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# Library Values that Interface with Technology: Public Service Information Professionals, Zotero, and Open Source Software Decision Making

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## Abstract

Decisions about which software to use are increasingly made by individual public service professionals. This article contextualizes those decisions and their implications within the framework of existing library values such as collaboration, intellectual freedom, and public good. The open-source bibliographic management tool Zotero provides an apt example that clarifies how public service information professionals need to conceptualize their technology decisions. The development model of software has repercussions, both short and long-term, that must be taken into account so that public service information professionals can effectively represent their values and serve their users.

## Introduction

The open-source bibliographic management tool Zotero exemplifies technology that public service information professionals can utilize to meet their patrons needs. It enables users to interact with a library's bibliographic information in ways that situate the library as part of the greater information landscape. As the role of public service information professionals has evolved, their positions increasingly require the ability to utilize new software in order to serve patron needs. Technology, whether in the form of a library website, chat or video tutorial, is often a crucial intermediary between information professionals and library patrons. The software libraries use can have a dramatic impact on how libraries interact with their patrons, and affect how the patron perceives the library. Over time these decisions can also influence how software develops. In the modern technological environment, decisions about which software to use are increasingly made by individual public service professionals. They must be able to evaluate that technology and understand the implications of the technology choices they make within in the context of existing library values. Zotero can provide an effective model for contextualizing many of the implications of these decisions.

## Methodology and Considerations

Using a single example such as Zotero brings the clarity of an apt example to a set of issues that can

otherwise be overwhelming. Specifically, Zotero highlights how the development model of free software can have implications for library values. However, it is important to recall at the outset however that using a single example can also distort by implying that all kinds of software can be fully understood through the prism of Zotero. The reality is that all programs are created in unique circumstances and come with their own unique set of complications. The decisions surrounding them can be equally complicated. Nonetheless, the technology used and promoted by public service information professionals has repercussions of all kinds. In order for information professionals to embody their values in this arena, they must come to understand these relatively new dynamics, and Zotero provides a unique window for doing so.

Zotero is a bibliographic management tool, similar to Endnote or RefWorks, and as such is directly tied to core library services. Information professionals can use it to share search results with patrons, and patrons can use it to organize and cite bibliographic information. By making the bibliographic data inherent to most library catalogs and databases more transparent to patrons, it serves a core library outreach function. Because it is open source software (OSS) that is also aimed at a general audience, it has pressure on it to be intuitive and build on Web 2.0 concepts. For instance, Zotero integrates an iTunes like interface, webpage archiving, automatic cloud-based syncing, and a number of other features that bring it in line with modern sensibilities. It can serve to bridge the gap between expert information users and relatively new, inexperienced patrons.

Crucial to information professionals are the ways that technologies such as Zotero are aligned with library values. The development model of OSS and its user-centered design necessitate that libraries consider this kind of software differently. OSS finds itself in sympathy with the same library values of cooperation and freedom of information that have led many libraries to support open-access (Corrado, 2005). Additionally OSS is developed with the implicit goal of removing cost-barriers to end-users, just as libraries often function to remove cost barriers to their patrons ability to access information (Bollier, 2003; Pyati, 2009). Since OSS projects can be difficult to monetize, they frequently harnesses the power of distributed effort and collaboration to create a public good that can benefit everyone in society, including libraries.

Zotero makes information resources of all kinds more accessible and makes it easier for patrons to manage their bibliographic information. These concepts however have implications for a much wider array of software. While debates about the economic sustainability of the OSS model have already received significant attention, the implications of OSS in the context of library history and values have remained relatively unexplored (Bitzer & Schröder, 2006; Josh Lerner & Tirole, 2002; Joshua Lerner, 2010). Libraries have a long history of collaboration and commitment to intellectual freedom that can be drawn upon when considering how to respond to choices about software. These values can have a direct impact on how software decisions are made, and, in turn, how software like Zotero is understood. Using the example of Zotero brings these factors into even clearer focus by demonstrating how specific features of software can be understood as natural outgrowths of their development model. Even the word “free” can have radically different meanings depending on the mission of a given library. It is not the case that public service information professionals should utilize and promote inferior OSS over superior alternatives. But it is the case that public service information professionals need to understand the broad outlines of how this technology is developed in order to make decisions that represent their values and serve their users in the long-term.

