submit the article to for publication.

Sharing Citations

There are several methods of sharing bibliographic references. These depend on the tools being used and people involved in the sharing. Citations can be shared as a list of references, as a computer file that can be imported in reference management software, or online. Most reference management tools allow users to generate a list of selected references. The list can then be printed and handed to students and colleagues, attached to an email or published on a website

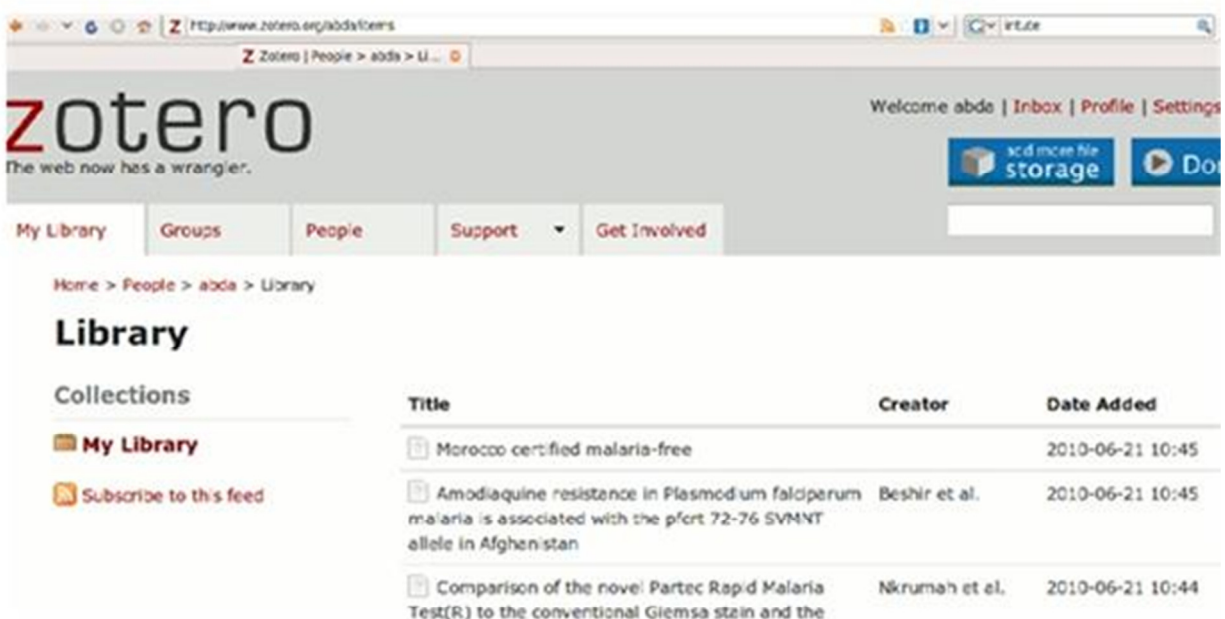


Illustration 3: Online copy of a collection of bibliographic citations created with Zotero

Many reference management softwares are able to export records to or import them from a computer file. There are different file formats used to exchange citations: RIS, EndNote, BibTex. When sharing citations, it is important to choose a file format that can be understood by the tools used by the people who are sharing the citations.

Most online tools allow users to share and collaborate. With Connotea a user can share an entire collection or a set of references online. With Zotero, several people can collaborate and maintain a group library (collection of references). Members of a research team or students in a class may maintain a group library to share their findings.

Recommended Techniques

Computerized Bibliography Management Tools

Here are a few recommendations on how to use a reference management software efficiently:

- Use reference management software to store citations,
- Create different collections (libraries) for different tasks and topics,
- Use consistent keywords to describe the content of documents,
- Add your notes and comments to citations,
- Centralize your citations in a single location,
- When working on different workstations find a way to have identical copies of your data on each computer,
- Delete citations you don't need any more,
- Indicate the location of document.

Paper Based Management Tools

- Store citations in a single place,
- Have a consistent approach in grouping citations,
- Write one citation per page. The space left on the page may be used for notes and comments,
- Tag citation with keywords,
- Use different colors for different information when annotating and commenting on documents.

Management of Bookmarks

Traditionally a bookmark is a piece of paper, textile, wood or some other material readers insert in a book to indicate pages they want to read or refer to again. In the context of the Internet a bookmark is a reminder of location of a web resource. Bookmarks are stored locally on a user's desktop. Nowadays bookmarks can also be stored online.

Bookmark Management Tools

Bookmarks can be managed within the browser or using an external tool. Most browsers have bookmarking feature: in Mozilla Firefox, that feature is called bookmarks (3) while Internet Explorer calls it “Favorites”.

In addition to the browsers bookmarking feature, there are online tools offering bookmarking functionalities. Most of these online tools allow users to create an account login, add web address, organize and retrieve them.

