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Using Information Architecture to Evaluate Digital Libraries

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Information users face increasing amounts of digital content, some of which is held in digital library collections. Academic librarians have the dual challenge of organizing online library content and instructing users in how to find, evaluate, and use digital information. Information architecture supports evolving library services by bringing best practice principles to digital collection development. Information architects organize content with a user-centered, customer oriented approach that benefits library users in resource discovery. The Publication of Archival, Library & Museum Materials (PALMM), a cooperative digital initiative of the state university libraries of Florida, demonstrates the value of information architecture to digital libraries.

KEYWORDS information architecture, digital libraries, digital collections, digital library services, digital collaborations, information organization, information ecologies

INTRODUCTION

As the amount of digital information increases, library services must build on instruction for the discovery of electronic resources to include a greater role for librarians in designing the information architecture of digital collections to improve access to content. Librarians are skilled in navigating online information systems and adept at meeting user information needs. Users confronting a rapidly expanding information environment have altered their library search strategies in response to the Internet age. Librarians are well-positioned to design and deliver a customer service
oriented information architecture that can leverage digital library collections. Library services continue adapting to meet changing user information search strategies with library web sites seen as critical service points for users (Riley-Huff 2009). In digital libraries, information architecture supports library service points to access digital collection content.

Information architecture as defined by Morville and Rosenfeld (2007) is the combination of organization, labeling, and navigation schemes within an information system. This includes structuring the design of information spaces for intuitive access to content, facilitating user task completion such as finding an e-journal or digital object, and managing digital content through collection organization. In digital libraries, collection organization may be based on file type, subject scope, or audience. Information architecture applies familiar concepts in librarianship to the digital library environment.

One example of best practices in information architecture in digital libraries is the development of technical specifications or metadata standards that facilitate greater interoperability among library systems. Other best practices include consistent layout of collection pages, types of search features to include, and the use of particular taxonomy or labeling practices. Librarians work as information architects by organizing content, creating consistent metadata, and structuring search and navigation systems within web sites and Intranets to support the information needs of users. The central focus of information architecture is on bringing principles of best practice to the design and architecture of the digital landscape (Morville and Rosenfeld 2007). In collaborative digital initiatives, this can be advanced through consistent placement of navigational information on a page, the use of pull-down menus, site maps, and content labels (Yakel and Kim 2003/2004).

Efficient and effective access to content through improved information architecture supports instructional services in the electronic information search process and maximizes use of the unique resources of digital library collections. The Association of College & Research Libraries (ACRL) research committee listed digitization of unique print collections as a primary mission for academic libraries (Mullins, Allen, and Hufford 2007). As research libraries strive to meet this challenge, expanding digital collections will need greater coordination of information architecture within and between academic institutions and their partners. Information architecture in digital libraries aids library instruction because it reduces navigation time, speeds information retrieval, and enables greater focus on the teaching of other information literacy skills, such as the evaluation and use of discovered resources.

The evaluation of digital libraries is important because it helps inform decisions made by information architects, collection managers, subject matter experts, and grant funding institutions. Research suggests that digital library evaluations have been lacking due to the failure of project planners...
to identify the significant decisions they seek to inform. Evaluation can provide answers to specific issues and support evidenced-based decision making (Reeves, Apedoe, and Woo 2005). To provide a practical example of information architecture analysis, this evaluation of the Publication of Archival, Library and Museum Materials (PALMM) digital initiative discusses best practices guidelines to inform project design decisions.

PALMM

PALMM (http://palmm.fcla.edu) is a cooperative digital initiative begun in 2000 by the Florida Center for Library Automation (FCLA), the shared library management system of Florida’s public university libraries. Like many digital libraries, PALMM is defined by the feature that it is not a single entity and that it uses technology to link multiple, disparate digital collections and services so that they appear transparent to end users. PALMM is an umbrella initiative that encourages digital collection development of library, archival, and museum materials across the 11 institutions of higher education within Florida’s State University system and with external partners. The FCLA set up PALMM as a host for project contributors, and the FCLA’s Digital Services Library unit provides optional technical services to participating university libraries. Financial support is received from collective use of state funds, library resources, and external grants governed by the Digital Projects Planning Committee of the State University Libraries Council (Waters 2004).

