

# Beyond Searching: The Evolving Role of Librarians in Supporting Citation and Information Management

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## Introduction

The rise of the web has altered the information landscape drastically. While students and researchers have more access to information than ever before, managing this information has become an increasing challenge. Old systems of keeping track of citations in a notebook are no longer practical, since so much research is done online. Instead, researchers have a need to manage their citations electronically and have a good method for citing, sharing, and searching them easily.

Citation management software has been around for over two and a half decades [1]. However, recent developments in software technology and the electronic availability of scholarly literature have both spawned new citation management software products and made these software products much more efficient and effective in the last few years. As a result, the prevalence of this software has increased among scholarly communities, and with it has increased the need for support and training in its use.

In this paper, we'll discuss the changing capabilities of citation management software, historical and potential roles of librarians in the support of the software, and the successes and challenges of using of a team-based support model in the MIT Libraries.

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## History and background

### Early citation management products

To get an accurate idea of the evolution of our support model, we must examine the history of the landscape. In the past, the array of software options for citation management was much narrower. In the 1980's, there were only a few options for citation management software, including Reference Manager, ProCite, and EndNote. These products were proprietary and required purchase and installation on the local machine.

As technological capabilities grew throughout the 1990's, so did the strength and features of these programs. Adoption of the Z39.50 protocol enabled these products to strengthen and expand their connections with library catalogs and some databases. Direct export functionality offered the ability to search in the native database interfaces and easily add the results to a citation collection. Advances like these made for increasingly seamless transfer of references from a database or a catalog to a personal citation collection.

In the late 1990's and early 2000's, new citation management software products were developed to take advantage of untapped technological advances. The prevalence of the internet led to the creation of some web-based products, like RefWorks, and they required no download or local installation. In this way, a user's citation databases became accessible from any computer with an internet connection.

## **Role of librarians at MIT and beyond**

A quick review of literature and web resources can give us a good picture of how other libraries have been supporting citation management software. Many libraries offer web pages of instructional material both supporting the use of citation management products in general and offering specific instructions on how to use it with the library's specialized resources. Most offer a comparison chart with information on the benefits and drawbacks of each product supported. EndNote maintains a list of institutions that support EndNote with links to their help pages [2].

Historically, librarians have shied away from supporting software, and software instruction has been conducted by staff in information technology departments. However, librarians do offer training in using online resources and downloading references from databases, and as East stated in 2001, "from here it was only a short step to beginning to train researchers in the management of those references" [3]. In addition, many of the software products interface closely with library catalogs and proprietary databases, and librarians and library staff play important roles in making sure that the connection is smooth and seamless. Many librarians have accepted and even welcomed these expanded roles as they arose, viewing them as opportunities to connect with the community in a different way. However, as the citation management landscape has expanded, it has become increasingly difficult to support the software on an as-needed basis.

At the MIT Libraries, many initiatives are often championed and worked on by those librarians or staff members who propose them, and citation management was no different. One librarian observed the use of EndNote increasing on campus in the early 2000's, and decided to begin offering classes to support it. He drew in other library staff to assist, but he clearly played the role as the main point of support. When RefWorks became a viable option, the same librarian worked to propose the purchase of a site license, and when access was activated in May of 2005, he spearheaded the promotion and support of the new service. As usage and demand for classes and support increased and new software options requiring thoughtful research and testing arose, it became clear that this one-man support model would not be sustainable in the future.

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## **The present landscape**

### **Market status**

As the landscape in bibliographic software has grown and the number of available programs has increased, pressure has been placed on companies to develop more functionality to meet the needs of users. As a result, some of the major products from the past have declined in their importance or have faded away altogether, and many alternative programs have appeared that

offer different functionality. Several new products have been developed over the last few years, and some of these offer functionality not yet incorporated into older products.

Zotero, for example, has proven to be a major competitor, since it meshes typical citation management system features with new options, including a fully searchable pdf library, options to tag and sort items, and ability to take notes and highlight directly on html documents. Zotero is also interesting because it is open source product for which anyone can develop new tools. Other products that have emerged recently are listed in Table 1.

