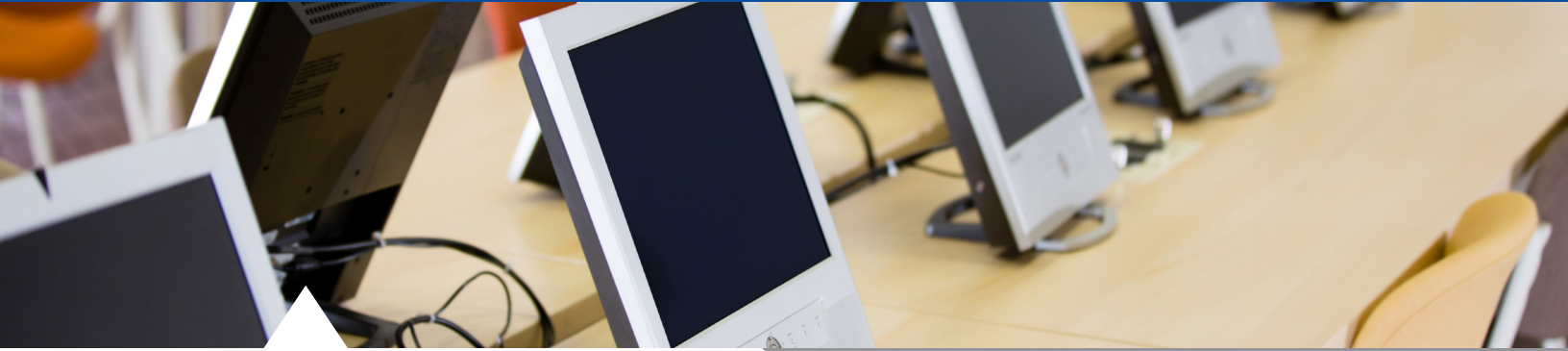


» “Perhaps no place in any community is so totally democratic as the town library. The only entrance requirement is interest.” -LADY BIRD JOHNSON

Strategic Library™



Issue 14 // February 15, 2015

Libraries and the Needs of People with Disabilities

WHO NEEDS A DAM LIBRARIAN?

*The evolution of information management now embraces digital content.**

BY DEBORAH FANSLOW

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» **Barrier-free electronic resources are essential to meeting the research and learning requirements of this diverse academic population.**

BY AXEL SCHMETZKE, CHERYL PRUITT, AND MICHELE BRUNO

Access barriers not only exist in the physical environment but also online. Just as certain architectural design features make it possible, or impossible, for people with certain disabilities to move about independently, certain design components in the electronic environment create either enabling or disabling conditions for individuals wanting to access that information.

As a result, when librarians get together and decide to procure a specific online information resource (an e-book package or an article database, for example), they determine not only what new content is to

be put out there, but also (often unknowingly) who will, and will not, have access to this content.

In the United States, two major sets of guidelines aid designers with the creation of accessible electronic resources: the Web Content Accessibility Guidelines (WCAG) published by the World Wide Web Consortium (W3C)¹ and Section 508, issued by the U.S. government. WCAG, last revised in 2008 (WCAG 2.0), distinguishes between three levels of conformance: A, AA, and AAA. Section 508 has been under review for several years now. A revised version closely aligned with WCAG 2.0, Level AA, (Section 508 “Refresh”), is expected to be adopted within the near future.²

ACCESSIBILITY AWARENESS AMONG COLLECTION DEVELOPERS

Several professional library organizations have recognized the need to include accessibility among the criteria to be considered during the selection process or addressed in the licensing language. For example, in 2009, the American Library Association (ALA) Council issued a resolution demanding that “all libraries purchasing, procuring, and contracting for electronic resources and services require vendors to certify that they comply with Section 508 regulations, Web Content Accessibility Guidelines 2.0, or other criteria that become widely accepted as standards of accessibility evolve.”³