## **Historical Context**

Grappling with the role of technology is core to the narrative of modern librarianship. Most recently, the Internet has transformed how information is processed and transmitted worldwide. It has transformed the physical spaces, work environments and even how the profession conceives of itself (Tracy & Hayashi, 2008). As new information technologies are developed and implemented, librarians have been shown to provide a crucial link to their successful implementation in libraries. Furthermore, librarian’s attitudes and understanding of the technology have been shown to determine how they

respond to the new technology (Ramzan & Singh, 2010).

Public service information professionals have not been immune to these changes. To fill these needs, libraries have increasingly relied on new positions such as “cyber librarian” or “emerging technology librarian” to help moderate the transition and meet emerging needs. Content analysis of job descriptions confirms that the need for technology skills is on the rise within the profession. Skills that traditionally had been the domain of Information Technology (IT) specialists are increasingly found in the job descriptions of front line librarians (Mathews & Pardue, 2009). These position descriptions also incorporate new levels of complexity when compared to older job descriptions (Meier, 2010). The role of the librarian is evolving to utilize and evaluate complex technology, which enables libraries to be more productive, and function effectively.

The results of a series of focus groups highlight this point. The surveyed librarians reported their sense that technological changes do not mean that all librarians need to demonstrate advanced technological skills such as programming experience, but rather that a new attitude and conceptualization of the profession is necessary for the profession to thrive (Partridge, Menzies, Lee, & Munro, 2010). Information professionals must be able to interact appropriately within an information ecosystem that depends on emerging technologies.

These general trends hold true worldwide. It is difficult to draw definitive conclusions at this scale, but a review of library science education literature demonstrates that a facility with using internet applications, and library technologies are universal needs (for example: Khoo, Shaheen, & Lin, 2009; Onyancha & Minishi-Majanja, 2009; ur-Rehman, 2009). From Africa to the Middle East and beyond technological proficiency was highlighted as one of the keys to the future of educational requirements in the profession.

Many patrons now encounter their libraries primarily through technology; not simply via the libraries' website but also through social networking sites, e-books, mobile phone applications, video instruction and online promotional materials. In turn this affects how information professionals perform tasks such as reference, instruction, and outreach. For information professionals who interact with the public as a primary function of their position, the ability to properly utilize appropriate technology has and will continue to transform how their core job functions are performed. Furthermore, it means that information professionals can benefit from understanding concepts that were previously the realm of systems level specialists. Doing this means connecting these new skills to the values that continue to define the profession.

### **Library Values: A History of Collaboration and Intellectual Freedom**

The technology-driven transformation of the library role is nothing new. Throughout the history of our profession libraries have been affected by both societal and technological changes. It is also true that during most of these times, those involved believed themselves to be living in a time of unprecedented change. This makes it all the more important that as the profession grapples with modern technology-inspired challenges that it does so in the context of the values that define our profession (Gorman, 2003). Libraries may differ in how they interpret and apply our shared values, each guided by their mission, cultural context, and individual preferences. These differences do not preclude acknowledging the importance of making decisions in light of our shared values. The following examples help illuminate places in our shared history and values that provide the context for understanding this new technology.

The International Federation of Library Associations and Institutions (IFLA) places “intellectual freedom and the right to information at the apex of the federation’s approach to its objectives” (Byrne, 2007, p. 67). This stated goal of providing access to information highlights libraries role as non-competitive facilitators of information. Individual library facilities, collections and services remain vitally important and should not be discounted even as libraries come to understand and emphasize their role in providing access to their patrons (Byrne, 2007). This model positions each library as a local expression

of a global library network that supports education, provides access to information, and promotes intellectual freedom.

These conceptual underpinnings are ineffectual without action. Fortunately, collaboration has long been a practical cornerstone of the library profession. One of the defining characteristics of libraries has always been their attempt to provide their patrons access to information. Examples can be found throughout the profession of libraries collaborating in order to create institutions that share our values and accomplish tasks that would be difficult alone. Relatively recent, technologically enabled collaborations such as the 2CUL initiative highlight the power of this kind of collaboration (Neal, 2010). This tendency can be seen historically as well. Libraries have endeavored to create efficient access for their patrons by sharing bibliographic information to benefit local users as well as the extended community of users worldwide (Glynn, 2004). Libraries have consistently banded together to collaborate both regionally and internationally to meet the challenges of their times. The *Online Computer Library Center* (OCLC), formed as a nonprofit cooperative and now operated by an international board, is perhaps the most visible example of this type of effort. OCLC has grown to become the primary contributor of research on metadata to library catalogs worldwide (Wedgeworth, 2004). This kind of collaboration is essential to libraries.

