6-2012

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http://unllib.unl.edu/LPP/

***Library Philosophy and Practice* 2012**

ISSN 1522-0222

SFX, Information Needs, the Academic Library, and Its User

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Introduction

Libraries need an efficient way to manage their diverse electronic resources. At the same time, they need a tool that provides users with easy access to those digital items. Guaranteed simple and reliable access to full text sources (depending on existing subscriptions of course) is one of the main concerns of libraries in the digital age. The tool that supplied the solution to this problem is the OpenURL link resolver. (Ponsford, Stephens & Sewell, 2011).

Today, SFX by Ex Libris is the most widely used OpenURL link resolver (Robertson &. Soderdahl, 2004). This article examines whether SFX can be used not only as a link resolver, but also as a tool for assessing user information needs. We shall review SFX's contribution to the assessment of information needs in an academic library and its benefits to the users and to the library.

Background

Most commonly, link resolvers provide the library patron with the ability to move quickly from a citation in an abstracting and indexing database to the full text itself (Robertson &. Soderdahl, 2004). SFX and other link resolvers seamlessly offer links from one information resource to another. For example, users can jump from a citation in an abstracting and indexing "source" database to "target" resources, such as full-text articles, online catalogs, interlibrary loan or other options a library chooses to offer. The whole range of possible options is displayed in one menu, instead of having to perform multiple separate searches to locate what they are looking for. (Wakimoto, Walker & Dabbour, 2006). When integrating SFX software with Google Scholar, which is widely used by academics as one of the main gates to reliable academic sources, it enables users to search the library's collection for e-journals, and eBooks, all through Google Scholar itself. Clicking on SFX icons in Google Scholar, the user is redirected to the SFX resolver, which displays links to the selected article that is a part of the library's subscriptions elsewhere or displays other services related to the article, such as an interlibrary loan service or other function the library chose to offer. (Xu, 2010; Stowers& Tucker, 2009).

SFX was first developed at the University of Ghent by Herbert Van de Sompel and was released as a commercial product by Ex Libris in 2001. SFX is an XML-based product that was not only built on the OpenURL framework, it was the technology for which OpenURL was originally defined and thus was the first OpenURL-based link resolver on the market. (Robertson & Soderdahl, 2004). Since 2001, for ten years now, SFX offers a wealth of features for end users and librarians at over 1800 institutions in more than 50 countries as ExLibris puts it.

SFX offers its users four major benefits. First, it allows the retrieval of full text items that are part of the library's subscriptions.

Second, it enables users to find full text by its citation details without knowing in which database it is hosted. Third, if there is only a print option of the article available it will direct users to the library catalog for the holding information. In case the library doesn't have the requested item, the interlibrary loan option will be suggested by the software. Last but not least, since 2009, SFX includes a recommender system, bX. By harvesting metadata from the SFX usage log files from all of the subscribing institutions, bX provides recommendations to articles. The bX recommendation service is similar to a commercial web site recommender. When a user searches for a specific article he gets a list of articles other users found interesting. This feature is very useful for users (Ponsford, Stephens, Sewell, 2011; Xu, 2010; Imler, 2011).

SFX offers some crucial benefits for libraries, too. It not only helps to manage its electronic resources and provides smooth access to its customers, but also it allows librarians to learn a lot more about user information behavior and needs, using its unique features such as its statistical reports and more.

The University of Haifa is located in the northern part of Israel, on Mount Carmel and across the Mediterranean Sea. The university community has about 18,000 students (bacholars, graduates, and PhD students) and over 1,200 faculty members. The Younes & Soraya Nazarian library is a central library which serves the entire university community. Its collection comprises more than 2 million books and electronic resources, among them 45,000 electronic journals. In January 2005, the library integrated the SFX software into its systems. The library experience with SFX and report analysis from the SFX log files will be used to demonstrate the potential advantage of SFX in the area of assessing information needs.

How SFX Reveals and Satisfies the Academic User's Information Needs

The focus of this article is the contribution of SFX as a tool assisting the library to evaluate user information needs and satisfy some of them. This article will assess information needs by some of the parameters as first suggested by David Nicholas in 2000 and updated to the digital consumer by Nicholas & Herman in 2009 (Nicholas, 2000 ; Nicholas & Herman, 2009). SFX usage & statistical reports, produced at the Younes & Soraya Nazarian library of the University of Haifa, will be the source to the data presented according to these parameters.

What are Information Needs?