Advancing the visibility and usability of PALMM’s collections to a broader audience requires a flexible approach in information architecture. Collaborative initiatives need to balance adherence to broad best practice standards and the need for local project advancement. Although each initiative proceeds at its own pace, certain technical and design guidelines must be met if good information architecture is practiced. Evaluation of how well PALMM digital initiatives achieve best practices can serve as a model for other collaborative initiatives. The idea is not to redesign sites but rather to encourage the information architecture team to be flexible, accommodating, and experimental in nature (Morville and Rosenfeld 2007). Members working on PALMM initiatives take a team approach using the Digitization Services Planning Committee under the Council of State University Libraries as a forum to discuss best practices and to foster agreement on image quality, markup, and metadata (Caplan 2002).

This heuristic evaluation critically examines PALMM’s digital library design by testing it against set guidelines devised for achieving best practices in information architecture (Morville and Rosenfeld 2007). These guidelines include whether a site provides: multiple ways to access the same information, the use of indexes and sitemaps to supplement taxonomy, a
navigation system that provides users with a sense of context, consistent use of language appropriate for the audience, and the integration of searching and browsing so that they reinforce each other (Morville and Rosenfeld 2007). Each of these guidelines will be described and the degree to which they have been implemented in the PALMM initiative examined. Uniformity across collections in a collaborative digital initiatives is an important information architecture design standard.

UNIFORMITY OF STANDARDS BUILDS TRUST AND ESTABLISHES BRAND

An underlying principle of the PALMM cooperative has been the desire to establish a familiar experience when viewing one of the PALMM collections so that each has a common “look and feel to them” for digital library users. This effort at consistency is implemented through uniform product specifications, quality control procedures, and training opportunities (Caplan 2002). Page layout guidelines include the use of the PALMM logo as a top graphic banner, a left sidebar with standard recommended links, contact information at the bottom of the page, and a short centered text visible in the browser without too much scrolling. An example of conformity to this layout is the Yiddish Children’s Book Collection (http://palmm.fcla.edu/ycb/), digitized for PALMM and contributed by Florida Atlantic University Libraries. PALMM banners and left side bars are most often blue and a palm tree icon is used to return users to the PALMM homepage. A light background and dark font are employed as good practice for ease in reading. Search buttons are consistently positioned to the right of center text with only a few collections placing them alternatively above/below the center text. These design practices are followed fairly uniformly throughout the PALMM collections. The layout design consistency and palm tree icon support efforts at establishing the PALMM initiative as a brand.

The PALMM initiative seeks to digitize treasured state university collections and as such it must offer a sense of community in the selection and organization of content. Returning users will have an improved experience facilitated by PALMM’s use of best practices in information architecture. Building trust between a user and the digital library may boost student self-efficacy in search performance and bolster digital collection use, bringing a vast array of resources into their everyday information flow. As a brand, PALMM offers a return on investment to partners by making unique holdings digitally available to a wider user community. At a time when the ACRL calls for making digitization of unique library holdings a priority, the State University Library System in Florida can champion PALMM as an archetypical digital collaboration.
MULTIPLE WAYS TO ACCESS THE SAME INFORMATION

For users, findability precedes usability and if information cannot be found it cannot be evaluated for use. When users are successful in meeting their information needs at a digital library, they will feel confident in returning for future research. This breeds site familiarity and reinforce successful user search strategies. Findability and ease of use reinforce site trust and credibility among users. Improving findability requires information professionals to use metadata to make objects more identifiable so that one object can be distinguished from another. Findability can be defined as the degree to which a particular object is easy to discover or locate or the degree to which a system or environment supports navigation and retrieval.

