

What a reference manager can add for a physician in web 2.0 era

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Building knowledge is an incremental process that happens by systematic use of previously stated bits of information to reach new ones. It can also be just looking to old cubes from another perspective. Referencing helps scientists and readers to trace back this process and acknowledges the efforts of previous researchers.

In the medicine field, Index Medicus, which was indexing medical literature since 1879, became the backbone of medical bibliography and started to be digitized in 1964 as a part of US national library of medicine (NLM). Searching in this database was made available electronically inside libraries as The Medical Literature Analysis and Retrieval System (MEDLARS) and later as online service (MEDLARS online or MEDLINE), in 1971, but it remained accessible within certain libraries too. PubMed, which incorporated free version of MEDLARS, was made available in 1996. Currently, Medline contains 20 million indexed citations growing with 730 000 new citations every year [1,2].

Concurrently with the establishment of PubMed, online publishing of journals showed a marked increase facilitating the indexing and accessibility of full text.

Reference management has come a long way since the time they were written on cards and kept in boxes to the time, where reference management softwares were developed to allow scholars to store publications and automatically manage citations.

With increased number of journals and their citation styles and tremendously growing number of publications, the need was urging for automating the process of identifying, collecting, storing, and retrieving relevant scholarly information.

The revolution of information technology in operating systems environments of early 1980s has inspired

programmers to develop software for helping researchers develop their articles and integrate bibliographies easily with it. To the best of our knowledge, this was started by 'Bookends' for Apple computers and 'Reference Manager' for Microsoft Windows operating system in 1983 and 1984, respectively [3–5]. This was followed by integrating referencing tools with popular word processors. There were trials from word processor software companies to build its own bibliography plugins with limited functionality.

Many reference management software packages were developed over the following years, including Endnote, RefWorks, BibTeX/LaTeX-based programs, Zotero, Mendeley, and, last but not least, Qiqqa [6]. While many reference management gears share the same features including importing from other programs, linking to full text and retrieving PDF citation, searching online databases and selecting from query results, integrating queries with online identifiers such as DOI and PMID and creating bibliography inside the manuscript and independently inside the referencing program [7]. Among those, only Zotero and Mendeley were the freely most widely used programs [8].

Zotero has introduced an easy way of importing and sorting literature with its integration with the famous free internet browser, Firefox, in 2006 [9].

Mendeley, as a reference manager software, has succeeded overcoming many of the shortcomings that scholars face with other reference managers packages, starting with it being an open source, to being able to synchronize, share, and analyze [6,8].

Mendeley has introduced three unique features that resembled an understanding of the change in the users' needs and behaviors. The first is integrated PDF management including searching, indexing, annotation, and highlighting files, which allowed researchers to extract

ideas from papers they read and sort it in a meaningful way, beside the ability to share such ideas with colleagues.

The second feature is synchronizing the offline library with the online Mendeley repository. This allows the researchers to have their own library of papers and citations mirrored to all of their computers. Many packages followed this concept after that [10].

The third and most important feature is that it transferred the concept of social networking to reference management. After the researcher builds his library, creates folders, and sticks the identifying tags to his papers, Mendeley discovers the user interests and starts suggesting related publications. The networking was focused around the citations or documents itself, common topic or interest, and researcher profile. It allowed the researchers to create public and private groups to share citations and documents and discuss those papers with teamwork. Moreover, it helped them to establish an online professional profile that integrates scholar publications, interests, and contacts, and connected them with other researchers in the field.

With such huge backend of two million users, 200 000 workgroups and 365 million papers in users' libraries, Mendeley had coined a new term for the research community, which is crowd-sourced referencing and citing, bringing really important and relevant publications back to stage [11].

When we introduced Mendeley to undergraduate medical students in clinical research training programs to assist them working collaboratively on their research papers, they reported an easy interface with rapid learning curve, few technical difficulties and mentioned that it facilitated working collaboratively on the same paper when it was joined by Google Documents [12].

Newly developed software including Qiqqa, Docear, and ReadCube tried to introduce three new concepts: mind mapping/brainstorming of ideas and article structure, visual mapping of related articles, and

enhanced PDF files, but most of their features are still under development.

Previously, many research portals were introduced to manage networking between researchers around the world based on their interests and locations, whereas others focused on their profiles and many others discussed specific research topics. A review written by Hull *et al.* [9] suggested that future digital libraries will be more social, personal, integrated, and based on web communities. We believe that currently successful applications are walking this boulevard. There is no doubt that these multidimensional tools are changing the face of knowledge construction in the conceptualization age.

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Conflicts of interest

There are no conflicts of interest.

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