

Accessing Our Research Bibliographies Online:
Better or Just Different?

by

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Abstract

This is an exploratory case study of the relationship between bibliography software and user preference regarding bibliographic database management. The research focus centers on what makes the new online bibliographic software (*RefWorks*) attractive to academic users compared to other offline bibliographic software packages, such as *EndNote* and *ProCite*. In order to re-formulate this question in a testable form, interviews with 16 higher education faculty and advanced graduate students (online, offline, or synchronized users) are conducted for exploring potential research questions regarding user characteristics and preference towards bibliographic database maintenance and technology. Though not statistically confirmed, there seems to be a slight preference for offline programs like *EndNote* among offline and synchronized users while there is a preference for online programs like *RefWorks* among online users.

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INTRODUCTION

Imagine this scenario: You are on vacation in Peru but need access to your last paper's bibliography since your co-author's computer crashed. Equipped with RefWorks, you can access your database online and pull all the citations and bibliographies you have ever created and share them with your colleague in Morocco. Although it sounds great, do we really use it this way and does it work? Can we count on reliable and fast Internet access in Peru or are we better off lugging our work with us to everywhere including vacations? Is the future of research simply means embracing all things online, never having to carry another file with you, as long as you can access and share it universally via Internet?

In this exploratory research we will investigate the user characteristics and his/her approach to bibliographic database management strategies. Is there a particular kind of user, with a particular approach to technology and research, who prefers online software over one like EndNote? Our case study takes place at Arizona State University where RefWorks is recently made available online through the library system. A convenience sample of ASU faculty users of EndNote/ProCite and RefWorks have been recruited into three user groups: online user (uses RefWorks primarily), offline user (uses EndNote primarily) and synchronized user (prefers a mixed method of both software packages). Short e-mail interviews with sixteen faculty members and graduate students are completed. We are interested in user characteristics, reasons for preference of online vs. offline bibliography maintenance and connections to broader user approach to technology. These interviews are analyzed with qualitative software package NVivo.

Preliminary results allow us to identify research questions for a more empirically rigorous, large scale study of higher education users and technology components. Additionally it is useful feedback for administrative purposes. Higher education institutions invest in certain software modules like Course Management Systems, bibliographic software like *RefWorks* and invest in establishing a support system for users in anticipation that it is what the users need and want, and that ultimately it will increase productivity. Our exploratory results can be used as a preliminary evaluation of the chosen software and also as an input for hypothesis generation for research pertaining to software system integration that is germane to research institutions.

Comparison of bibliographic software

Most professors, researchers, students, and librarians use bibliographic software to search online bibliographic databases, organize their references and images, and create bibliographies and figure lists. Descriptions of the major bibliographic software packages are as follows:

Refworks: a Web-based bibliography and database manager that allows users to create a personal database by importing references from text files or online databases.

EndNote: The most popular and user-friendly package that is primarily used in an offline fashion.

Reference Manager: Offers network features with simultaneous read/write access to databases.

ProCite: Provides flexibility to group references and creates subject bibliographies.

WriteNote: The Web-based tool that helps users conduct research and write papers.

Table 1. Comparison of bibliographic software

Feature	Reworks	EndNote	Reference Manager	ProCite	WriteNote
Version	Jan. 2006 Release	9	11	5	2.5
Organize references	Yes (online automatically)	Yes	Yes	Yes	Yes
Store and cite images and objects	Yes (using URL Provider link)	Yes	No	No	No
Format bibliographies	Yes (247 output formats)	Yes	Yes	Yes	Yes
Online database searching	Yes	Yes	Yes	Yes	Yes
Import filters for online databases	98+ predefined; you can require (Over 1000 database services supported)	480+ predefined; create your own	430+ predefined; create your own	580+ predefined; create your own	420+ predefined
Z39.50 searching	Yes	Yes	Yes	Yes	No
Operating System	Win, Mac & Unix	Mac OS X & Win	Win	Win	Win, Mac & Linux
Access to references	Desktop & Network, Web browser, Optional toolbars - Word	Desktop & Network	Desktop, Network & Web browser (via Web publisher)	Desktop & Network	Web browser, Optional toolbars - IE, Mozilla and Word
Software installation required	No (IP-authenticated URL) In case launching Write-N-Cite from off-site, we need to install it	Yes	Yes	Yes	No
Intranet-ready	Yes	No	Yes	No	Yes
Multi-user access	Yes (RefShare allows users to share their Reworks database)	No	Yes	No	Yes
True Network Capabilities	Yes (Some firewall or security software or security settings in your browser may block links to documents)	No	Yes	No	Yes
# of output styles	401+ predefined; you can require	1300+ predefined; create your own	950+ predefined; create your own	650+ predefined; create your own	1000+ predefined