Software	Features
Mendeley	Social software system for managing and sharing research papers
Papers	PDF organization tool developed specifically for Mac
QUOSA	Tool for searching native database interfaces and harvesting full-text files of papers from those databases
RefAware	Current awareness service that saves searches and automatically notifies users when a new paper is published fitting the criteria specified in their searches
WebNotes	Online research tool that allows the user to notate and highlight web pages for later reference
Zotero	Firefox extension with typical citation management features; includes expanded PDF library functionality and tagging, sorting, and note-taking abilities

**Table 1:** Major features of a selection of recently-released information management tools

## The effect on libraries

This influx of citation management options puts libraries in an interesting position. Users are forced to choose between many different programs with different capabilities, and they often find it difficult to know which one will fit their needs. There is an opportunity to develop knowledge among library staff in order to help users to choose and use appropriate software to manage and cite their references. Although most companies offer their own form of customer support, librarians understand the needs of their own community better than a product representative, and there are often questions about how local resources work with products. Many research libraries have acknowledged that reference statistics are decreasing, partly because of the ubiquity of information [4], but this glut is also a major reason that users need help with the organization of their information. People need to manage different types of information from all over the web, including articles, data sets, web pages, and videos, but the task can feel overwhelming and isn't typically taught in classes.

Capacity is an issue for librarians to consider when supporting bibliographic management products. Since there are many constantly changing products, it would be unrealistic to think that librarians could know how to use every one, but it is realistic to know of several that would serve their community well. Evaluation of new products is critical, so that only the most effective and relevant programs for the community are supported and marketed. Periodic assessment of already supported products is also important, so that support is discontinued for programs that are decreasing in effectiveness.

Librarians are experimenting with many different support models to address these issues. The University of Tennessee has been teaching classes on citation management software since approximately 2002, with high demand pushing the program to offer at least twelve EndNote classes of 25 students per year. Recently, to meet this ever-increasing demand for support, librarians there have compiled an online EndNote tutorial to supplement and enhance their instruction practices. This endeavor allows librarians to reach a much greater audience and does not restrict instruction to particular class times so that students can learn whenever is most convenient for them. This process frees time for the librarians and makes instruction more timely for the students [5].

## **MIT's approach**

At MIT, a group has been formed to support the use of citation management software. The group, known as "Cite-help" because of its email address, cite-help@mit.edu, is currently composed of five people, one from each divisional library at MIT, in order to serve the unique needs of each community and to disperse the workload. The group reports to the MIT Libraries' Research and Instructional Support Group.

Cite-help provides first-line technical support to users through e-mail. The group currently supports three products: EndNote, RefWorks, and Zotero. Cite-help's creation was first publicized in March of 2008, and in the year since that announcement, the group has fielded over 40 help requests from patrons and other library staff. Group members work cooperatively to determine the best solution to user problems. If the group members can't answer a question, they ask the product's customer support service for help, and then communicate that information to the user and incorporate it into their background knowledge, in case the same issue arises again.

In addition to offering technical support, Cite-help educates users in a few different ways. Several times each year, members of the group coordinate and teach introductory classes, including "EndNote Basics," "RefWorks Basics," and "Managing Your References: Overview of EndNote, RefWorks, and Zotero." In the first half of 2008, the MIT Libraries presented 14 instruction sessions covering citation management software, reaching a total of 138 students. Video recordings of these classes are available online. Classes are scripted, so that any group member can teach any of the classes with little preparation time. In addition to offering classes in library space, group members are often invited to classes, labs, and departments to offer classes in community space. These invitations provide the group with an opportunity not only to teach the software, but to tailor the instruction directly to the audience, thus providing a more germane instructional session. When users need more specialized help, individual research consultations are scheduled. Since different researchers have unique needs for managing their information, the Cite-help group recommends certain products to users, and in some cases, they may even recommend using a few different products together to accomplish tasks. Group members have compiled a comparison chart (summarized in Table 2) to help patrons choose the product most appropriate for their needs [6].

	EndNote	RefWorks	Zotero
<b>Strengths</b>	<ul style="list-style-type: none"> <li>• Excellent for organizing citations for papers and theses</li> <li>• Best option for major research projects, because it offers the most options for customization and formatting</li> <li>• Most widely used product at MIT</li> <li>• Most output styles for formatting</li> <li>• Most customizable</li> </ul>	<ul style="list-style-type: none"> <li>• Allows users to share citations</li> <li>• Good for organizing citations for papers</li> <li>• Web-based</li> <li>• Since MIT has a site license, there's no cost</li> </ul>	<ul style="list-style-type: none"> <li>• Simple download of records</li> <li>• Good for managing a variety of formats, including webpages</li> <li>• Offers most functionality in a free, open-source product</li> <li>• Downloads records from with several databases that don't work with EndNote and RefWorks, including Factiva and USPTO</li> </ul>
<b>Cost</b>	Must purchase client software, available at MIT Coop; web version free for MIT	Free via MIT license. See the RefWorks guide for information on how to register.	Free; open-source Firefox 2.0 extension. Download Firefox, then download Zotero. Also works with Netscape Navigator 9.0 and Flock.
<b>Learning curve</b>	Takes longer to learn, but not difficult with training	Fairly quick to learn; many online user guides and demos	Quick to learn; simple design, many online user guides and demos

**Table 2:** Summary of a table designed to help researchers choose the appropriate citation management software for their project. The full table is published on the web [6].