Nicholas & Herman devote a whole chapter to the definition of the term “information needs” and distinguish it from closed terms such as “information wants” and “demands”. (Nicholas & Herman, 2009). "Information that would further this job or this research, and would be recognized as doing so by the recipient" (Line et. al., 1974) and "When people recognize a gap in their state of knowledge, that is, when they experience “an anomalous state of knowledge”, they wish to resolve that anomaly: (Belkin and Vickery, 1989) are the basic definitions used in this book for the term information needs. An important added value for those definitions is: "One can build upon these definitions by adding that it is the need for information that individuals *ought* to have to do their job effectively, solve a problem satisfactorily or pursue a hobby or interest happily". (Nicholas & Herman, 2009, p.18).

Nicholas & Herman suggested a set of 11 elements that can be used in a very practical way for assessing information needs of individuals as well as professionals and organizations of all kinds. These elements are:

1. Subject
2. Function
3. Nature
4. Intellectual level
5. Point of view
6. Quantity
7. Quality
8. Currency
9. Speed of delivery
10. Place of publication
11. Processing and packaging

In this article, we will use these elements to evualate the use of SFX in relation to the information needs as defined by this

framework. We will expect that it will assist libraries in revealing users' information needs and benefit its users by satisfying their information needs easily and quickly.

User information Needs Analysis and SFX

This section analyzes the contribution of SFX to assessing and/or satisfying user information needs by the evaluation SFX and the elements suggested by Nicholas & Herman. (Nicholas & Herman, 2009). Only the relevant aspects of those elements to SFX's contribution to libraries who wish to help and understand this process will be discussed here. It must be emphasize here that these elements contain a much wider and deeper analysis of information needs than what is under discussion in this article.

Subject

Historically, academic library collections are usually arranged by subject matter. That is why the 1st and 2nd generation of information retrieval systems were based on subject terms (controlled vocabulary known also as descriptors). Building an efficient information query is not an easy task. With the increase in computer literacy, many people believe they can do successful information retrieval by themselves. However, the truth is that this needs to be done by a skilled professional (usually a librarian or an information specialist). Search engines, such as Google, Yahoo, and the like try to solve this problem with different algorithms, suggesting to the user results that might suit him best, based on his latest search results. In many cases the user might find a high proportion of the results to be irrelevant. SFX doesn't offer a search option based on subject. The input in SFX's search box needs to be the citation details the user supplies. The assistance SFX offers to the user, when it comes to the "subject" element of information, is the bX recommender service. Recommendations have become highly popular with users, who find them both relevant and valuable. When viewing a specific article in the SFX menu, bX recommends other articles. The offer is based on SFX user log files, showing what other users, who were interested in this specific article, also viewed. When it comes to what the library can learn about its users' subject information needs, SFX cannot contribute any insights at the present time.

Function

Nicholas & Herman presented six types of functions (purposes) which reflect people's information needs (Nicholas & Herman, 2009). The next paragraphs review shortly each section, with SFX's added value for it.

1) Fact-finding function – The SFX's citation linker function is one of the services of the software. The user inserts the citation details of the requested article and SFX connects the user to the fulltext of the article. Between 1.10.2010 - 30.9.2011, 906 citation linker requests were submitted by University of Haifa Library users. Those users knew the specific details of the article, meaning they were familiar with their information need and with the tool to fulfill it.

2) Current awareness function – SFX features several possible current awareness functions.

A. keeping up-to-date with A-Z list or with citation linker services is an easy way for users to get access to their favorite sources. The user chooses a specific journal from the list and inserts limitations regarding the request year. For example: just the last 2 years. This limitation helps him to review only the latest issues

B. Another way is using "Hot Articles". This new shortly-to-be released feature from the bX team will show the most viewed articles based on a weekly calculation. Again, by analyzing the SFX log files, "Hot Articles" will alert users to important articles in a specific field and should be regarded as helpful, but cannot be analyzed until its release.

C. A report of requests for fulltext that have not been fulfilled can be produced through SFX. These data are important to the library's understanding of its users needs. The data in table 1 collected between 1.10.2010 - 30.9.2011, show users requests that have not been fulfilled and the reason for them. The status column suggests in most cases that the current parameter is the issue here. Those data can assist the library in making some acquisition decisions.