Reference size	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Max # of References	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Max # of fields	55	52	37	45	34
Max # of Reference Types	31	37	35	39 + create your own	12
Create table and figure lists	No	Yes	No	No	No
Subject Bibliography	Yes	Yes	Yes	Yes	No
Spell Check	No	Yes	Yes	No	No
Create a list of "favorite" styles	Yes (RefWorks has integrated a RSS (Really Simple Syndication) Feed Reader so you can easily add your favorite RSS Feeds from publishers and websites, view the information, and import data into your RefWorks database)	Yes	No	No	Yes
Reference grouping	Use folders	Use keywords	Use keywords or multiple databases	Yes	Use folders
Advanced searching capabilities	Yes (You can use the Advanced Search option for a very specific search of your database.)	No	No	Yes	No
Search across multiple databases	Databases & Cite While You Write	Cite While You Write	Databases & Cite While You Write	Cite While You Write	No
Integrated in MS Word	Cite While You Write (Write-N-Cite is a utility that allows users to run an abbreviated version of RefWorks in their word processor.)	Cite While You Write	Cite While You Write	Cite While You Write	Cite While You Write (with optional installation)
Construct document with MS Word templates	Yes	Yes	No	No	No
Link to PDF files on	No (?)	Yes	Yes	Yes	Yes

the Web or desktop					
Access OpenURL links	Yes (If <i>RefWorks</i> administrator has added an Open URL link to the <i>RefWorks</i> program, there will be a link in the main viewing area of the program right next to the View and Edit links for each reference.)	Yes	Yes	No	No
Unicode compliant	Yes	Yes	No	No	Yes

Retrieved from <http://thomsonisiresearchsoft.com/compare/>

METHODS

Interviews with 16 users (15 higher education users and one ASU alum, now industry/ Research & Development user) were completed over email. Nine of the users were defined as offline users (EndNote, ProCite, Ref Manager users), four users were online users as they used the online bibliography software *RefWorks*, and 3 users were defined as synchronized users as they used both online and offline software packages (*RefWorks* and *EndNote*).

Interviews focused on why the user prefers online or offline software package, pros and cons of the software choice, how they use it for publication and research, and how they access it while they are away from their office. Data were then coded with the help of NVivo, a qualitative software analysis tool. When results showed a difference between academics that traveled more or published with others, responses were structured into a matrix with travel (heavy/light traveler) and authorship (sole/co-authorship) variables for Cytel's StaXact (Cytel Corporation 2005). Since the sample size is small and many cell counts in the row-by-column tables are less than five, it is invalid to employ conventional Chi-Squared test to examine the relationship between software use and user preference. As a remedy, the exact test in StatXact is used. This

test allows us to exhaust all the possible combinations by re-sampling from the existing data. These possible scenarios can be viewed as the reference set, and the data at hand can be compared against this reference set to determine the rarity of the observed relationship between the bibliographic software preference and the user characteristics (authorship, travel frequency). There were 4 sole authors in the sample, 10 co-authors and two users with no prior publication record. Five users were described as heavy travelers (5 or more business trips a year) and 9 users as light travelers while two users did not have any academic related trips in the past year.

LITERATURE REVIEW

Bibliographic software has been used in a variety of ways in both academic and research settings. After the campus-wide implementation of EndNote at Leigh University, one of the colleges developed a database of faculty publications using the software module (Siegler & Simboli, 2002). In addition, librarians used EndNote to sort bibliographic records of documents by faculty at the institution. Similarly, the Library at the University of Minnesota used RefWorks to create databases that contain documents published by faculty members from four departments, including family social science, food science, rhetoric, and social work (Marsalis & Kelly, 2004).

Universities have also used bibliographic software as a means of preventing plagiarism. The University of Victoria Library recommended RefWorks to students as a simple way to write a bibliography (Kehoe, 2004). The university hoped that the user friendliness of RefWorks would encourage students to cite all materials used in their papers.

Additionally, the Association for Business Simulation and Experiential Learning (ABSEL) used EndNote to develop a database, which contains citations for every article published by ABSEL (Platt & Peach, 2001). The ABSEL EndNote database (AED) allows anyone visiting the ABSEL web site to search and access all materials published by ABSEL, which in turn increases the visibility of works published by ABSEL.

Collaborative writing and co-authoring is a common practice in the creation of academic articles, books, business reports, and even web pages (Sharples, et al, 1993). Much of this effort in the last twenty years has traditionally been done through word processing programs where a great deal of time is spent in passing the document back and forth among authors for review and editing via hardcopy, email, and fax (Noel & Robert, 2004). Although there is increasing buzz about virtual collaboration environments, certain research studies found that for various reasons few co-authors utilize these environments (Dillon & Maynard, 1995; Noel & Robert, 2004).