A prominent modern example is the Berlin declaration. So far, 344 institutions have signed onto this declaration that embodies the core library values of intellectual freedom and access while also including stakeholders beyond libraries. The Berlin declaration recognizes that “The Internet has fundamentally changed the practical and economic realities of distributing scientific knowledge and cultural heritage.” (Chan et al., 2002). Alongside with the definitions put forward in the Budapest and Bethesda statements the Berlin declaration has come to help define the language for talking about open access (Morrison, 2009). Just as wide scale open-source software like Zotero is only possible with Internet as a framework, so too does the Internet allow for new ways of sharing knowledge. The connections between open access and open source are multifaceted, and both movements share significant intellectual underpinnings (Corrado, 2005).

On an international level, one of the most important collaborations in which libraries have engaged is the International Federation of Library Associations and Institutions Committee on Freedom of Access to Information and Freedom of Expression. This committee has worked with to “promote and defend the right to information.” (Byrne, 2007, p. 115). This task commits the profession to take a stand on concrete actions by entities that attempt to stymie free expression and information, indicating that while libraries may wish to remain neutral providers of information many of the resulting tasks cannot be done in a vacuum. They must be tied to larger institutional action. Despite the wide variety of challenges to their intellectual unpinning, libraries remain fundamentally democratic institutions dedicated to providing users with information. Whether recognized explicitly or not, this act is designed to create public good (for a discussion of the theoretical implications of this see: Buschman, 2003). The degree to which an information professional involves themselves in activity creating public good will have important implications for how they prioritize understand their technology decisions.

If a library shares its metadata with another library, then both libraries benefit by having more robust metadata, whereas if two soft drink producers share their trade secret formula, it has a very different relationship to their business model. Most libraries have a cooperative, non-competitive relationship with each other, and certainly not the same kind of competition typically found in commercial endeavors. Libraries can and have benefited from a wide range of collaborations, and as we will see, OSS offers a community-driven method of developing software that harnesses this cooperative spirit. The resulting public good allows for innovation and a common intellectual property that can benefit not just libraries, but have broad based benefits that accrue throughout a society.

Open-source is not a new concept in librarianship. Its history is embodied in voluntary alliances such as Code4Lib and oss4lib where communities of librarians devote and share resources to produce open-source technology for the benefit of all libraries. In this context, OSS has been seen as a force for handling technological challenges while creating spaces for intellectual freedom as well as challenging

long held economic assumptions (Pyati, 2009). These efforts focused primarily on those with advanced programming expertise that is atypical for public service information professionals. They resulted in programs that affected public service information professionals, such as such as catalogs and information delivery systems, but which could not be installed or maintained by most public service information professionals. Applications such as blogs and wiki's are relatively user friendly, but require technological expertise in order to setup (Coombs & Hollister, 2010). However Zotero represents a different kind relationship. It is a consumer level program and while specialized skills are still required to adapt or modify it, the decision to use it is made on an individual basis rather than an institutional one. A single user can decide to install Zotero on their computer. This is in contrast to something like Wordpress which requires a hosting server, or a transition to an open source catalog which would require a full institutional commitment.

The work embodied by these declarations and alliances of institutional support align with long-standing library values. They provide front-line practitioners with guideposts about how to conceive of technology now that is increasingly a part of their daily practice. As noted above, many open-source projects are complex systems, the decisions about which to use have primarily been the domain of professionals with specialized expertise. Zotero is part of a society-wide trend towards increasingly democratic technology that can be used, if not modified, by public service information professionals with relatively little specialized training.

### **Zotero as a Model**

Zotero is web-based software funded by grants that allow it to meet needs that are core to libraries. It interacts with a variety of library catalogs and many online databases and enables users to manage their bibliographic information in an interface that is modeled on iTunes. It also extends beyond traditional library collections to provide seamless integration with online resources including Youtube and Wikipedia. Either from within a web browser, or operating as a stand-alone program, users can extract bibliographic data from all of these sources and then manipulate them using a feature set that includes tags, International Standard Book Number (ISBN) lookup, automatic archiving of websites, synced user libraries, PDF metadata lookup, link resolvers and much more. Once organized, users can insert citations into almost any textbox, including e-mails, instant messengers as well as websites. Zotero can also be extended to work with word processors to allow for internal citations and to generate bibliographies. These features extend beyond traditional libraries resources to meet users in the web-based information environment they use. This program is made available for free to the user in over 30 languages.

