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Making Electronic Databases Functional on the Library Website: a Practical Approach

by Kanu A. Nagra, Ph.D., MLS, MLIS

Abstract: This paper presents a process on making electronic databases functional on the library website for on and off campus access for optimum use. It covers the steps after the price, license terms and conditions are finalized between library and vendor and the decision is made by library and subject experts to subscribe or purchase the database. The operational workflow steps can be challenging for new professionals when implementing it for the first time. The step by step approach provided in this paper is meant to help new professionals in strategic planning, organizing the structure and management of library databases provision, along with providing an operational workflow for successfully mounting electronic databases and open access electronic resources on the library website. The operational steps include gathering necessary access information from vendor, local branding, creating metadata, enhancing discovery and access points, setting up access authentication, updating link resolver service and journal portal, testing, anticipated maintenance and delivery of subscribed electronic database and open access electronic resources on the library website.

1.0. Introduction:

In recent years library databases have gone through rapid and continued developments with respect to nature, format, access and delivery. Provisioning and presenting electronic access on a library website vary from institution to institution. Web platforms and collections also vary based on intrinsic and extrinsic factors. However the core idea of making databases available 24/7 is a common goal.

Because of the wide variety of databases in every discipline and the diverse vendor platforms it can be confusing to patrons to use them. This paper presents detailed steps for making databases fully functional and accessible on library website with multiple points of discovery and use. Libraries often perform trial run of database to evaluate and test the database's potential for their academic community. The paper describes the subsequent operational steps on making

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electronic databases functional on the library website successfully once the price and the selection of open access e-resource or purchase decision of database and licensing terms are finalized between library and vendor. This paper recommends a simplified step by step procedure for implementing databases on library website and building and maintaining related areas in database management.

2.0. Methodology:

The review of literature and author's own experience in the electronic resources field is used to investigate successful practices to make electronic databases fully functional on the library website for on and off campus access with multiple discovery and access options for optimum use.

3.0. Review of the Literature:

An extensive literature search was conducted. The literature summary is presented in categories below to highlight changing concerns of libraries and librarians.

3.1. Consistent Style of Web Pages:

Garlock and Piontek (1996) emphasized creating a similar design and document style for all the pages on library website to ensure a consistent structure of the web pages. According to them the creation of a standard template for the team working on different web pages helps to maintain consistency in style and look so that users easily recognize that they are on the same library website. In addition authors emphasized that the organization of resources and databases on a website may vary from standard classification system to library's own developed schemes or systems but whatever method a library is using it should be client centric.

3.2. Link Maintenance, Regular Testing and Updates:

Bartle (2000) presented a model to mount a web-accessible database using HTML pages, File transfer protocol (FTP) and a server supporting PERL. She provided numerous tips and recommendations on avoiding invisible characters and archiving every change for database as well as showing title and date of updates. In addition, she recommended checking file permissions for mounting database, building and maintaining a schedule for updates, and maintenance of resources for efficient mounting and maintenance. Herrera and Aldana (2001) reported the benefits of centralized maintenance of electronic resource URLs in the library catalog and linking subject guides to the catalog at the University of Mississippi. These practices helped to provide users with a uniform access to resources and also saved library staff time in updating the URLs. In addition, the authors described a method to present electronic resources effectively in the MARC 856 field in the catalog and of inputting the call number field with different categories' of e-resources such as e-books, e-journals and e-databases to deliver precise results.

3.3. Organization of Databases on Library Website: Alphabetical and Subject Indexes:

Murphy (2003) reported that web titles or databases is often times replaced from the catalog with an alphabetical list of web titles, subdivided into subjects or departments. This may facilitate users discovery and suggested that with the rapid development of web resources a controlled vocabulary and design terms need to be given careful consideration. Dupuis, Ryan, and Steeves (2004) described the development and ease of using dynamic subject guides at York University using a content management system (CMS) by subject experts. The subject librarians

created the guides using easy to use CMS templates which enabled them to maintain and manage links of subscribed resources on all the reflected subject guides at the same time which saved time and effort. In addition the CMS tool made it easier for subject librarians to publish pages and implement changes on library website quickly and efficiently. De Jager (2007) suggested including remote electronic resources into the library catalog to promote single source searches for both print and electronic resource collections within catalog rather than accessing separate subject lists on library website.

