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Zotero: Information Management Software 2.0

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The open-source citation management program Zotero meets the needs of advanced information management professionals, but does not give the impression that it was created solely for them. Rather, it harnesses the lessons of modern interface design and ingrates them with powerful bibliographic tools. This makes Zotero relevant to information professionals while also having a broader appeal that harnesses the best of Web 2.0 design. This dual purpose manifests itself throughout the program's feature set. Zotero has many powerful tools that add functionality for users who want to maintain bibliographic control, but it does not force this model on all users. These advanced features operate "under the hood" and in service of a program that cribs from the iTunes interface and functions just as well with Youtube as with EBSCO databases. While Zotero can be utilized to create vast databases of bibliographic information, it also meets the needs of patrons who want to find an easier way to cite papers or share Wikipedia articles with friends.

At its heart, Zotero is an information management system similar to Endnote or RefWorks that can be used to collect, organize, and cite information, with an emphasis on bibliographic information from online sources. As an open-source project, Zotero is available for free to users around the world and is constantly evolving its feature set. A full list of what it can do is most accurately conveyed on their website. So rather than try to list all of its components here, I will focus on key features that exemplify why Zotero should be seen as relevant to information professionals looking for ways to make library resources less intimidating to patrons.

Collect

Zotero's core functionality enables users to easily record the relevant citation information from online items and store them in a flexible personal database that can then be used to generate internal citations and/or bibliographies. By integrating this functionality with the Firefox web browser, Zotero is particularly well suited to record information from online sources. Because Zotero is an add-on to Firefox (a standalone desktop application is currently in development) the user does not need to open a second application (Maron, 2011). Instead, any time the user is browsing within Firefox, he/she is already only a click or two away from being able to utilize Zotero's functionality.

Given the prevalence of information online, this is ideal for many researchers. In addition to the online catalogs and databases that Zotero supports, it also has integrated functionality with many websites. This includes popular websites such as Wikipedia and the New York Times, as well as lesser known sites such as the Internet Archive. When using websites that have a Zotero translator, all items are exported using the same universal interface that does not change. Instead, whether the user is on Youtube or PubMed, he/she can ideally click an icon in the address bar to download citation records (Puckett, 2010). While this does not always work perfectly, it represents an intuitive and universal method for importing records.

Organize and Annotate

Zotero then creates a database of items with as much bibliographic information as it is able to harvest. That database can then be edited and organized according to the preferences

of the user. The full functionality of reference management software is there, but it also works equally well for users who simply need an easy bookmarking system. Zotero integrates with link resolvers, making it easier for patrons to return to items for which the library provides access. This enables a user to return to the digital version of a document later, without having to download the full-text the first time they find the item.

The database Zotero creates can also store a copy of the original item, whether it is a PDF article or a snapshot of a website. Once stored, items can be annotated and analyzed using a wide variety of methods depending on the preferences of the user. While most systems strive to give the user flexibility, what is notable about Zotero is how it has combined, adapted, and improved familiar organizational models to create a powerful new tool. The promotional materials on Zotero's website frequently tout how similar Zotero's interface is to that of the popular media player iTunes (kalvesmaki, 2010). For many users this is a powerful hook and offers a helpful reference point for how to navigate the interface. It can also put off users who have negative associations with iTunes or imply limitations that do not exist. While the iTunes analogy is apt because it describes the general layout it also fails to convey the depth of control advanced users can expect.

In some ways, it is more helpful to think of Zotero's database as a robust folder system. Each folder can contain many subfolders, and items can be dragged between folders or exist in more than one folder at a time. The folder system is optional; users are free to put all of their items in the same folder and rely on one of the organizational systems such as the Web 2.0 tagging that allows for the possibility of a customized controlled vocabulary. Alternatively, users can connect their items to each other through a "related items" system. In addition to being

able to link items to other items, they can also be related to files such as PDFs.

Built on top of these organizational systems is the ability to annotate. For instance whenever a website is brought into the Zotero database, it automatically creates a snapshot of the site. Users can then mark up their archived copy of websites. They can also create stand-alone notes that can be related to items or exist on their own. These notes can contain as much or as little information as the user puts into them. Once created, they are searchable and have the potential to be integrated fully into the research process or be ignored entirely.

Most users will probably end up using some combination of the above mentioned features to organize and annotate their database of items. When organization breaks down, Zotero includes both basic and advanced search options. Whenever Zotero is open, the simple search box is always available. This search includes the robust metadata within Zotero, both the data created by the user, such as the aforementioned notes, as well as whatever bibliographic information it was able to bring in from the original citation. Once you have results, the central panel can sort them to refine the search. If the basic search resembles Google in its simplicity, then the advanced search resembles a library database. The advanced search can perform complicated, multifaceted searches in any of the over sixty fields that Zotero tracks. When new items are brought into the Zotero database that meet pre-defined search criteria, Zotero can continue to auto populate “saved search” folders.