Cite-help also maintains research guides that point users to appropriate vendor-provided software documentation and answer specific questions on how to use the software with MIT resources [7]. This system affords users the opportunity to learn about the software on their own schedules and to contact Cite-help with any specific questions that may arise.

The group plays an important role in the administrative side of support, as well, deciding which products to support and the level of support to provide, and liaising with vendors on matters including licensing discussions, bug reports, and



**Figure 1:** An example of one of the EndNote pages maintained by Cite-help to assist researchers in using the software with MIT-licensed resources.

enhancement requests. They also stay informed of recently developed products to consider expanding support. In the last year alone, the group has seen demonstrations of four new software products, with varying impressions of each. The group coordinates vendor visits for both library staff and the university community to showcase new products and to provide training on supported products.

Cite-help has been successful since its inception in 2008. Librarians from the system have lauded the new ability to refer questions to the group, so that they don't need to learn the products themselves. Users seem pleased with the service, and after teaching students, it's not uncommon to hear "I wish I would have known about this when I was an undergrad!" and "Do you think you could come to my lab to give a class?"

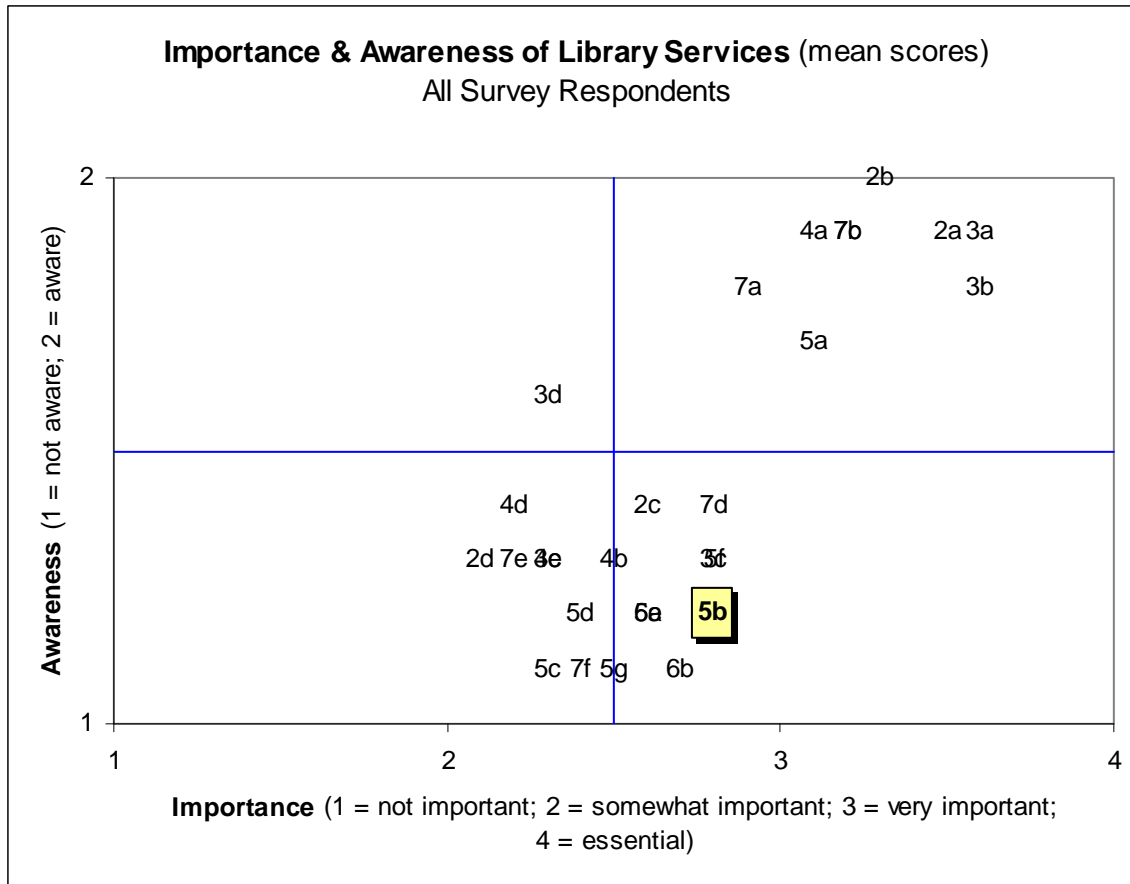
## **Challenges for MIT's support model**