3.4. Implementing Controlled Vocabulary, Metadata and Description of Databases for Successful Retrieval of Information:

El-Sherbini (2001) stated that metadata for electronic resources is often an extension of MARC 21 and reported problems associated with the variety of metadata styles being generated. The author recommended using existing classification systems and standards for building metadata for e-resources. Baca and Harpring (2002) recommended implementing controlled vocabularies, authorities and consistent formatting for metadata for e-resources based on their experience with descriptions of works of art (CDWA).

3.5. Enhancing Discovery of E-resources:

Frick, Duncan, and Walsh (2005) described context-sensitive linking services and their benefits for enhancing access. They reported an OpenURL is an actionable URL, which consists of a base URL and a query which identifies the library of a searcher and is supplemented with one or more descriptions which identifies user's information request.

An OpenURL link resolver service enables libraries to provide increased access to full text in addition to Journal portals. It is useful for vendors in setting up and maintaining target sites to provide improved access.

Linoski and Walczyk (2008) described how development of federated search tools helps users to identify relevant subject databases and allows simultaneous search within multiple licensed and local electronic resources. Federated search has many synonyms such as meta search, parallel search, and broadcast search. They concluded that the federated search is not a replacement for searching individual databases but it is another research tool which performs simultaneous search and its selection requires careful planning to augment existing technology and budget. Further, Williams, Bonnell, and Stoffel (2009) affirmed that the majority of students in their focus group study were satisfied with library's Web Feat federated search tool and they were using the federated search tool in addition to individualized databases and other sources. Many participants suggested inclusion of instruction of this tool in library classes along with suggestions like placing the federated search link as starting point for research and displaying it at a prominent place.

Williams and Foster (2011) noted that discovery tools are the next stage for library resource searching and discovery. Their study findings revealed that discovery tools provide better search experience, more ease of use, more relevance to search items and improved response time compared to federated search. Further, they explained that the gap in content due to non-sharing of metadata with discovery tools by some vendors causes libraries to hesitate to use discovery services and to continue using federated search and/or standalone subject databases to fulfill user's information needs.

Miller (2012) affirmed that the web-scale discovery services provide a way to improve access to library collections but found that they are still evolving. According to Miller, hundreds of libraries are using discovery services to provide a better searching experience that competes well with Google, Bing and others by providing a library version of a universal search for resources. He mentioned there are still a number of publishers/vendors who do not share their

Making Electronic Databases Functional

metadata with all discovery services so that careful planning is required to ensure that that discovery service that the library is planning to purchase or subscribe to is capable of incorporating all their paid resources to be accessed. He suggested libraries can modify acquisition policies to give preference to vendors who partner and share metadata with web scale discovery services.

On the other hand Hallyburton, and Marcus (2012) said that a multiple database search from a single vendor is cost effective and worthwhile if the library is using all or most of the research resources indexed in databases available from the publisher/vendor. And, it will add more value and enhance the library experience full text access and more content is provided. A small investment in integrated search which enables simultaneous searching in databases, can maximize discovery and user experience while leveraging what library already possess rather than a large investment on a new discovery tool.

Somerville (2013) described the evaluation, challenges, complexities, triumphs and final implementation of a discovery system in the Auraria Library. He revealed that the SerialsSolutions Summon discovery service was the best fit for their library. It allowed them to use the same knowledge base as an OpenURL link resolver service for enhanced access to journals already in use by avoiding a duplication of work.

4.0. Mounting Electronic Databases on the Library Website: A Model

The process of mounting an electronic database on a library website can be a challenging endeavor. However, the model highlighted in ‘figure 1’ on the next page can be easily adapted for local use. The order of steps may vary for some libraries due to logistics but the basic idea is to provide 24/7 access with multiple access points and discovery to library clients on variety of devices.