Bookmark Management Techniques

Managing bookmarks consists of the following activities: creating, organizing and using them. The following are the techniques used in bookmarking:

With a Web Browser

While you are browsing the Internet, when you come across a resource you desire to revisit later on, add it to your bookmarks. In Firefox you do this by clicking the Bookmarks/Bookmark this page.

Give a name to the page. This is usually automatically created by the browser, but users can change the name to something more meaningful to them and easier to remember.

Select the folder in which you want to store the new URL. If it does not exist, you can create it.

Organize your bookmarks into folders: Even though browsers allow users to have their bookmarks in a flat list, it is better to group them into folders. You may create folders by topic, type of resources or intended use etc. Bookmarks are organized using a bookmark manager which is available under bookmarks/Manage Menu.

Add description: Description is a small portion of text describing what the resource is about. It's a kind of a short abstract. Description can be added at the moment of creation or later on.

Bookmark manager allows the user to reorganize the bookmarks by:

- Moving them across folders,
- Editing , deleting and sorting them,
- Tagging with keywords,

Firefox bookmarking capabilities can be extended with the help of many extensions and add-ons.

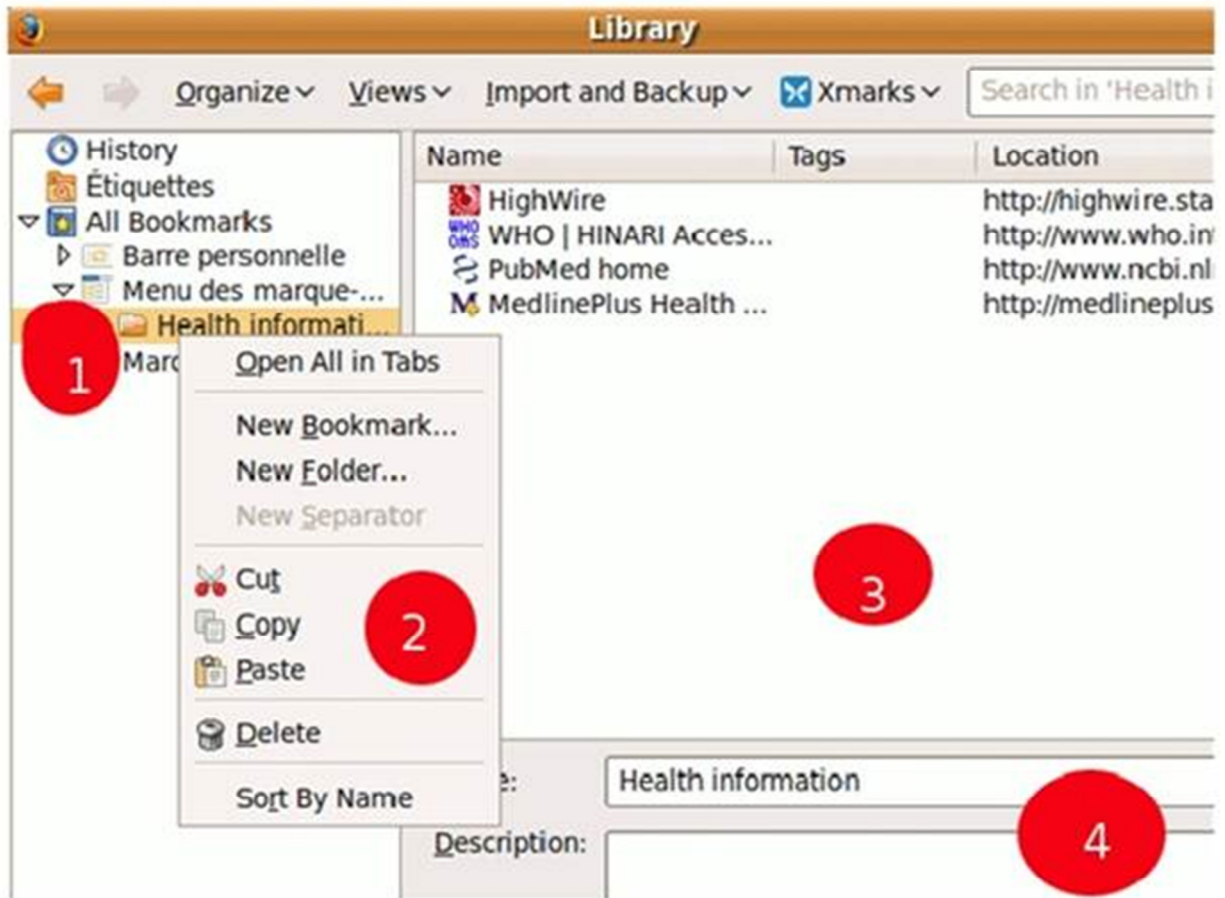


Illustration 4: Firefox bookmark management function

Firefox bookmark management feature allows users to group bookmarks in folders (circle 1), copy, move or delete bookmarks (circle 2), edit bookmarks (circles 3 & 4).