Table 1- top 15 "Journal requested that have no full text" report

Journal	No. of Requests	Status
0419-4209 *Dissertation Abstracts International*	756	not owned full text database

0272-9490 *The American Journal of Occupational Therapy*	301	years beyond subscription-consider purchase a subscription
1550-056X *&*	220	not owned-consider purchase a subscription
0742-1656 *Art Therapy*	182	years beyond subscription
1095-158X *Psychiatric Rehabilitation Journal*	127	years beyond subscription
0023-852X *The Laryngoscope*	121	not owned-not one of the subject fields developed by the library
0193-953X *Psychiatric Clinics of North America*	109	series, not owned electronic subscription, own print subscription
1064-8011 *Journal of Strength and Conditioning Research*	109	years beyond subscription
1072-4133 *European Eating Disorders Review*	109	years beyond subscription
1554-0138 *PsycCritiques*	107	not owned
0031-4005 *Pediatrics*	107	years beyond subscription
0022-3891 *Journal of Personality Assessment*	104	years beyond subscription
0017-8012 *Harvard Business Review*	101	years beyond subscription
0003-990X *Archives of General Psychiatry*	97	need username and pw. Difficulties
1743-6095 *The Journal of Sexual Medicine*	90	not owned-not one of the subject fields developed by the library

3) Research function - Investigating a new field in-depth : SFX's does not offer a specific service for this function.

4) Briefing function – Stands for obtaining a background understanding of a topic. SFX's does not offer a specific service for this function

5) Stimulus function – "The creative aspect of many a new undertaking feeds on information, which can often serve as a stimulating agent, the source whence initiatives for an original venture may hopefully ignite." (Nicholas & Herman, 2009, p.47). SFX's bX recommender service can stimulate users into directions not thought about beforehand. Between 1.10.2010-30.9.2011, 8,573 requests were submitted to the bX recommender service by the University of Haifa Library users. Those requests ended with 8,088 click-through. The difference between "requests" and "click-through" is important and needs to be clear. Request defined as clicking on the SFX button in a source. A request generates an OpenURL that is sent to SFX. Upon receiving an OpenURL, SFX produces a screen (the SFX services menu) from which to choose options such as fulltext. A request only means that a person has asked for further information that SFX can provide; the presence of an SFX button does not guarantee the availability of full text. "click-through" happens when a patron selects a link in the SFX services menu to link out to a target, that action results in a click-through. (Chrzastowski, Norman, Miller, 2009). 94% of requests ended in click-through emphasized this service contribution to users from their point of view. With the integration of bX directly into ScienceDirect and Scopus, it is likely that its usefulness will increase.

6) Browsing function – surfing the web with no goal in mind, reading random titles at the library shelf's are familiar habits of most users. The SFX A-Z list service can fulfills this aspect. Users can choose particular/random journal and look it through. However, the SFX A-Z list contains only electronic journal sources. Between 1.10.2010-30.9.2011 , 9,315 requests were submitted to the SFX A-Z list with 8,568 click-through. This high proportion of 92% click-through suggests users find this option suitable for their information needs.

Intellectual Level

"This characteristic refers to the minimum extent of knowledge and sometimes the level of intelligence an individual might need in order to understand the information available" (Nicholas & Herman, 2009, p.57). The easiness of getting information through the internet can produce popular and/or scientific materials , simple and/or complex content and the user have to make up his mind is those outcomes appropriate for his work or not. Nicholas & Herman explain some more regarding user information seeking behavior: "Much digital activity involves navigating and not using. The quality and reliability of some information is judged by its popularity; the wisdom of the crowd is the key measure of worth." (Nicholas & Herman, 2009, p.60). If you are a young student, wisdom of the crowd is risky. One can miss valuable sources this way and will have difficulties in determine the intellectual level of what he found. Is it considered academic? Peer reviewed? Can he use it in his assignment? SFX takes what might be an obstacle and tries to turn it into an advantage with the new feature "Hot articles". Due to the fact that academic universities and other research institutions are the vast majority of customers of SFX and thanks to the openURL Link standard, here we can assume that the SFX KnowledgeBase stands on the scholarly wisdom of crowd. Usage of scholars is the measure that makes the most viewed articles pop up every week as the "Hot Articles". The nature of the material (theoretical, statistical, or else) is hopefully clear to those with at least some practice in the diverse academic fields.