While the service has been an overall success, there are a few challenges and shortcomings. It's been challenging to learn how to use the products at an advanced level. Troubleshooting the products forces the group to learn specifics for each product. While none of the products are overly technical, it still takes time to figure out some of the idiosyncrasies of each. While the members on the group are fairly persistent in troubleshooting, sometimes it may be faster to ask the vendor's customer service for help sooner.

The group has not come up with systematic criteria for evaluating new products. Many students and colleagues mention new programs that we should consider, and for the most part, we don't examine suggestions until a few people have commented about them. With so many products to investigate, a methodology for evaluation is key. This step has been informal at best, since it takes time and effort to develop such a methodology. In the future, we could develop a few simple tests for software, and if the program fits our requirements, we could consider it for further, more in-depth evaluation.

Communication within the group is mostly done with e-mail and instant messaging, and with five people on the group, it can be difficult to stay aware of questions that still need action. We could move away from communicating through e-mail and instead adopt the use of the reference tracking system at the MIT Libraries, so that we could easily keep track of which questions have been resolved and which questions still need action. This system would have the added benefit of allowing us to track statistics and content of questions.

We are still trying to figure out the best way to market the service to students. According to the last user survey in the MIT Libraries, users knew how important the software was, but the majority didn't know that we offered the service (see Figure 2). We've already done some work to improve that by making web links to the service more prominent, publishing an article in the campus "Information Services and Technology Newsletter," and e-mailing departments about the service. We have some work to do to market the services better, and to a younger batch of students. We've considered several methods to do this, including advertising in the student newspaper, hanging posters, contacting faculty to ask them to include this content in courses or class pages, and adding more information about the topic to a wide variety of library subject research guides and course pages.



**Figure 2:** Scatter plot of data from the MIT Libraries’ user survey comparing user awareness and importance to users of various library services. Bibliographic management tools (service 5b) are deemed very important by users, and yet very few users know that we support this software and even have a site license for RefWorks.

## Future of information and citation management

### New product capabilities and evolving user needs

The landscape of information management continues to evolve rapidly, driven both by technology and user needs. Software is being developed that offers more capabilities than ever before, including visualization tools and the capability to download full text for batches of articles. Functions like these were nearly unimaginable twenty years ago, when early citation management software products were being released. Software capabilities will continue to develop in this manner, continuously offering new, valuable functions not previously considered possible.

User needs will also influence the way information management software is used and developed. As functions are added to these products, users will begin to see places where additional utilities could be useful. Users can propose these functions to existing companies, or

they can write their own add-ons to open source products like Zotero. The landscape of research also affects user needs quite strongly. More and more researchers are producing data sets and other computer files or are finding them in the course of their research, but they lack an easy and effective way to manage those files. Many are finding that citation management software can be used to organize and search for data, images, and other files easily, in addition to storing references and full-text papers.

## **Opportunities for librarians**

Given this changing landscape, librarians possess the unique opportunity to expand their roles from finders of information to managers of information through the training and promotion of a carefully selected set of software products. Because these software products are closely related to the resources that libraries license and make available, community members come to the libraries to find out about these products. If librarians are knowledgeable and well-versed in a thoughtfully chosen array of software products, they can use these tools to teach their communities how to manage information of many types in order to meet many goals or personal desires. If librarians, however, are not able to help their patrons with these types of products, they forfeit the opportunity to connect with their community on a whole new level, forcing patrons to go elsewhere for help with their information needs.

As new products for managing citations and information are released, librarians must carefully evaluate the needs of their communities and determine whether the product offers a new, valuable service. These evaluations should consider the capabilities of currently supported software; in many cases a new product will appear to be quite useful, but will actually offer little new functionality over what is already supported. In some cases, a switch from supporting an old product to supporting a new one may be warranted, but the energy needed to convert products should not be underestimated. If the old software has many users, they will all need training on the new software. In addition, users may need help converting their data to the new software format. Librarians should also keep a close eye on the needs of their communities and consider what researchers are currently doing that may be done more efficiently with the use of the citation management software. It may be possible to develop techniques using existing supported software to solve the problems users are struggling with.