Online Bookmarking

Online bookmark management tools are websites that allow users to store URLs. They act like the bookmark functionality of your browser. These are also called social bookmarking. Online bookmarking is popular for mobility reasons and the ease of sharing and collaboration. There are many online tools such as Delicious, Digg, Yahoo and Google in addition to free email accounts offered by online bookmarking tools.

Online bookmark management systems have the following advantages:

- They are available from almost any computer with internet access. Therefore users are not tied to one workstation*
- They make sharing and collaboration easier,

- They allow accessing bookmarks created by other users and may be used as discovery tools.

However online bookmarking requires internet access for both storing and retrieving bookmarks. One can argue that it is a waste of bandwidth, a precious and scarce resource in Africa. Online bookmarking tools are run by companies that can change owners or usage policy frequently, therefore reducing the stability of the tool.

Almost all of them work the same way. They require the user to have an account to be able to log in and add new bookmarks. To use delicious for instance, a user needs to create an account (register). After registration he/she will receive a username and password. To store bookmarks users have to:

- Login into an existing account,
- hit “save a new link”,
- describe the web page by giving its url, title, description, tags.

In “delicious” bookmarks are organized using tags, one word keywords are used to describe the content of bookmarked resources.

*Most online bookmarking sites are categorized as “social websites” and are sometimes blocked by firewalls.

“Delicious” buttons are available for different browsers. These buttons integrate the browser toolbar and allow users to store and manage bookmarks into “delicious”.

Box 4 : Online bookmarking tools Here is short list of online / social bookmarking websites

- Delicious <http://delicious.com/>
- Digg <http://digg.com/>
- Yahoo! Bookmarks <http://bookmarks.yahoo.com/>
- Google Bookmarks : <http://bookmarks.google.com/>

In “Delicious” a visitor can access their own and other people's bookmarks. There is no need to login to access public bookmarks created by other users. Bookmarks can be retrieved either by browsing or by searching. They are usually browsed by username, tag and can be searched using keywords.

Note: Users with Yahoo and Gmail email address can use their account for bookmarking. Yahoo! Bookmarks and Google Bookmarks have few advantages: the reduction of usernames and passwords the user will have to manage, the possibility to login once for the email and bookmarking service and the centralization of user's data under one username.

• **Xmarks, a Mixed Solution**

Formally called Foxmarks, Xmarks (4) is an online bookmarking solution that relies on browsers bookmarking feature. It acts like a remote backup of locally created bookmarks. Xmarks has the following advantages:

Users can access bookmarks when away from their usual workstation,

- Bookmarks created on different computers can be centralized and replicated. People working and accessing Internet on different computers (the office desktop, the desktop at home, laptop) usually have their bookmarks fragmented and dispersed. At the end of the day they become difficult to retrieve. Using Xmarks to synchronize contributes to building one collection of bookmarks.
- Duplication reduces the chances of losing one's bookmarks in case of a computer crash or other problems. Using Xmarks to synchronize bookmarks created on different computers or browsers will create a copy of a person's bookmarks on each workstation and online,
- Coherence: Xmarks help maintain the same organizational structure of bookmarks irrespective of the user's location.

To use Xmarks one need to create an account, download an extension to his browser, and synchronize his bookmarks on a regular basis. Xmarks extensions are available for different browsers: Firefox, Internet Explorer, Google Chrome and others.



Illustration 5: Bookmarks saved online using Xmarks

On this illustration the username (circle 1) is provided, the bookmarks are group in folders (circle 2), bookmarks can be move across folders (circle 3)

Definition of Terms

Abstract	is a brief summary or description of the content of a document.
Bibliographic record	is information elements that given together describe a document in such a way that it can be identified. Examples of such elements are author name, title, date of publication, etc.
Bookmark	is used to designate a record of the information indicating where a document is available online
Bookmark Management System	is web browser feature, desktop application or a website that allows users to keep track of the web pages interesting to them. Citation: is reference to a document used as source of information. Sometimes a citation is used as the synonym of bibliographic record.
Citation Management Software	see reference management software
Keyword	is a term consisting of one or more words used to name a subject or topic discussed in a document.
PubMed	is an online database of bibliographic records describing journal articles published in the biomedical field. PubMed is produced and updated by the US National Library of Medicine
Reference Management Software	allows a user to collect, organize, retrieve information describing documents as books, articles, and Web sites, etc. Some Reference management softwares can work with word-processing software to cite documents while authoring a paper and generate a list of references as footnotes or at the end of the paper.
Tag	see Keyword
URL (Uniform Resource Locator)	is a set of elements that indicates where an identified resource is located. The term URL is widely used to indicate the address of a document on the internet.

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