Quantity

Scholars need to be updated continuously with new and relevant information in their field of research. This situation isn't new although the circumstances have changed. In the past the main challenge was retrieving and locating the information. Today the main challenge is to select and evaluate the appropriate material from what is known as the "information flood". This flood of information requires new strategies to evaluate knowledge. Nicholas & Herman explain how academic scholars deal with it: "… the key to contemporary researchers' effective information consumption is selective reading. This is why their strategy for coping with the time pressures typical of today's scholarly endeavour, on the one hand, and the vast quantities of information incessantly flowing to them, on the other, is screening, evaluating, and filtering, not just to distinguish relevant from irrelevant, but to separate dispensable from indispensable relevant material." (Nicholas & Herman , 2009, p.71).

SFX, based upon openURL standards, enables all aggregators and vendors to be included and share the growing SFX entire database which is called the KnowledgeBase. (Robertson, & Soderdahl, 2004). This large unified KnowledgeBase allows the user to search for a specific article use the SFX citation linker, without knowing in which database it is included. More and more aggregator's, vendors and publishers embrace the openURL standard enlarging the KnowledgeBase for the benefit of all.

As for the library, assessing its databases compatibilityto users information needs the SFX "Number of click-through per target" report facilitates the library to learn which databases handles the sources most users are using. This tool can assists the library in its decision making process regarding future alliances with those information suppliers. Table 2 shows the usage for the ten top information aggregators in the 2011 academic year at the University of Haifa library.

Table 2 "Number of click-through per target" report

Target	Clickthroughs
PROQUEST_CENTRAL	33096
ELSEVIER_SD_FREEDOM_COLLECTION	31626
WILEY_ONLINE_LIBRARY_2010_FULL_COLLECTION	26111
LOCAL_CATALOGUE_EX_LIBRIS_ALEPH	24713
GALEGROUP_ACADEMIC_ONEFILE	12464
APA_PSYCARTICLES	12225
INFORMAWORLD_TAYLOR_FRANCIS_SOCIAL_SCIENCE_HUMANITIES_LIBRARY	12137
SAGE_PREMIER_2010	9949

SPRINGER_LINK_JOURNALS_STANDARD	6964
WESTLAW_INTERNATIONAL	6218

Quality

The huge amount of information in the digital environment makes the process of quality determination a difficult one. "The esteem in which a journal and/or a publishing house are held is often well-known and frequently used as an indication of the quality and authority of information." (Nicholas & Herman, 2009, p.80). Can the library and SFX contribute to this indication and even assist in this process? Nicholas & Herman suggest: "There is a possible role here for the information professional in providing quality assessments, especially in the construction of information-filtering mechanisms that take account of quality and authority criteria…. Librarians seem to be facing up to the challenge by developing their own search engines. These are meant to offer the trusted and effective searching environment which is missing from the big search engines and Google Scholar". (Nicholas & Herman, 2009, p.84).

The library's main function has always been the organization of academic knowledge and within this framework, the librarian not only organizes existing knowledge, but is also active in the field of collection development, whether printed or digital. This role does not end with selection of materials. It also involves the selection and development of better retrieval systems and useful software's for users. Choosing and operating SFX can be considered as one of those steps. The large KnowledgeBase offered by SFX is assembled from a high proportion of quality sources which promote a quality search environment. Although it is impossible to compare quantatively the usage of the library collection with the internet at large when it comes to the way scholars collect their information, the SFX report "Number of requests and click-through per day /week/month" can give some figures regarding full text retrievals per days, weeks, month or a year period. A query for the academic year of 2011 (Oct 2010-Sep 2011) indicated 405,364 requests which ended into 329,682 click-through. High demand is especially shown at the end of the fall semester: peak of 73,223 click-through for Dec 2010- Jan 2011. We may assume that those figures are the result of the students' need to complete and submit their assignments by the end of the semester. This information, especially over time, can give the library some insight if it is on the right track to fulfill her user's information needs. It will be even more efficient if the library can learn from SFX reports more details regarding the type of usage according to specific academic groups (students vs. faculty).This option does not exit at the present time.

More important input regarding the quality parameter is the SFX report "Journals requested but have no full-text". From this report the library can learn which journals are demanded but are not included in its collection. This report can assist with acquisition decisions. It can point directly to gaps between users' needs and the collection inventory.

The Individual users who wishes to check the quality of a specific journal can use the ISI-JCR option in SFX's menu window (see image 1). Using this option supplies the user with details about impact factor for example. This is an important function, especially for those who wish to check their options before submitting their own article. In addition, one usually should check the ISI-JCR when citing in order to make sure they are using an article from a well known peer-reviewed journal.