If a product is deemed valuable enough to begin supporting, it is important to articulate what level of support to offer and to prepare a cogent plan for publicity and training based on this support level. Some software may merit a full site license, a publicity campaign advocating for its use, several training classes each year, and multiple staff experts available to help patrons. Other software may only require a mention as the solution to a few specific problems, with a single knowledgeable staff member offering individual instruction as needed. Recognizing the difference between these two levels of support is necessary to prevent the workload of those librarians supporting the software from growing out of control.

If, after a thorough evaluation, a product is not considered valuable enough to be supported, it is still necessary to articulate the weaknesses or overlaps with other products that prevent it from being a useful product itself. If a patron hears about the product elsewhere and comes to the library asking about it, knowledgeable librarians can tell the patron why that product is not supported, and what other options are available to perform the needed functions instead. In addition, many companies appreciate library feedback and are willing to take the



recommendations of librarians who have tested the software into consideration when deciding how to further develop their software.

## **Planning for the future at MIT**

Through careful evaluation of software and planning of publicity and training, librarians can play a major role in the management of information. Knowledgeable librarians can recommend useful products to patrons and train them in their use, while shaping future developments in products by advocating for community needs with producers of new products. Here at MIT, we plan to continue doing that to a greater extent in the future, while continuing to observe and be driven by the needs of our community. Two examples of this type of evaluation and planning manifested themselves in the form of class sessions during January of 2009, with mixed results:

MIT does not have a site license for QUOSA, but several of the laboratories on campus, especially those working in biological engineering, have purchased copies of the software. After some testing, we decided the software was not at the level that we could justify purchasing a site license, but that we should offer some amount of training to our users. We invited a representative from QUOSA to come to MIT and give a training session. Since users were unfamiliar with the product and its capabilities, attendance at the training session was incredibly low. A better plan for the future will be to look at where QUOSA is currently being used, try to encourage some amount of word-of-mouth publicity from the laboratories currently using it and from librarians talking to patrons, and publicize its strengths and reasons why patrons might want to try it. Then, once an adequate group of researchers are interested in learning more about the software, we can invite the QUOSA representative back to give a much more well-received and useful talk about the product.

It is becoming apparent that people want to find a product to manage more than just their references; patrons are looking for ways to manage data, papers, and other files as well. Having heard this from our patrons, we were very happy when an MIT postdoc volunteered to teach a class on how to "Make Your Paper File Cabinets Searchable." This class turned out to be very popular, proving that our user community is interested in learning how to manage more than just citations. Based on this information, we intend to plan more classes like this in the upcoming months and years.

MIT will also continue to evaluate and attempt to provide constructive feedback for prospective software. This has proven successful in the past; when RefWorks first approached MIT about its product, there were many shortcomings. After an evaluation period, we gave feedback to the company, telling them what would need to change or be improved for us to purchase their product. When RefWorks approached MIT with a new version in early 2005, many of the issues from the earlier version had been addressed. MIT purchased a site license in May of 2005, and to date, almost 2000 accounts have been created on MIT's license. By providing honest feedback, we played a small part in molding RefWorks into becoming a tool that is valuable to our user community. Continuing this practice is an important part of the support group's work. There is no reason to think that the number of new products requiring evaluation will diminish in coming years. Some of these products may not become anything we support in the future, but some may, and with our help, they can be very useful tools for our community.

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## Conclusion

The formation of the citation management support group in the last year has afforded the MIT Libraries the opportunity to train our user community on existing software, evaluate new software options, and offer individualized assistance and recommendations much more efficiently than our past model in which one person championed each software package. In the past year, we have offered more classes with greater attendance than ever before. We have had the time and expertise to adequately address more complicated problems than in the past, and we have started supporting a new product in Zotero.

In doing so, librarians at MIT have become more embedded in the work of their community. We are becoming a known point of contact for help with citation and information management, and we are able to give helpful, well-researched solutions to the problems and challenges posed to us. Moving forward, we have the opportunity to shape the landscape of information management by providing feedback to developers, making thoughtful choices of software to support, and making appropriate recommendations to our users of what products to use. Continuing to provide this service and do this work at a high level will benefit our community by improving efficiency and organization. It will also allow us to make connections with our users in a whole new way, ensuring that we can help them well into the future.

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