Bibliographic software: A cite for sore eyes

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"Proper" bibliographic referencing when written out was, and is, a time-consuming process. This article reviews the features of the software now available, looking at free and commercial products and how they might meet the needs of different users.

INTRODUCTION

Anyone who wrote their theses or research papers in the 1980s (as I did) will remember the nightmarish business of keeping track of references. Having found the item on a library shelf and copied a sentence or two to bolster your assertions, you then had to write down in laborious detail the name of the journal, the title of the article, its date, the authors' names, the volume and the page range – a process that often took longer than writing out the quote. This all then had to be regurgitated in alphabetical order in precisely the correct form in one's bibliography, and cited accurately in the thesis or paper itself. To make matters worse, different subjects like biology and history usually insisted on different citation methods.

I remember thinking at the time how sensible it would be to give every potential citation its own unique identifier, and just use that instead. Years later Tim Berners-Lee stole my idea, and the rest, as they say, is history. But even in this connected century, academic supervisors and scientific journals still insist on "proper" referencing. Fortunately, there is now an abundance of software to make the task easier.

This article begins with a look at the basic features of bibliographical – or "citation" – software, then goes on to examine a few of the better-known programs in more detail. Since the usefulness of a citation program increases over time as you accumulate more and more references, it's important to start off with one that will meet your needs in the long term. As usual, the more powerful software is also harder to learn, but it may repay the effort. Fortunately, there are several recognised standard formats that most of the programs can import from and export to, so if you do need to change from one to another all is not necessarily lost.

GENERAL FEATURES

The core of any bibliographical system is a database of references. This may be stored locally on your own PC or in the "cloud" online. The usual pros and cons apply: locally stored data is quicker to access, more secure, and doesn't rely on internet access being available; however, online storage can be accessed from any PC with an internet connection. Most major bibliographic programs support two-way synchronisation, so local data can be backed up on the web and vice versa.

The old-fashioned method of entering references involves typing them in to a form, tabbing between fields. All bibliographic programs support this. Newer methods involve reading information off webpages – sometimes called "page scraping" – or downloading them from online databases. Access to free online databases is often built in to the application – PubMed searching, for instance, is pretty well ubiquitous – but to find and download citations from commercial databases you will need a paid subscription. This may be available through your employer or learning institution.

For web-based references, point-and-click or click-and-drag methods can often be used to create a reference for a particular webpage. Sometimes links on a webpage can also be added by right-clicking or dragging them to the database panel.

Once they have been added to your collection database, references can be sorted, edited, categorised into groups and subgroups, tagged, selected, deleted or printed in various formats to use as a bibliography. Most programs now support a system variously called "cite while you write" or

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"write-and-cite", whereby the bibliographic program installs a new toolbar into your word processing program. Press a toolbar button and a list of citations comes up; select one, and a correctly formatted reference is placed in your text, while the citation appears as a footnote or in a bibliography at the end of your document.
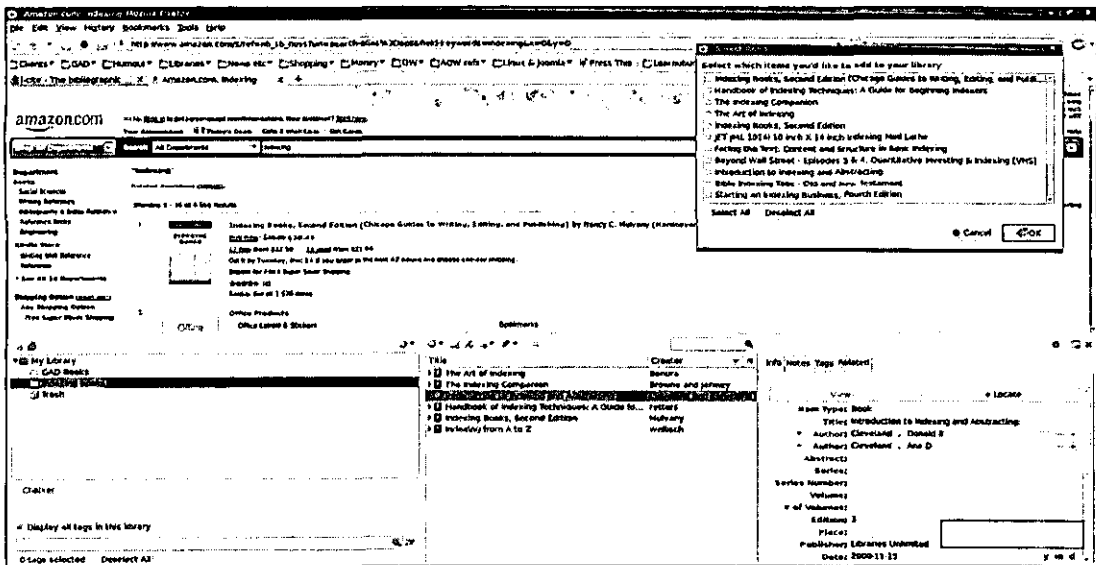
Bibliographic applications with online storage also allow for sharing references, so a group of collaborating authors – or even a whole department -- can work from a single master list of references to which they can add their own citations.