Step 1: Collection of Information from Electronic Database Vendors and Open Access Resources:

Once the decision is made by the library team to implement an open access e-resource or subscription/purchase of a database, the process for making the database accessible to library clients begins. The electronic resources librarian needs to gather complete information and reconfirm related items for accessing the database. Some of the information may have been gathered during the trial access period if a trial was arranged; however, many vendors provide different settings for trial and purchased access. Therefore, it is important to ensure that you have the necessary information to enable database access for both on and off campus use.

In order to facilitate the process it is advisable to prepare a checklist for obtaining the information items from the database vendor to avoid any confusion and delays due to incomplete information. The checklist on the page following “Figure 1” may prove useful in collecting information from the vendor. Local variations can be added or deleted based on library's requirements.

Making Electronic Databases Functional

Figure 1: Mounting Electronic Databases on the Library Website: A Model



Checklist of Information Needed for Database Access Implementation

- ___ URL of the database
- ___ Gather account details:
 - ___ Account number
 - ___ ADA Complaint details
 - ___ Contact details for billing
 - ___ Contact details and provisioning of access
 - ___ Technical support contact details for troubleshooting. Document process for opening and escalating support requests.
 - ___ Username and password for admin access for customizing the database and gathering usage statistics.
- ___ Identify exact date range for content access for indexing and full text access.
- ___ Proxy details for configuring on and off campus access.
- ___ Process to grant access to users. Do users need to create a login to use database features
- ___ MARC records
- ___ OpenURL link resolver/Scholarly linking details
- ___ Title of collection in Serials Solutions client center/Journal portal.
- ___ Availability of mobile applications.
- ___ Metadata sharing and partnership of database with your discovery service
- ___ Unlimited access is allowed or there is a limit on number of simultaneous users.
- ___ Frequency of content update.
- ___ Availability of basic tools within database such as email, save, listen, cite, print, export feature etc.
- ___ Is export feature compatible with your current bibliographical manager?
- ___ Supported browsers and compatibility
- ___ Are any special plug-ins needed to access content or features?

Making Electronic Databases Functional

Step 2: Discovery of Database and Open Access Resources on Institutional Website:

After collecting the information from the vendor, prepare the database to make it discoverable from multiple access points. Different libraries follow different practices. Some libraries input the MARC record of databases in their library catalog, provided it is available from the vendor, along with placement of database titles and its description in separate indexes on the library website. Examples of such resources are electronic book databases and electronic video databases. Electronic resources can be organized, integrated and placed at various locations to be discovered by patrons on the institution's website. Then add and integrate the databases and electronic resources wherever applicable in your library and institution website. Examples of such resources are the library catalog, the university's union catalog, a journal portal, a multiple database search, and a federated or integrated search and library discovery services platform.

Most academic libraries arrange databases on their library website in various ways: an A-Z alphabetical list of databases, databases by subject, databases by categories / formats, mobile databases, trial databases, subject guides, library guides, databases by individual courses and university's shared web pages.

Nowadays, many academic libraries subscribe to discovery service platforms that work on the principle of searching, in a single search box, a complete knowledgebase consisting of multiple electronic resources from different vendors. The knowledgebase may consist of local resources such as institutional repository, catalog, free online resources, and the library's licensed or non-licensed resources which have metadata sharing partnership with discovery services. Examples of discovery services are Primo from Exlibris, Summon from SerialsSolutions, and EBSCO discovery services from EBSCO.

The federated search is a research tool which allows simultaneous search within multiple licensed and local electronic resources. Examples of federated search tools are WebFeat owned by SerialsSolutions, 360 search from SerialsSolutions, MetaLib from Exlibris and zPortal from OCLC. Discovery tools solved many of federated search problems, such as difficulty of use and irrelevancy of results and they also offer an improved search environment. However, discovery services are still evolving and libraries must carefully evaluate and choose between discovery services and the federated search.