Crucial for this discussion, Zotero is OSS, and its feature set reflects this. The core freedom of open-source is the ability to download the source code of the program so the user can make whatever changes they want to the source code. Built around this concept however, is an entire culture of ideas and expectations that can help determine how a program develops and evolves (Muffatto, 2006). Its development process is inherently collaborative, community driven, and based on a fundamentally different paradigm than traditional software development. Because the program codebase can be improved upon by anyone, the technology can be influenced, contributed to, and improved upon by programmers around the world. The ability to download it for free is just the beginning of the freedoms involved in being OSS. Just as libraries first shared bibliographic records, then metadata, now they can share in the technology that powered their interactions.

Because Zotero marries open-source development with consumer-level technology, it also has broader meaning. While Zotero benefits libraries, it also meets broader needs and exists within an ecosystem beyond the library. This affects how information professionals relate to this kind of technology. In promoting an open-source catalog, an information professional was unlikely to inspire a technology savvy patron to start donating their time and energy to improving that catalog. For programs like Zotero however, there is an entirely different dynamic where users have a wide variety of ways to contribute, from direct financial donations to simply promoting the product. Entire libraries have the potential to donate resources and time to improving Zotero, but more importantly, the patrons the library interacts

with can as well.

On the Zotero “Get Involved” page they list “Contribute Code” as one option, and contributing to the coding work on the software is key to its sustainable future (“Zotero | Get Involved,” n.d.). But they also list a variety of ways help improve the documentation and usability of the product that do not involve specialized technology skills. The act of promoting a product that depends on this kind of democratic, distributed labor affects how the product will grow and evolve. Spreading awareness about the product is crucial to its survival because it depends on distributed labor to thrive. A subset of the user base evolves over time to take on the tasks of a development team for the product. For some this may mean programming, whereby users can contribute through creating new translators or style guides to Zotero; for others it might mean simply helping by using the forums and making the program more accessible by reporting problems. An even smaller group of users will end up contributing code to the core product. All of this gives users and libraries a different relationship to Zotero than they have with other software built using traditional development models.

### **Comparisons: Endnote**

The underlying philosophy with which software is developed shows throughout the product in subtle ways. Conceptual distinctions have real-life implications, but it is impossible to be certain how they will manifest in any given product. One of the clearest examples is with regard to support and technical assistance. Endnote is another bibliographic management tool, developed and sold through a more traditional model. Institutions can purchase site licenses for their users, or individuals can purchase copies of the program for their own use. Not only does purchasing Endnote give users access to the product, it also helps to fund their extensive help service. Users of Endnote can, among other options, call a support telephone number and receive assistance in troubleshooting their problems.

For both Endnote and Zotero, the primary mechanism for troubleshooting is their documentation and website. In the case of Zotero, the documentation and support can be edited and updated by volunteers. While the closest equivalent of the Endnote technical support staff are the Zotero forums where their problems are handled by programmers who work on Zotero, and more commonly, other Zotero users who volunteer their time to help provide guidance on the product. Endnote also offers forums for troubleshooting, but the differentiating factor is the emphasis that each is given. In each case users can usually find someone to help them, as well as find online documentation. But how those resources are created and maintained grow directly out of the nature of the core product.

In addition to owning Endnote, *Thomson Reuters also operates the database Web of Knowledge*. At times it has been difficult to export citations from this database into Zotero, but it has consistently worked for products like Endnote and Endnote Web. This is in contrast to companies like WilsonWeb (prior to their merger with EBSCO) that stepped in to provide a translator to Zotero ensure that its databases would be accessible (ajlyon, 2010). The differences in the two companies’ approach could be explained by technical limitations or differences in their corporate strategy. The salient point is that utilizing OSS reduces the economic incentives do anything to block competition, whereas other companies will only do so inasmuch as it also benefits their own product.