Now to specifics.

ZOTERO

Zotero (http://www.zotero.org) is a free web-based citation manager that stores its data on your disk but allows for optional synchronisation with a copy in the cloud. It installs as an extension to either Microsoft Internet Explorer or Mozilla Firefox (no Google Chrome version yet, alas) and thus runs on almost any platform or operating system. Word processor plug-ins are also available to connect it with Microsoft Word or OpenOffice Writer. Users need to set up a free password account with Zotero, and Firefox must be running, though not necessarily connected to the internet, when you use Zotero for write-and-cite work.

FIGURE 1 Zotero prepares to enter book citation details from an Amazon search page
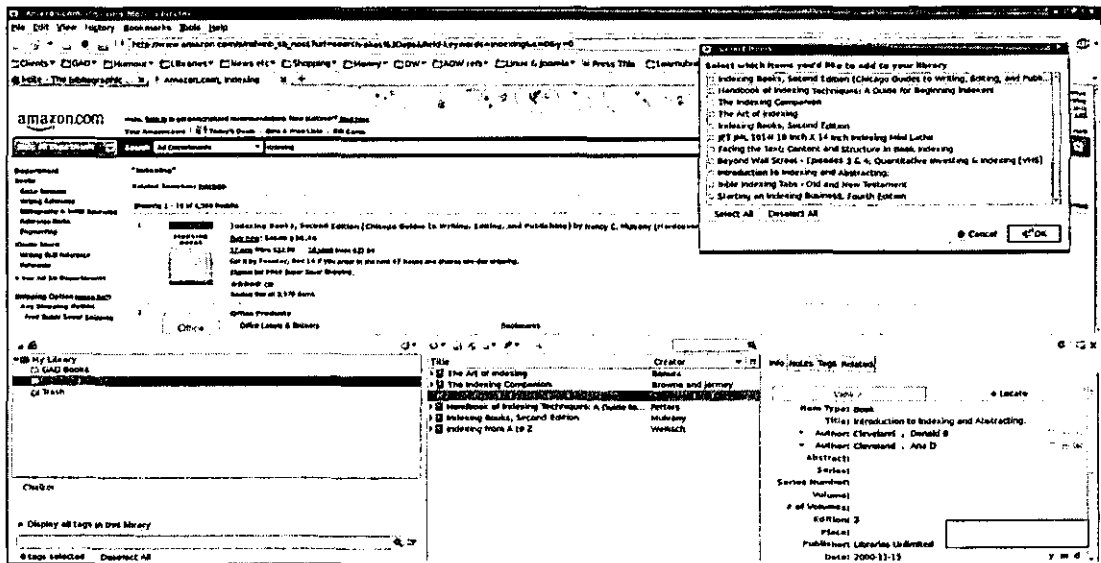

When Zotero is running, it displays a small symbol at the right of the status bar in your browser. Clicking the symbol brings up a size-adjustable pane occupying the bottom half of your screen. The pane is divided into three resizeable parts. The leftmost section shows a hierarchical set of folders and subfolders corresponding to categories and subcategories that you have defined. It also shows any tags you have defined, as small labelled buttons. The pane can be hidden, or maximised to a full screen display, at any time.

The central section of the Zotero pane shows the references you have collected. Selecting a particular folder and/or tag(s) at the left filters the display to show only matching references. The references can be sorted alphabetically or numerically by any field, and new fields can be added to the display. Available fields include language, year, date and publisher. An icon shows the type of reference -- standard options include books, journal articles, newspaper articles and webpages, but an extended list allows for more exotic media, such as maps, emails or video recordings.

Buttons at the top of the central section allow for new items to be added, and there is a shortcut button for making a reference to the current webpage. Zotero can also look up ISBN numbers, DOIs (Digital Object Identifiers) and PubMed ID numbers, and fill in the details of the citation automatically. The reference list also acts as a browser shortcut menu; users can jump to any cited webpage by double-clicking on the citation. Single or multiple references in the list can be dragged on to the folders or to the tags at left in order to categorise them.

At the far right of the Zotero pane a tabbed section shows detailed information for each reference. By default this includes author, title, abstract, date and language. Other types of information can be shown if required. A second tab allows the user to add their own formatted notes, and a third tab allows tags to be added or removed. The fourth and final tab is especially powerful in that it allows references to be linked, so that a chain or cluster of related references can be formed.