If your library is using subscription discovery services and/or federated search it is vital that you provide the necessary access information for the database such as URL, vendor information, link resolver service, and any other relevant items for your library's open and subscribed resources to the federated search vendor or discovery services vendor.

Some database vendors do not provide access to content through discovery services. It is recommended that libraries check with individual database vendors about their database availability, connectivity and partnership to share metadata and access policy within discovery services platform before making their subscription/ purchase decisions to discovery service platform or any individual database.

Additionally, to enhance discovery and access of electronic resources on your institutional website, add your library's electronic database resources on virtual spaces such as virtual research commons, course management systems like blackboard, faculty and student resource web pages to facilitate discovery.

Step 3: Metadata and Description of the Electronic Resources:

There are varied practices and terminology commonly used to describe electronic resources and databases in the library catalog. MARC field 856 in catalog can be used represent electronic resources in the library catalog. MARC

Making Electronic Databases Functional

856 subfield u (\$u) can represent the URL of e-resource and subfield z (\$z) is dedicated for public notes and captions as per the guidelines for the use of the 856 field by the Library of Congress.

The metadata for the database may include information about the database's coverage, features and uniqueness along with subject and extent of full text availability. Meta data may have a shorter or a more detailed version or both depending upon the requirements and decisions of your library. It may also depend on the nature of the database lists or indexes, the design of your library website and the discovery of databases on related web pages.

Alphabetical lists or subject indexes may organize the databases in different categories. These arrangements may not be sufficient for good patron's access. To let patrons know what is available in certain databases and to what extent, information on databases in the form of metadata or short descriptions is required. It is advisable to create a standard control vocabulary and style sheets for building a description and metadata for your library team. It will help in generating consistent design and formatting to maintain consistency.

Step 4: Access Authentication and Management for On and Off Campus Access:

Users want to access library e-resources from both on and off campus anytime they need them. Most database vendor's standard license terms and conditions allow on and off campus database access for legitimate users of institutions. Legitimate users are those users who are affiliated with the institution or allowed to access library facility. Institutions must maintain and utilize a system to authenticate their patrons and at the same time prevent outsiders from accessing their institution's subscribed content. According to Curtis, Scheschy, and Tarango (2000), this can be accomplished through authentication techniques that enable legitimate users who are enrolled in the institution to access library electronic resources. There are a wide variety of methods available to allow off campus access to resources on the library website. Ascertain what method your library is currently using and what is provided by the database vendor. Most database vendors are flexible in offering whatever method is preferred by library for off campus access. Examples are the user name and password method, IP authentication, proxy server and configuration of browser proxy settings and EZproxy server. Following are some examples authentication set-up for off campus access to library resources.

4.1 IP Range Authentication, Proxy Server and Configuration of Browser Settings:

Whenever a library subscribes or purchases licensed electronic resources, have your institution's IP ranges and IP address of the proxy server provisioned correctly by the database vendor for proper authentication to provide access on institution's IP ranges for the licensed resource. Users must configure their electronic device's proxy settings for accessing library resources from remote locations. Institutions may require users to enter barcode number or login information for authentication. Curtis, Scheschy, and Tarango (2000) provide a simple description of how the proxy server technology works on the principle of communicating directly with database site.

It is recommended that libraries provide patrons clear configuration instructions on their website for the various devices used by their patrons.

4.2 The Username and Password Method:

The username and password method is not preferred by many vendors and libraries as it either will likely result in the need for more help desk intervention when each patron has a different password or less security when a single password is used. If the library is using username and a single password access method for remote access for all or certain databases for some reason then provide this information to users in such a way that it is accessible to legitimate users of your library. Ensure the users are aware of restrictions on database usage and that it is available and limited to library users only.

4.3 IP Range Authentication, EZproxy Server and its Configuration:

According to information on OCLC (2013) website, EZproxy authentication and access software enables users to access library's licensed resources while off campus. EZproxy can be configured with a variety of authentication services, amongst them are LDAP, Athens, SIP, and Shibboleth which helps in reducing the number of authorizations / passwords and provides an uncomplicated experience to users.