One way of looking at the use of technology for collaborative writing is by using Ede and Andrea's (1990) classification of three different types of collaboration: co-authorship, scientific collaboration, and "business" writing. Co-authorship is more common in the academic community and less likely to utilize virtual and online technologies for their collaborations as opposed to word processing and email exchange. Scientific collaboration and business writing are more likely to use virtual collaboration such as ProAuthor and WebDav, with business writing collaboration showing evidence of the most use.

Part of the discrepancy in use of technology for collaborative writing could be ascribed to different roles of those involved in the collaboration, the purpose of the

writing, as well as the existence of different writing strategies. Posner and Baecker (1993) describe the roles in collaborative writing as including the 'writer' who actually writes the document, the 'consultant' who offers information but does not actively participate in the document creation, the 'editor' who modifies the document directly, and the 'reviewer' who suggests changes to the document without modifying it directly. Adkins, et al. (1999) noted that a single person could hold many of these roles.

Additionally, Posner and Baecker (1993) provided a description of the different writing strategies that could be employed. They included the 1) single writer – one person writes, while others in the group take on the other roles; 2) separate writers – each participant works on a different part; 3) joint writers – each participant works closely together on the same part (synchronicity); or 4) scribe – one person write the document based on group discussions.

Perhaps a more significant explanation for differences in use and preference for use of technology for collaboration is variance in group size. Academic collaboration, in particular, tends to be among smaller groups of typically two, sometimes three members (Beck, 1993; Beck & Belotti, 1993; and Rimmershaw, 1992). Also central to academic writing is the sense that each project occurs over a relatively short period of time with a limited audience (Dillon & Maynard, 1995), so the time and effort it would take to learn a new, less 'natural' system and potentially new workflow is not worth it (Noel & Robert, 2004).

Kraut (1988) identified the three phases of writing as planning, drafting and revising. In Kraut et al.'s (1992) study on collaborative writing they found that 87% of the planning process was done in time-consuming, face-to-face meetings. Often part of

the planning process is a review of the literature and empirical data available. Use of bibliographic software packages, particularly those that are online and may be shared, could serve to reduce some of the time spent in this part of the writing process. Indeed it appears that this could be a new technological approach to collaborative writing that could be utilized especially in academia. Bibliographic software such as Endnote, ProCite, Reference Manager, RefViz, and Onfolio are being increasingly marketed (Mattison, 2005). While their ability to interface with the web and be collaborative is more limited, online programs such as Refworks are taking the stage, especially in scientific collaboration (Schilling, 2005).

FINDINGS

Table 2. Data Summary

Respondent	Software Package	Prefer Online/Offline	Sole/co-authorship	Heavy/Light Traveler
15	EndNote	both	sole-author	light
12	EndNote	offline	co-author	light
1	EndNote	offline	co-author	heavy
8	EndNote	offline	co-author	light
2	EndNote	offline	sole-author	heavy
4	EndNote	online	co-author	heavy
3	EndNote & Refworks	both	sole-author	heavy
10	EndNote & Refworks	both or offline	co-author	heavy
5	EndNote & Refworks	offline	co-author	light
11	Procite	offline	co-author	light
16	Procite	offline	co-author	light
7	Reference Manager	online	co-author	light
6	Refworks	online	co-author	light
9	Refworks	online	N/A	N/A
13	Refworks	online	N/A	N/A
14	Refworks	online	sole-author	light

Overall, respondents had concerns over storing their bibliography libraries on an online server somewhere. They prefer to have their libraries on their home computers. Regarding anywhere/everywhere access respondents stressed that it was important but

that anywhere access usually meant that they take their laptops with them on business trips or while working away from their office. Dependence on Internet connection was overall not desirable, particularly for users who go on international trips where there is no or limited Internet connection, or the connection is slow and/or expensive.

Respondents who tend to access multiple computers for their work (such as a lab, office computer, laptop and/or home desktop computer) were more likely to say that having their libraries stored online helped. One user suggested that people whose computers never crashed might not appreciate the value of storing/backing up materials outside of their own computers.

Almost none of the respondents are using these programs collaboratively. Even when collaboration takes place, respondents suggested that one person takes care of the references section. If the authors are using different software packages or the same software package but different versions, problems arise. RefWorks and EndNote, for example, are not compatible or sometimes what the university library system supports turns out not to be compatible with the version or the software choice at home. Many respondents suggested that if the online and offline software can be truly compatible and can be transferred from one system into another without losing data, it might be desirable to use them in conjunction with one another. This was especially the case since different software had different pros and cons that might be resolved by using them simultaneously. However, this requires an intuitive interface and a quick learning curve. Users who access both RefWorks and EndNote stressed that they were not compatible at all.