Cite and Share

While researchers will inevitably find new and creative uses for the bibliographic data stored in the Zotero database, the most common use for the program is likely to be to

generating citations for research papers. On its most basic level, Zotero can be used to download bibliographic data and export it according to style guides. This capability is not limited to word processing software. Citations can be highlighted and dragged and dropped from the database into almost any text field, including chat windows, blogging software, or e-mails. Users can also choose to export their bibliographies as html that will let other Zotero users easily download the citation information into their own Zotero database.

The ability to export citations easily is useful not only for bloggers and other patrons who need to communicate about information with each other, but also for information professionals who may be using new technologies to perform reference work in an increasingly digital world. For instance, during reference interviews, Zotero can keep track of items that are worth returning to later but are not worth distracting from the search to locate immediately. In e-mail or during chat reference, Zotero offers new opportunities for sharing the results of searches with patrons.

With the addition of an optional plug-in for your word processor, Zotero can also serve as a cite while you write tool, creating in-text citations and automatically generating bibliographies according to style guides. For many users, this makes writing academic papers significantly easier by reducing the amount of detail work (Muldrow and Yoder, 2009). It is also helpful when the author has to submit a paper in a format other than his/her preferred format. He/she can write the paper using their preferred style, and then switch the entire document to the new style upon completion. For example, a user could then write using footnotes, and generate a bibliography based on the items they cited. Before turning the paper in, he/she could then convert the footnotes to in-text citations.

Advanced Users

While this ease of use makes it easy to promote to a general audience, Zotero does not sacrifice more traditional input methods. On websites that are not compatible with Zotero, users can still open the program and have it grab a significant amount of information. Any website can have the date and time it was accessed, title, and other basic information stored in a record the user can manually edit. Websites are always archived by default, so that if they change later the user can refer back to the site at the time he/she looked at it. This makes it a powerful tool for researchers who use websites as primary documents.

Zotero's integration with the internet should not distract from its power as an all-purpose database. Full bibliographic records can be typed in manually or imported using ISSN/ISBN numbers. If all the user has is a PDF, the metadata can often be retrieved through Google Scholar. In fact, the items put into Zotero do not even need to be primarily items with bibliographic information. The bibliographic fields can be ignored entirely, and Zotero can be used to organize almost any kind of file. Because the online shared bibliographies can also be automatically published online in a RSS (Really Simple Syndication) accessible format, this allows for the generation of online, constantly updated, and collaboratively generated "living" bibliographies.

Zotero 2.0 & Conclusion

The RSS functionality stems from the 2.0 update Zotero released in 2009 (Owens, 2009). This update added extensive online features that built upon the core strengths of the program.

Users can now sync their libraries from multiple computers and, perhaps most significantly, citations can be shared in group folders that can be configured for various levels of privacy. This allows small groups to work together on projects or open up their library to create collaborations with other Zotero users around the world. The same website that houses these bibliographies can also house mini-profiles of users in ways that resemble a social-network. Should users opt-in to it, Zotero's website can build upon these online features to help users connect with others who share similar interests.

The flexibility and range of possibilities exemplified in the 2.0 update highlights the underlying nature of Zotero. It has core functionality that works easily and simply. Beyond that exists a wealth of additional features that can be ignored by casual users or harnessed on an as needed basis. For instance, while Zotero has impressive online functionality, it can also be run as an offline database, and it does not require constant internet access to function. For users who do not want to download items from within their web browser it has the ability to serve as stand-alone program that just happens to use Firefox at its core. It has features including a timeline generator which creates visual timelines of citations and the ability to retrieve metadata for PDFs using Google Scholar. Jargon like SFX may be foreign to many users, but the fact that Zotero can use library link resolvers to get patrons back to a resource they found earlier has wide appeal. Similarly, the fact that it archives copies of websites may go unnoticed by many, while other users may find it to be a lifesaver when the webpage they wanted to cite has been changed. Just as cloud computing can be an intimidating term, but being able to access your Zotero database from multiple computers is now an expected feature for many users.

Zotero is by no means a perfect program. To get the most out of it requires that libraries be prepared to offer a new type of technical support that relies on using the Zotero official forums rather than calling an official help line. While it works with many sites, there are still some important online resources where downloading citations requires workarounds that detract from the simplicity of the core design. However, it is constantly improving and because it is open-source one of the factors that helps it improve is the amount of support it receives from the wider community of users. Just by promoting Zotero libraries will be helping to make it better.

The open-source mission of Zotero also finds it in sympathy with many library values. Libraries are institutions that value the sharing of information. Available in over thirty languages, Zotero reduces barriers to information for library patrons and information seekers around the world. Most crucially however it meets a core need of many libraries by making it easier for users to manipulate the often complex bibliographic information that libraries provide without sacrificing what is valuable about that information.

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