Zotero’s goal will always be to work freely with as many platforms as possible and provide its technology to others to adapt and improve upon. The logic of this goal is unlikely to change, precisely because of the model under which it is being developed. It would be possible for Zotero to attempt to restrict its functionality; in fact they do because of technological limitations as well as for prioritization purposes. However, OSS is developed by community, and given away for free, making openness a natural outgrowth of the logic of economic model rather than an additional pressure that needs to be applied.

### **Comparisons: Mendeley**

While Endnote is not free, even free applications that are intent on building a profitable business

model are under different pressures than OSS such as Zotero. Mendeley, another free bibliographic manager, consistently draws much of its appeal from the social network of researchers that it is building around its shared bibliographies and other collaborative tools (Holt Zaugg, Richard E. West, Isaku Tateishi, Daniel L. Randall, 2011). As a result, they are able to leverage the lessons of other freemium and social media companies to find ways to build sustainable development models.

Mendeley provides a free service, but needs to build an economic model around features that users will pay for to enhance their product. This has resulted in a product that provides many features for free, while emphasizing its PDF integration, including large amounts of free online storage, and social network-like features. Those also happen to be the features that will most likely cause you to want to purchase additional storage space as you run out of online storage for your shared PDFs. In so doing it is creating a truly valuable resource, but the differences are illuminating for both products.

Zotero by contrast has similar potential. It has dedicated infrastructure for profiles, online shared bibliographies and other similar features, but it has not placed the same emphasis on them. It would be irresponsible to make a direct casual claim between their different emphases in this arena, but it highlights the kinds of pressures that distinguish these models. As OSS, Zotero is less inclined to need to leverage a unique resource; in fact it cannot because most of what it produces is automatically available to others once it is created. Mendeley is under pressure not just to be useful, but to create irreplaceable resources. Online storage will always incur a cost and Mendeley's business model also makes it possible for it to offer significantly more free storage to its users than Zotero can. In contrast, Zotero is under pressure to create resources that can and will be replicated freely. Operating under these pressures it is perhaps unsurprising that Mendeley allows users to build applications on top of their product that improve it and utilize the powerful bibliographic data set that it is creating (Holt Zaugg, Richard E. West, Isaku Tateishi, Daniel L. Randall, 2011). That brings value to their product, but is not the same as being open source.

While distributed labor solves many problems, it does not completely eliminate the need for funding. Zotero was made possible by grant money, although it also allows users to purchase additional storage space for their cloud-based libraries. Users can store as many citations locally as their computer will allow, and can purchase cloud storage on their own, but free accounts have limitations, and many of the Web 2.0 features such as synced and group libraries are integrated into this system. In effect, Zotero has created some hard to replicate resources in order to build a product that meets current market needs. While the information contained within the profiles is restricted to the Zotero.org website for privacy purposes, everything else is available for download. This creates a different kind of ecosystem for users.

It also creates sustainability questions for those aspects of Zotero which are funded by sources such as grants. If libraries find ways to collaboratively invest in these products, then this would not be an issue within our ecosystem. Delving too deeply into this aspect inevitably leads to arguments about the sustainability and economic viability of open-source software in general, issues which are a continued source for debate in the OSS literature (for instance: (Bitzer & Schröder, 2006; Josh Lerner & Tirole, 2002; Joshua Lerner, 2010). These pressures pertain here only inasmuch as they tend to prevent certain kinds of innovation as highlighted by the Mendeley example. In so doing they also tend to maintain library values such as privacy, collaboration and openness.

### **More than one Kind of Free**

As already noted, OSS products like Zotero evolve and improve more rapidly the more people use it. This alone is not a reason to support Zotero, but it is an example of how the libraries relationship to the product is changed by its funding and development model. The distinction between different kinds of free is not a purely academic one and it can be particularly enlightening because there are a variety of "free" technologies, such as search engines and social media sites, that exist as key components of today's information world.



At the consumer level, many web applications technologies that are thought of as free, such as Google, are funded primarily through advertising (Google, 2012). Others use freemium models, where the user can try a limited version of a program, and is asked to pay money in order to use additional features (Pujol, Pujol Enterprises, & Kirkland, 2010). Users who pay money are subsidizing the free users, who exist promote and add value to the product. In both cases, the program, which appears to be free at first, incurs a different cost later. Instead it incurs a cost that is made up for either by deferred sales, or through advertising schemes that increasingly raise privacy concerns. For instance, Facebook is a “free” program in a sense, but it is also a program that comes with numerous privacy-related advertising hooks attached to it (Debatin, Lovejoy, Horn, & Hughes, 2009).