Important aspects of information architecture that ensure multiple ways for the same information to be discovered include consistent use of metadata schemes, the use of a top-down taxonomy (controlled vocabularies) combined with a bottom-up approach using natural language descriptors, and the structuring of content to facilitate search and navigation. This includes structuring information in digital collections so that it can be searched by topic, audience, or medium type and with tools that permit multiple ways to access content using advanced search options (Morville and Rosenfeld 2007). PALMM’s Textual Collections have been structured this way so that users can employ Boolean, proximity, or citation search options across multiple PALMM collections.

Contributing institutions to PALMM are responsible for creating item level metadata and for adhering to best practice standards. The Association of Library Collections and Technical Services recommends that digital collections use controlled vocabularies such as Library of Congress Subject Headings (LCSH) because doing so facilitates interoperability with existing MARC records and is an effective labeling system covering a wide range of subjects. The main drawback in using the LCSH is that it requires a sophisticated vocabulary that users may lack. Best practices in information architecture lean toward a combined approach of using a top-down taxonomy of subject categorization with a controlled vocabulary coupled with keyword descriptors using natural language. Contributors to PALMM collections enhance findability by using LCSH terms in subject fields and natural language keywords in content description fields. An example of this combined use of a top-down controlled taxonomy with a bottom-up approach to metadata creation in PALMM can be found in the Florida Voices collection. In this collection, oral history interviews of Key West residents use the controlled vocabulary of LCSH such as “Street names—Florida—Key West” and “Florida—Social conditions” for subject terms combined with a Dublin Core description field that includes natural language keywords such as street nicknames, gay, and Chinese laundry.
Findability can also be enhanced with user-generated metadata, a bottom-up approach of enabling collection users to tag resources for ease in finding them again or to guide others to a collection. Digital library content frequently used by specialists and researchers could be enhanced if sites allowed user-generated labels (Morville and Rosenfeld 2007). Social or communal annotations by experts, researchers, and educators can help librarians leverage digital collections by incorporating or verifying user-generated metadata. The exponential growth of content requires innovative organizational approaches that create new labeling systems given their importance in helping locate and refine information. As users become familiar with digital content and social networking tools, their expectations in finding information quickly and the desire to use information in new ways has risen. A recent check on the social bookmarking site Del.icio.us showed PALMM’s homepage tagged by 40 users, with 5 of those tags placed by Florida public libraries, an indication that librarians are using these tools to refine content more quickly.

User expectations are increasingly important to digitization projects with a strong desire to offer users the kind of interactive experience they seek (Eisenberg 2008). The integration of social networking tools for collaborative learning is a feature that can enhance, customize, and personalize library instruction and use of digital content. In PALMM’s Everglades Digital Library (http://cwis.fcla.edu/edl/), the portal software allows users to rate and comment on resources. This is an example of improved information architecture that creates a more interactive experience for users, builds trust, and facilitates discovery of PALMM content and leveraging unique library collections.

INDEXES AND SITEMAPS TO SUPPLEMENT TAXONOMY

The sub-navigation systems that support multiple ways to access digital library content are an important element of information architecture to enhance site use. Morville and Rosenfeld (2007) emphasize the importance of sitemaps, indexes, and guides as important sub-navigation systems designed to fit the broader framework of integrated searching and browsing capabilities of a site. Sitemaps provide a “birds-eye” view of the site, A-Z indexes allow users direct access to content, and guides provide customized navigation by task, audience, or topic. Similar to a table of contents, site maps aid granularity in finding subdocument information and help optimize search engine indexing. Site maps offer the user in search of specific information a “way out” prior to becoming frustrated. Best practices in design have evolved out of the field of human–computer interaction (HCI) with standards reducing the amount of information that a visitor needs to retain in short-term memory to navigate a site and enabling site familiarity so as facilitate their search process.
PALMM’s web site lacks a site map, which could help manage the collections better, particularly because it is a collaborative project. Incorporating a site map would help PALMM architects maintain individual collection page uniformity and avoid the pitfall of buried legacy pages. It might also help users understand how they are sometimes navigated to collections hosted on university web sites.