FIGURE 2   Using Zotero to find and enter a citation while writing a document in OpenOffice

To call on Zotero while writing a paper, the user must install the free Zotero add-in for Microsoft Word or OpenOffice. This adds a new toolbar in the word processing program with seven buttons. The first button adds a new citation, and the first time this is done the user will be asked to specify a citation standard from a list. Sixteen options are available including IEEE, *Chicago Manual of Style*, Vancouver and the US National Library of Medicine. This choice becomes the default citation style for that document.

Other buttons allow the user to change or edit the citation, insert or edit a bibliography drawn from those citations, refresh the display to reflect any changes made in the references, change the default citation style, or remove the field codes from the document – eg for conversion to plain text or a webpage.

Zotero has other tricks up its sleeve too. Point it at the Google Books or Amazon webpage for a particular book, and it can extract the book's details as a reference. If a Wikipedia page contains PubMed citations, Zotero will identify and extract them. On the PubMed website (http://www.ncbi.nlm.nih.gov/pubmed), Zotero can extract citation details from search results or specific pages. It can identify and add citations from a wide range of library catalogues.

Zotero references can contain file attachments (eg images or PDF files), which are stored with the reference and remain available. It can also display your references along a timeline – a handy way to
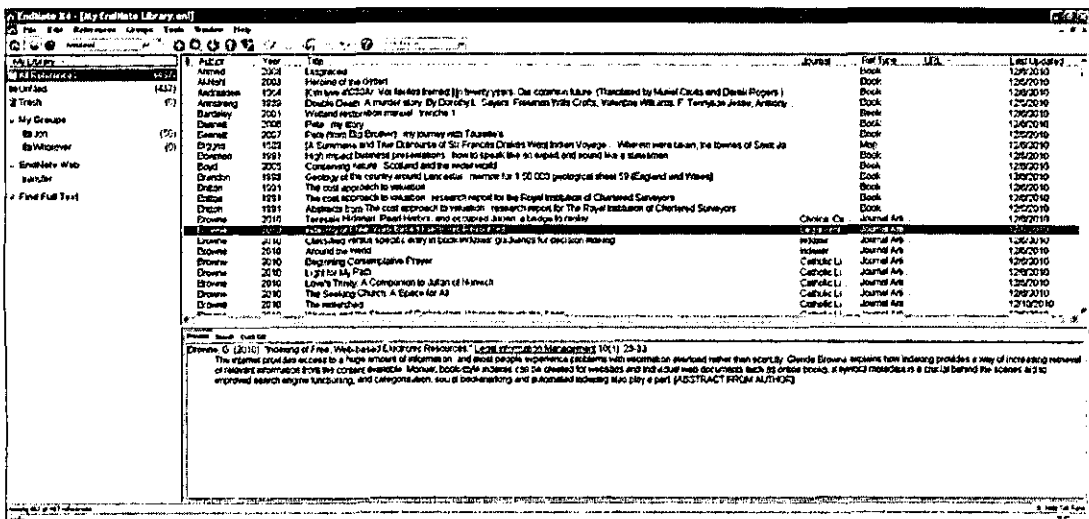
identify current developments in your field. Zotero can also export some or all of your references in a range of different open-source formats. All of these and several others, including MARC, are also supported for importing.

The free open-source Zotero is a hard act to follow, especially for users of non-Windows platforms like Linux and Macintosh. How do commercial offerings compare? Nearly all bibliographic software programs have free trial versions available for download, so I was able to test some of the industry leaders and see what they can do.

ENDNOTE

EndNote (http://www.endnote.com) from Thomson Reuters is an applications program for Windows or Mac computers. There is no Linux version. The website offers a free 30-day trial version, and also provides many predefined journal style templates that users can download and install. It integrates with Microsoft Word or OpenOffice Writer for its write-and-cite functions, and operates via Mozilla Firefox or Microsoft Internet Explorer (but not Google Chrome) for scraping references from webpages.