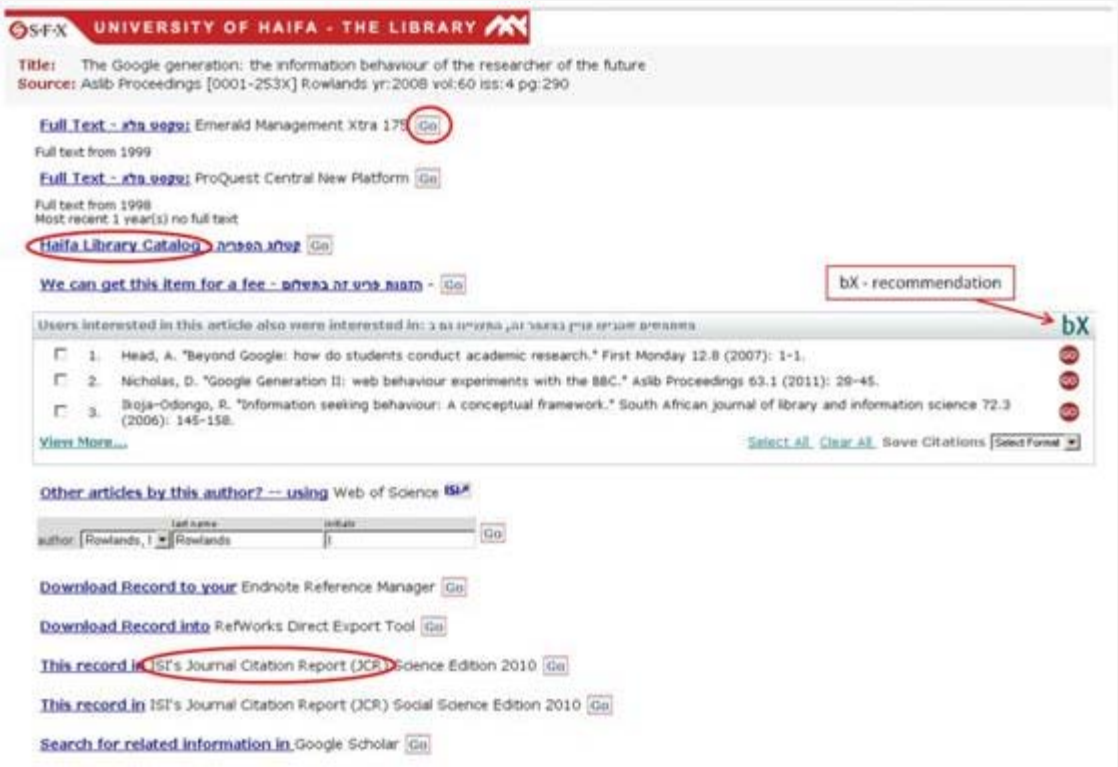

Image 1

Currency

Currency is with no doubt a major thread of information needs. Researchers in all fields need to keep update with the latest information. The new feature of SFX, bX Hot Articles, is a notable aid in terms of currency. The most viewed articles are calculated every week and can be publish by the library. Another option for the user is to browse journals' latest issues, which can be done easily by using the SFX A-Z list feature or to search the SFX citation linker by inputing a publication title and a chosen year data.

Speed of Delivery

"Total access, as quickly as possible, appear to be the present-day information seeker's key information needs requirements… Nobody wants to wait" (Nicholas & Herman, 2009, p.90). SFX is designed first and for most to satisfy this aspect of users' information needs. It functions as a bridge between the library catalog and databases and the full text. Users focus on the GO button is so high they usually overlook other options suggested by SFX menu such as catalog links, help text, or even information as the journals peer-reviewed. (Ponsford, Stephens, Sewell, 2011). It satisfies the user's information needs quickly and seamlessly. As for the library, SFX is the solution needed since the rise of the digital information environment. It enables the library to offer the user smooth access to fulltext when the requested information is digital. Fulfill by that their information need in terms of speed of delivery. A second advantage for libraries, in terms of understanding its user's information needs, happens when it gets data from the SFX statistical reporting package. It is providing another look at how library users navigate and utilize electronic resources. Unlike other statistical reports, provided by vendors, SFX data cover both successful and unsuccessful links, meaning that libraries can identify items patrons wanted, but which were not - for some reason - available.(Chrzastowski, Norman & Miller, 2009). "Journals Requested But That Have No Full Text"reportis a query that ranks requests for full-text journals that failed or had no link to the full text. There are a number of reasons that journals would appear as having no full text. If full text is limited to certain years, the years outside the requested coverage will appear as "no full text." Also, book series or conference proceedings often appear in this query because either they are not available in full text or they are indexed as books with ISBNs and do not have the correct linking to enter at the chapter or article level. This query can also show the library where setup problems exist in SFX, so each title listed can become a research project to determine why linking is not taking place. While time-consuming, these are the titles your patrons are trying to get, without success, and the time is well spent to determine why these requested journals are not accessible and by that harming speed of delivery for the user.