As with the proxy server authentication method, database vendors need to be provided Institutions' IP ranges and EZproxy server's address so that IPs can be authenticated to the licensed resource for on and off campus access. Institution's Ezproxy administrator needs to obtain this information from the database vendor to configure EZproxy for specific databases by editing configuration files based on the library's decision to use EZproxy using host name or port number.

EZproxy works on the principle of altering the URLs within the library web pages for the databases. The database URLs can be supplemented with EZproxy server information either with port number or hostname. Ezproxy server name is embedded within the URLs of databases on the library website. Off campus database access is allowed after user's credentials are authenticated by LDAP (or any other authentication method). There is no need to configure a user's device as the Ezproxy server name is already embedded in the URL.

There are a variety of authentication options available and their selection and use may be based on many factors including the library or institution's existing technology infrastructure or preferences.

Step 5: Journal Portal and Citation Linker:

Libraries use different kinds of platforms to organize, manage and search journals on their website. SerialsSolutions journal portal service and A-Z e-journal list & citation linker from ExLibris are examples of some frequently used platforms in libraries for connecting users to journals and related databases in the library's collection. Once a new database is purchased or subscribed to by the library, update the relevant collection in the admin module of SerialsSolutions client center and ExLibris link resolver service or any other services applicable for your library. If your library is using another service or homegrown system for library's journal portal, then update the new database in the system.

Step 6: The OpenURL Link Resolver Service & Scholarly Linking:

OpenURL is an acronym for Open Uniform Resource Locator. OpenURL link resolvers help in connecting users to full text access through open access resources and other databases licensed by the library when the database they are searching does not provide full text access. There are a variety of OpenURL link resolvers available in market such as LinkSource from EBSCO, Article Linker and Journal Linker from SerialsSolutions, SirsiResolver from SIRSI Corporation and SFX from Exlibris.

According to NISO (ANSI/NISO Z39.88), the OpenURL application works in a networked environment in which packages of information embedded with a description of the referenced resource is transported with the purpose of obtaining context-sensitive services relevant to a referenced resource.

The following example describes using SFX from Exlibris, for setting up OpenURL and scholarly linking to a library's e-resources. To get more information on the standards and available products for OpenURL resolver, NISO and Library of Congress portal are good sources.

6.1. SFX: The OpenURL Link Resolver Service:

Database vendors make their databases available in either source (e.g. indexing databases) or target category with in SFX link resolver service which allows the library user to access the full text of documents or articles from an institutional defined knowledgebase through plug in-integration to resources such as open access resources, a library's licensed e-collection, library catalog and inter library loan service etc. Databases, whenever purchased or subscribed to by the library, must be updated and customized in the SFX knowledge base, so that linking becomes possible for the licensed database and e-resources.

Step 7: Customization in Admin Account of Databases:

Database vendors provide libraries administrative access to view usage statistics and customize the display of features within the database as well as the capability to embed other links, images and related content to customize the display of the database on a library website. Libraries can perform customizations for a number of items such as adding a College or University logo, linking to catalog, linking to a chat reference service, or linking to a homepage within the database. Account Administrator may be able to set up a desired limit of parameters for basic and advanced search.

Step 8: Mobile Applications and other Important Information about Database for Users if any:

Besides providing clear off campus access instructions to databases on a library website, the database metadata as well as library handouts or guides should mention any special features supported or not supported by the databases. Some examples of special features are:

1. A database provides mobile website or mobile application for access on devices. Ascertain the method(s) to access database on different mobile devices and provide this information on mobile database index or appropriate webpage on your library's website. Additionally, update your library's research guides, handouts and frequently asked questions (FAQ) and help page(s) with this information.