A big issue was the support for any of the software mentioned. Though ASU library suggested EndNote to faculty and graduate students in the past, there has never been an established support line for it. Moreover, certain features that used to work fine in EndNote no longer works smoothly when information is downloaded from the library database. This has created uneasiness among users regarding investing time and money in a software package that may or may not be supported by the school in the future.

Among offline users cost associated with the initial investment as well as updates and newer versions were issues. EndNote users also mentioned that if they have an older version, they cannot import from newer version libraries. Cost is a major issue, especially for graduate students. And once a user invests in one of these programs, they are reluctant to spend more or take more time learning another program. One graduate student was concerned with the continuity of his databases created in the university online program once his affiliation with ASU ends. As of now, RefWorks is free and available to ASU users through their ASU user log-in, but it is not clear what happens once they leave ASU.

Overall our sample showed more preference towards using an offline program, particularly EndNote. However, more users in the sample were EndNote users to begin with. To test the idea that there is a correlation between user characteristics and their software choice we employed Exact test and the results are shown in Table 3 and 4.

Table 3- Authorship style and software choice

	Mostly sole authorship	Mostly co-authorship	Row total
Prefer online	1	3	4
Prefer offline	1	6	7
Both	2	1	3
Column total	4	10	Grand total: 14

*2 respondents who did not have prior publications were excluded

FISHER'S EXACT TEST

Fisher statistic 2.667
Hypergeometric Prob. of the table: 0.08392

Type	Statistic	DF	P-Value Tail	P-Value 2-Sided
Asymptotic	2.667	2	.GE.	0.2636
Exact	2.667	.GE.	0.2517	0.08392

Since the exact p value is .2517, which means that by chance alone 25 out of 100 times one can observe a data pattern as observed, this lack of rarity fails to reject the null hypothesis that there is no relationship between form of authorship and bibliographic preference.

Table 4- Travel frequency and software choice

	Heavy traveler	Light traveler	Row total
Prefer online	1	3	3
Prefer offline	2	5	5
Both	2	1	1
Column total	5	9	Grand total: 14

*2 respondents who did not have business trips during last year were excluded

FISHER'S EXACT TEST

Fisher statistic 1.62
Hypergeometric Prob. of the table: 0.1259

Type	Statistic	DF	P-Value Tail	P-Value 2-Sided
Asymptotic	1.62	2	.GE.	0.4448
Exact	1.62	.GE.	0.6014	0.1259

By the same token, since the exact p value is .6014 in Table 4, it also fail to reject the null hypothesis that there is no relationship between travel and bibliographic preference. There may be a relationship between the user characteristics defined above and their software choice, however this small data set does not support this conjecture and thus more research with larger samples would be needed for a confirmatory

conclusion. In our sample, preference was more towards using an offline program while online users preferred online but there were only 4 users in this category. Three users who used both online and offline however preferred to use both or offline program and would not prefer using only the online program. People who prefer to use both however mentioned that as it stands they are not compatible. To confirm that certain characteristics of academic users (such as the time away from office or amount of collaborative work) can give us a clue as to what kind of program they prefer (online vs. offline) and why, future research with larger samples is needed.

CONCLUSION

According to exact test results, no particular user profile for specific bibliographic use is identified. However, qualitative analysis showed a slight preference for offline software such as EndNote. The major issue seems to be the standardization among various software programs and accessibility. As long as one can switch easily from one to another, simultaneous access can be desirable. However, since at the present time compatibility is an issue, more respondents prefer offline programs such as EndNote even though they are aware of the issues with this complex program and the lack of support available.

Decision making regarding what software to support on a given campus needs to take into account the past investments users made, both financially as well as time commitment. Faculty expressed concerns over the possibility of labor for thousands of books already entered into their personal database and therefore their unwillingness to disrupt any work that has already been done. Endorsing any given product requires that

we have support available for users. Although one user had positive remarks about RefWorks' online help, the fact that it was only available online was an issue.

Although anywhere and anytime universal access is desirable and preferable, it simply is not the reality yet, especially when international travel is a hindrance to universal access. To be specific, you may not be able to access your libraries while in Peru, or access it but pay a high price for it. Also it may be the case that your colleague in Morocco may not be able to import it into existing program he/she has. However, if and when it does work-- you can access it from the Andes mountains and send it with a click of a button without paying for it and your colleague receives it and is able to use it immediately within her system of choice—it is a thing of beauty!

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