A NAVIGATION SYSTEM THAT PROVIDES USERS WITH A SENSE OF CONTEXT

Librarians can provide digital collections with a sense of context to help users decide what information will satisfy their research needs by organizing the navigational path in consideration of topic, audience, and media type. It is important for academic librarians to consider user navigation because they help design of learning management systems, learning object repositories, instructional services, and subject portals. An IMLS study conducted in 2003 concluded that academic libraries need to emulate Internet search engines for their systems to remain relevant (Prabha, Connaway, Olszewski, and Jenkins 2007). Simplified navigational searching and the co-location of different types of related information resources readily accessible online facilitates the user’s information search experience and bypasses the need for the user to navigate the complex structure of the library systems. PALMM offers users this experience by enabling cross-collection searches to retrieve multiple types of content, audio, images, or text on any information search.

The degree to which the digital library navigation system provides users with a sense of context reveals the level of best practices followed. A well-organized and well-designed site provides the necessary credibility for users to trust sites and impacts collection use. Successful completion of tasks, useful search results, and the ability to easily find information again builds user confidence. The branding of collections in the PALMM initiative is important because users come to rely on its credibility as part of the State University System. The return on investment from increased collection use can be future financial and political support based on the success of existing projects and collaborations.

Navigation problems arise within PALMM at the homepage search buttons that take the user to the Digitool search interface. Neither of the sub-pages from the main search buttons (“Photographs & Images” or “Books & Texts”) provide a breadcrumb trail or return text link to PALMM’s main collection page. Although the “Textual Collections” page offers a banner icon (Palm Tree logo), the link was broken at the time of writing. The back button has been “killed” as Morville and Rosenfeld (2007) refer to it, trapping the user navigationally and dissolving trust. Each subpage needs a direct path to the homepage and most of the sub-collection pages have the palm tree icon in the banner that will return users to the PALMM homepage.
but the Digitool search page needs to offer this same capability. The inability to return to main access points without hitting the back button multiple times disorients users and diminishes the sense of context and trust. University contributors to PALMM that use Digitool for their digital collections should insure that their school’s collection banners offer hyperlinks to the home-ages of their institution, library, and PALMM to facilitate multiple ways to navigate to and from digital collections. Of the four universities using DigiTool (Florida State University [FSU], Florida International University [FIU], Florida Atlantic University [FAU], and Florida Agricultural and Mechanical University [FAMU]), only FSU has three hyperlinks in its banner: FSU home (http://www.fsu.edu/), FSU library home (http://www.lib.fsu.edu/), and FSU digital collections home (http://www.lib.fsu.edu/services/tech/dlc/collections). A fourth link to PALMM in the banner of university digital collection pages would improve the sense of context for users and brand PALMM more firmly as the umbrella digital initiative of the State University Library System (SULS).

CONSISTENT USE OF LANGUAGE APPROPRIATE FOR THE AUDIENCE

The labeling and language of PALMM collections is consistent and appropriate for audiences seeking educational, historical, and cultural information. Reinforcing hyperlinked graphic icons with appropriate language (palm tree with the word “home”) can help new users in need of textual cues who may otherwise overlook subtle icons. Development of audience specific pathfinders could include discussion points, research paper topics, or lesson plans geared at different audiences, such as local civic groups, university students, and K-12 media specialists and teachers. The Florida Heritage Collection offers a suggestion list of themed topics, such as Native Americans, which might be developed further or could be enhanced by user tags detailing project suggestions or lesson plans for specific audiences. Subject matter experts can further develop topic pathfinders to aid PALMM collection usage. In PALMM, two good examples of pathfinders are found in the Florida Environments Online (http://palmm.fcla.edu/feol/) and the World Map collections (http://palmm.fcla.edu/map/).