FIGURE 3   EndNote in operation on Windows XP

Installation was fairly smooth, though I had to turn off the OpenOffice Quickstart option in the system tray before it would complete. Unfortunately, the nag factor on the trial version is high, and I had to put up with many reminders that I could upgrade to the full version (at A$399 for a download, A$449 on CD with a printed manual).
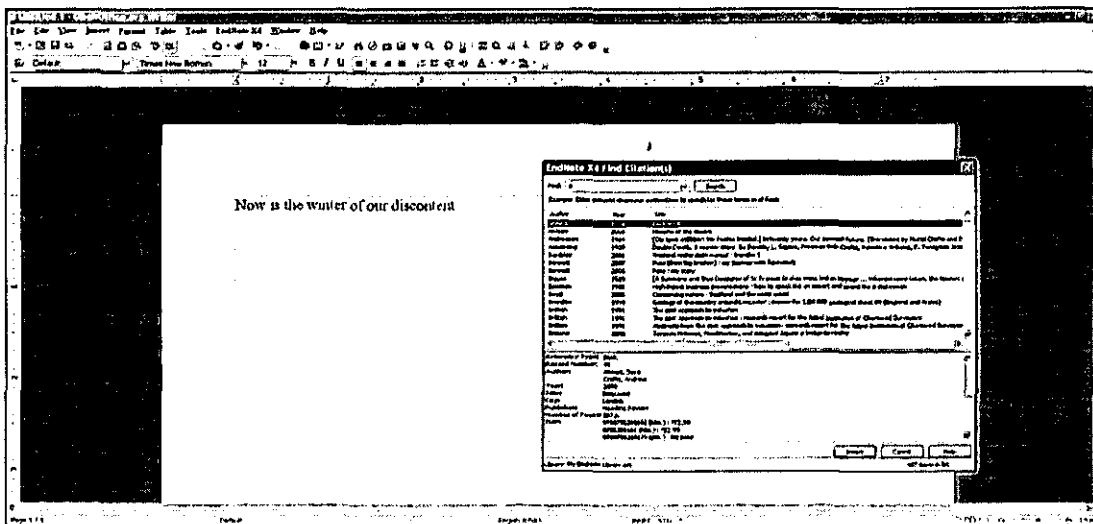
EndNote also opens in three panels, one vertical panel at the left and two horizontal panels at the right. It seemed less intuitive than Zotero, but it has many more options. The leftmost panel is used for categorising references into folders and subfolders, the upper right panel shows a sortable list of references, and the lower right panel is a tabbed display showing either a "preview" of the current reference, a search box or a quick edit panel. Double-clicking on a reference brings up a new window with a form listing the reference fields, which the user can then add to or edit. A spell checker is available and files can be attached to individual references.

The EndNote application uses its own toolbar icons rather than adopting the Windows standards, which is a little user-unfriendly and not what I expected in a relatively expensive professional program. I was also unimpressed that it added a whole new toolbar to Firefox, using up scarce vertical space, just to display two buttons. Especially so when one of them – the "Capture" button – didn't work without registration, and my attempts to register were met with the message: "NOTICE: You are not permitted to register for EndNote Web on this computer". This is *not* how to win friends and influence people.

On the plus side, the EndNote application has a built-in Connection Editor with about 100 predefined links to both paid and free data sources. These include Thomson Reuters-hosted databases such as Current Contents and the Web of Science, as well as others like the British Library, Library of Congress and Picture Australia. More than 4,100 additional links are available online as connection files to download and install – a process that only takes a few seconds. In the unlikely event that you can't find the one you need, you can create your own "connection file" defining the data layout of the source you will be using.

Once collected and categorised, any or all of the records can be exported in a wide range of different styles. These are all in plain text, but bolds and italics are preserved with special slash characters that most word processors will be able to read and interpret. A "Formatted Copy" option allows a formatted bibliography to be exported via the clipboard. For input, EndNote will import records from a huge range of formats and character styles.

FIGURE 4   Using EndNote to find and enter a citation while writing a document in OpenOffice

For write-and-cite work, installing EndNote adds a new menu and a new toolbar to Microsoft Word or OpenOffice Writer. Both menu and toolbar contain the same items, which closely resemble those found in Zotero. These give the user options to enter a citation, format the citation style, search for citations on the basis of text selected in the document, edit a citation once inserted, "unformat" the citations, and jump into the EndNote program. These all ran smoothly and produced an excellent result. EndNote must be running in the background for write-and-cite to work.

Thomson Reuters also produce Procite, another reference-handling package with similar features but a smaller range of input and output option, and Reference Manager, somewhere in between the two. Searches in Procite appear to be limited to PubMed and the internet via Ovid. Reference Manager has a couple of other options. Procite and Reference Manager both support write-and-cite, but only in Microsoft Word and WordPerfect.

CONCLUSION

For my purposes, I found Zotero was more than adequate, but for an individual or institutional subscriber to online databases, EndNote or one of its companion products could be valuable. I would certainly recommend one of them to anyone writing monographs or research papers. The reason for Thomson Reuters maintaining three separate applications that do the same thing eludes me, and I would prefer to see them combined into a single program with a broad user base covering all platforms – Windows, Mac and Linux – and linking to a wider range of word processing and web software. With the time saved from duplicating efforts, EndProManager – or whatever they decide to

call it – should be able to offer even more powerful features. Dedicated open source users, meanwhile, will have to make do with Zotero or the free but limited Bibus system (http://www.bibus-biblio.sourceforge.net).