Making Electronic Databases Functional

2. Certain databases such as E-book databases requires patrons to create username and password to check out e-books, personalize and utilize customization features such as note taking, highlighting, saving citations, embedding external links and more in their account within database. This information should be indicated clearly on relevant e-book web pages.
3. Some databases do not support an email feature within the database for sending full text articles via email. An alternative method to save and email or special instructions should be included in the description or at appropriate places on website so that patrons are aware of it.
4. Some databases are subscribed to based on the number of simultaneous users needed. This limitation should be highlighted in the description, handouts, guides and appropriate place on library website to reduce patron confusion in the case of high usage.
5. Some databases allow instructors to add and create content to connect with students in an online environment (e.g. Naxos Music Library, Transparent Languages, and Films on Demand) for interactive learning such as shared playlists for audio and video, saving favorites, online lessons and exercises, discussion in online groups etc. This feature should be mentioned in the description of the database and relevant library guides and web pages on library website.
6. Some databases display indexing to journals and articles for which the library does not have full text access based on subscription coverage (e.g. Science Direct and Springer). The search results may display symbols such as a green box image or partial green box image to represent the full or partial access available to institutional users. An indication of this feature in the description of the database or at an appropriate place on the library website will help users better understand the search results.

Last but not least the availability of special features such as cite, listen to audio, video and captions, email, PDF download, HTML access, bibliographic manager, export feature, availability of tutorials, help feature within databases, printing limits & loan period for E-books and its usage should be described on handouts, guides, database pages, in metadata and description of database or wherever applicable on the library website.

Step 9: Testing of Library Databases on Library Website:

It is important to note that thorough testing is required before making a database live on library website. Update the electronic database and open access resource in the testing phase first in all the relevant web pages of database indexes, subject guides, discovery services, and related discovery and access points with URL, metadata or description as applicable based on the design of your website.

If the library is using content management system (CMS) for the library website, then update it in the test phase. If the library is using any particular criteria for changes in cascading pages, then follow them to update all relevant indexes, discovery and access points in test instance.

Further test the functioning of electronic database resources for on and off campus access for the following:

1. Test the database for its presentation and display on all the relevant web pages, discovery services (if used by your library), all other discovery and access points on the institutional website.
2. Test database in browsers supported by your library for proper connectivity for on and off campus access.

Making Electronic Databases Functional

3. Check the access to articles or documents in search results, functioning of journal access for available coverage dates, videos, captions and images in search results of database.
4. Check the availability and playing of audio and listen features for print disabled patrons.
5. Test the proper functioning of features such as save, email, print, citation, export and other options within database.
6. Check the connectivity to OpenURL link resolver service or any other scholarly linking service used by your library.
7. Verify the connectivity and search results within citation linker and journal portal.
8. Test the access, consistency in public notes and URL connectivity to databases, journals, e-books within library catalog (whatever is applicable for your library)
9. Check the linking and proper functioning of library catalog, chat reference service, college logo and library's home page within database platform.
10. Test the access and connectivity to database within integrated search and licensed discovery service subscribed by library.
11. Check the access of database on institution's course management system such as Blackboard.
12. Check the proper functioning and access of databases on various database indexes and library guides etc.

Ensure proper display and functioning of the database for all web locations to provide uninterrupted access. Also, the database URL maintenance and verification need to be done regularly to avoid any access issues. It is strongly advised to build a central database for maintaining vendor tech support information, databases URLs and relevant web locations of discovery and access for your institution's website to perform maintenance activities efficiently.

Step 10: Making the Database Functional on the Website and its Announcement:

Announce the mounting and addition of new database(s) in your library's e-collection to your institution's community after testing and ensuring that the database, all database indexes, library subject guides as well as sources for its discovery and access are functioning properly.

5.0. Conclusion:

Making electronic databases functional on the library and institution website along with the placement of databases on various discovery and access points for on and off campus access may be challenging for the first time. The steps by step approach provided in this paper can help in organizing the structure and management of library databases. The detailed operational steps can help in enhancing visibility, discovery, access and utilization of e-resources. The model provided in this paper can be utilized for any type of library with or without local variations to achieve successful mounting and functioning of library databases for optimum use.

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