As with pathfinders, librarians developing LibGuides can direct users to digital collections. A Broward College LibGuide on the Everglades points to Florida International University’s Everglades Digital Library, a collection that is part of the PALMM initiative. Highly familiar web sites, such as Wikipedia, can direct users to quality digital collections. Links to Broward’s Legacy journal articles contained in PALMM’s Florida’s Heritage Collection can be found online in Wikipedia articles on Fort Lauderdale history. Librarians can leverage PALMM collections by using certain aspects of the digital landscape to bring quality digital content into the everyday information flow of users.
To leverage PALMM collections, librarians can submit their site information to Google’s Open Directory project or register a collection with OCLC’s WorldCat Digital Collection gateway.

INTEGRATION OF SEARCHING AND BROWSING

Browsing is an important capability for users uncertain of what they are looking for or what a website may contain and it is particularly important in an initiative such as PALMM, where access to a vast array of diverse digital content is provided. The integration of searching and browsing features serves to reinforce each avenue so that users have multiple ways to access the same information. The main homepage of PALMM collections provides one way to browse digital content in an attractive and appealing manner. This browsing capability is supplemented with the option to search the union database through a button labeled “Photographs & Images.” As noted earlier, a button labeled “Search All Collections” or “Union Database” may be more appropriate. When PALMM users opt to search all collections through the union database, a problem arises that needs to be addressed—the user cannot select a collection from the drop down menu to browse a collection. The collection can only be retrieved if the user also enters a search term that appears in the collection content. For example, when a user selects the PRISM Collection from the drop down menu, there will be no return of results found nor will the user be navigated to the individual collection page.

However, results will be retrieved if the user selects PRISM from the drop down menu of PALMM collections and enters a search term such as “socialism.” This reduces the ability of a user to browse once having entered the search interface and it assumes that the user will know enough about what the collection contains to come up with a relevant search term that will retrieve results. The drop down menu should at least bring the user to the individual collection page if no search term is entered or the user should be offered the option to “browse the collection” or be given “search tip hints” if no results are retrieved.

Integration of search and browsing in PALMM should offer users an option to navigate from the search interface back to the main homepage through incorporation of a PALMM home link. Even if the user moves down the search interface page away from the drop down menu to the “All Collections” category in an effort to browse, the attempts to access a collection can prove fruitless. An example would be Florida Environments Online, which is listed in the drop down menu and the All Collections category but cannot be successfully accessed through either path.

Subjecting digital libraries to rigorous testing of searching and browsing capabilities can help determine how users navigate a site and how to facilitate findability of content. Much of this can only be discovered through continual
quality control conducted by information architects and librarians. However, as digital collections incorporate social networking tools, it will be possible to have users discover problems and offer feedback, enabling librarians to improve information architecture so that digital library services are more responsive to end-user needs. Information architecture and digital library development must be seen as a complex, ongoing process because content collection continues to expand and is critical to digital library service in support of end-users.

CONCLUSION: USERS, CONTENT, AND CONTEXT

PALMM is a successful example of a collaborative digital initiative using best practices in information architecture to provide a user community with multiple ways to access a wide array of digital content collected by the State University Libraries of Florida and local partners. Evaluating the information architecture used by digital libraries provides evidence to inform decisions that further digital initiative development, enhance user experience, and facilitate digital library collection use. Search log analytics offer promising future research value if, by observing the actions of individual users in the aggregate, it helps improve navigation tools and digital library architecture.

Digital libraries are increasingly expected to provide users with a more natural flow of information in their environment. This trend is reflected in a movement away from traditional library-focused catalogs toward union catalogs with the incorporation of “get this item” features, favorites lists, and item images (Tedd and Large 2005). Instead of resistance, Nardi and O’Day (2000) advocate collective participation in the ongoing construction of local information ecologies as an opportunity to integrate information discovery tools into settings that make sense for participants. As a shared information environment, PALMM’s digital initiative is an information ecology for Florida’s State University Libraries system. Its shared commitment to enhanced digital access through best practices in information architecture enables disparate users to discover treasured Florida resources and provides them with a needed sense of context in the growing digital landscape.

REFERENCES