The word “free” can be deceptive in a variety of ways. While OSS is free, that does not mean that it exists outside the market, it just has different pressures applied to it. Like the technology described above OSS technology is also frequently the basis for technology that uses advertising, is funded and used by for-profit interests. It does highlight the parallel between the mission of libraries and that of OSS (Engard, 2010). OSS provides information professionals the opportunity to interact with and promote technology based on an economic model designed to produce a public good, whatever else it does. Fundamentally OSS is distinct from other forms of free technology, although creating free programs is one of the outcomes of OSS.

The key distinction is that OSS allows the end user to download the source code of the program, making it possible to adapt and alter it to suit their needs. There is another important kind of “free” software that is worth noting. That is software that is released for “free” to download, with no expectation of making a profit, but which denies the end users the ability to alter the code. The distinction has been described a “‘free’ as in ‘free speech,’ not as in ‘free beer.’” (Free Software Foundation Inc, 2012). The four goals outlined by the Free Software Foundation help to highlight this:

The freedom to run the program, for any purpose (freedom 0).

- The freedom to study how the program works, and change it to make it do what you wish (freedom 1). Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help your neighbor (freedom 2).
- The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this. (Free Software Foundation Inc, 2012)

Software that is free to download, but does not give users access to the source code so that they can improve upon it, can be extremely beneficial and worthwhile. These programs may not have the differed costs described above, but still do not accrue the same kinds of public good benefits that OSS does. They can provide a powerful tool, but do not enable community development. This distinction is particularly important for libraries, which have traditions of collaboration, because it means that free software cannot be built upon by libraries. Depending on the program this may be critical, or irrelevant. There is no correct model for software development, and there are economic questions about OSS that cannot be effectively analyzed through the lens of Zotero. Information professionals need to be aware that there is always a cost incurred to developing software, and if they that dynamic is not taken into consideration it can have unanticipated consequences. For some free software the cost is hidden through the charity of its creator. In other cases the cost is merely deferred due to their business model. This can be problematic as that software can have an effect on how the library is perceived in the minds of its patrons.

## Conclusion

When making decisions about embracing or promoting a new technology, a willingness to experiment is key. A willingness to experiment does not preclude engaging and struggling with the short and long term consequences of these decisions. Each library has to define its own mission, but most information professionals would agree that they have an obligation to serve their patrons to best of their ability. In the context of technology, this often requires using, providing and recommending technologies that best

enable the user to complete their desired goals. In so doing it is vital that information professionals acknowledge technology's role without becoming inadvertent IT consultants. The impulse to efficiently connect users with the resources that best meet their needs has long been embedded in the profession and has been adapted to meet emerging needs ever since (Gorman, 1998; Noruzi, 2004). These ideals are core to the ongoing conversation about library values, mission and purpose.

Zotero represents a longer-term investment. Not only does it have the potential to improve over time (as many successful products do, regardless of their development method), but in so doing it will be creating a free public good that aligns with library values. Our traditions of sharing and collaboration make us well positioned to take advantage of the benefits of open source, and the same values that have led many to embrace open access dovetail with the principles behind OSS (Corrado, 2005; Pyati, 2007). These debates are not new, but as software decisions are increasingly made at the public service level, and must now be confronted by a wider variety of information professionals.

Zotero sheds light on these questions by highlighting the importance of library values in public service information professionals decision making. Because Zotero also happens to be a high-quality product on its own, it can demonstrate the value that open-source can provide. The precise feature set that it brings is community-driven, because OSS rests, in part, on the premise of being community driven. The model for OSS is one of engagement with the community (Bitzer & Schröder, 2006). Zotero provides a concert example of OSS that meets library needs, but also builds upon the insights of a community that is not afraid to borrow liberally from other Web 2.0 applications.

If the choice is between Zotero and a competitor, the library's first obligation is to choose whichever product best enables it to meet the patron's needs. This must be done with recognition of the wide variety of costs that can exist beyond the well-understood purchase price. Information professionals must be able to weigh the value of creating sustainable public good against many other variables, including their libraries mission. Since Zotero is real software in the real world, it also serves as a reminder that the decisions are rarely clear-cut or the variables perfectly transparent. Evaluating software within the context of library values, with a basic understanding of software development models, can help to bring clarity, if not certainty.

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