Packaging

"All too often it is a package and not the information that is given in answer to a question, an attitude which might explain why librarians tend to present to their clients the electronic version of some material, even when the hard-copy alternative is available and, if it were only given some consideration, more fitting to the enquirer's circumstances." (Nicholas & Herman, 2009, p.108). This quote criticizes the librarian's attitude. The problem described in this quote is solved by the SFX menu. When searching for specific article, for example, the SFX menu will show all options how to retrieve the item requested: as a digital file if available, in-print through the library catalog or through inter library loan if it is more fitted according to users information needs. What do users prefer in terms of packaging? The feedback librarians usually receive is that if the item does not exist digitally, it is of no interest to the user. This might be confirmed by deep analysis of SFX statistical reports along with performing evaluation activities such as LibQual.

Conclusion

Providing simple and reliable access to information is one of the main concerns of academic libraries in the digital age. Link resolvers provide the ability for a library patron to move quickly from a citation in an abstracting and indexing database to the full text itself. Integrating OpenURL link resolver SFX within the library systems should assist in accomplishing this mission and might even do more. This article explored the possibilities of using SFX not only as a "bridge" for smooth access to digital content but also as a tool that can assist libraries to reveal their users information needs. The knowledge of its users information needs can suggest practical ways regarding how to fulfill it.

The framework to assessing information needs, as designed by Nicholas (2000) and updated by Nicholas and Herman (2009) regarding digital materials, has been used here to analyze some aspects of information needs with the OpenURL link resolver SFX. SFX's contribution for the benefit of users and/or libraries was discussed per each aspect and emphasized with some data from SFX's statistical reports. The particular reports were retrieved from the Younes & Soraya Nazarian Library SFX server between Oct.2010-Sep.2011. This article demonstrated that SFX can assist the library in the process of evaluating information needs by following the "footsteps" of its users as well as providing better services for its users. For users the main advantage is an easier gateway to fulltext. This is an important step for users to satisfy their information needs by themselves.

SFX main purpose is of course being a link resolver. However, as a secondary function, SFX assists in discovering information needs for the library and fulfilling information needs for the user.

Concluding SFX beneficial for users in their journey to fulfill information needs will include tools to perform the “Function” element of information needs. SFX is that tool. It provides the users with several points of access for information retrieval. The user can choose the citation linker and/ or the A-Z list according to his specific needs. When “Intellectual level” and “Currency” elements are the case, the bX recommendation feature is a plus. The new feature “Hot Articles” is expected to increase the fulfillment of information needs in the aspect of currency for the benefit of all users. The wide KnowledgeBase offer by SFX is assembled from high proportion of quality sources which promotes a quality search environment. When it comes to Individual users who wish to check the quality of a specific journal; ISI option in SFX's menu window is valuable.

As an instrument in discovering information needs, SFX is lacking tools. Regarding the "Subject" element, for instance, there are no SFX reports analyzing which subjects the library users are looking for. Neither can it discover which subjects are searched, but not found via SFX. Further, SFX does not allow us to analyze data by type of users (students vs. faculty, etc.) but it does have some important tools which can assists libraries in discovering users' information needs.

SFX’s reports provide huge and varied ground of data. Immediate insights along with deep analyses of those data are a practical tool for libraries in terms of digital collection management, assisting in acquisition decisions. This is especially important regarding future negotiations of contracts with information suppliers, but also regarding both specific materials missing in its collection as well as the library users needs. In terms of "Intellectual level", the next coming SFX service – hot article which is based on Usage of scholars should be an advantage the library can offer its users.

In terms of “Quality”, “Packaging” and “Speed of delivery” parameters, SFX has true benefits for users as well as for libraries. On the library side SFX is the solution it needed since the advent of the digital information environment. It enables the library to offer a smooth access to its users from its catalog, databases, and Google scholar. It also allows the library to find out fast and easy what is wrong when an error occurs. For users it obvious; it gets them faster than ever to "Holy Grail" of information needs in the digital era – the full text.

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