The Association of Research Libraries (ARL) endorses model licensing language “designed to permit libraries to make content in their collections fully accessible” (see **Figure 1**).⁴ ARL also published a Report of the ARL Joint Task Force on Services to Patrons with Print Disabilities (2012), which urges libraries to exercise their buying power to motivate vendors to make their product more accessible and suggests that including “language in publisher and vendor contracts specifically addressing accessibility requirements could have a significant impact if broadly adopted.”⁵

Unfortunately, recent research indicates that consideration for the needs of people with disabilities is the exception, rather than the rule, when collection decisions are made. No data is available that would show whether the collection development courses taught at our nation’s library schools cover this aspect of selection. But a recent content analysis of pertinent books on the subject reveals that, for the most part, its readers—students enrolled in collection development classes as well as already practicing librarians—are unlikely to receive adequate guidance.⁶

Of the 46 books included in the study, published between 2000 and 2014, only 19 address the issue of accessibility at all, and there is no clear indication that things have improved over time (see **Figure 2**). Among these 19 books, Jacobs (2007) stands out because it includes a whole chapter on “The Electronic Resources (ER) Librarian & Patrons with Disabilities.”⁷ The remaining 18 books do not address accessibility consistently or in sufficient depth, or they include inaccuracies indicating the authors’ unfamiliarity with the subject.

In light of the inadequacy observed in the literature, it comes as no surprise that, with

Model US License

“Licensor shall comply with the Americans with Disabilities Act (ADA), by supporting assistive software or devices such as large-print interfaces, text-to-speech output, refreshable Braille displays, voice-activated input, and alternate keyboard or pointer interfaces in a manner consistent with the Web Content Accessibility Guidelines published by the World Wide Web Consortium’s Web Accessibility Initiative. Licensor shall provide Licensee current completed Voluntary Product Accessibility Template (VPAT) to detail compliance with the federal Section 508 standards. In the event that the Licensed Materials are not Accessibility compliant, the Licensee may demand that the Licensor promptly make modifications that will make the Licensed Materials Accessibility compliant; in addition, in such an event, the Licensee shall have right to modify or copy the Licensed Materials in order to make it useable for Authorized Users.”

Figure 1: The Association of Research Libraries (ARL) model licensing language.⁴

a few exceptions, the needs of people with disabilities are not considered at academic libraries when the procurement of specific online resources (e-books and online databases) is discussed. At least this is the picture drawn from survey data collected from the libraries whose institutions are members of the Council of Public Liberal Arts Colleges (COPLAC) (Schmetzke, unpublished data, 2013).

Of the 24 libraries surveyed on campuses with an enrolment between 1,600 and 6,500 full-time students, only one library, Sonoma State University, had a collection development policy that addressed accessibility among its selection criteria. At some libraries accessibility had been considered at least once during the selection process despite the lack of an adequate policy guiding them to do so. However, that number—seven—was relatively small.

A survey of the libraries on comprehensive campuses within the University of

Wisconsin system—10 of 11 participating—showed a more positive picture: Four of the 10 libraries had a collection development policy with an accessibility component. Three of the six remaining libraries reported that accessibility was considered at least once when having selected e-resources.

ACCESSIBILITY EFFORTS AT CALIFORNIA STATE UNIVERSITY

It is no coincidence that Sonoma State University stands out as a positive exception within the COPLAC sample. As part of the California State University (CSU) with its 450,000 students (and more than 13,500 verified students with disabilities), this campus is subject to a system-wide policy which demands that electronic and information technology (EIT) resources and services are made accessible to all students, faculty, staff, and the general public regardless of disability.^{8,9}

The underlying premise of the policy

Content Analysis of Books on Collection Development (2000-2014)

Focus	# of books (total)	# of books addressing accessibility at least once	# of books addressing accessibility accurately, in-depth and consistently
General	11	4	0
E-resources	26	11	1
E-books	3	1	0
E-journal	1	1	0
Digital collections	3	0	0
Subject specific	2	0	0
ALL	46	17	1

Figure 2: Content analysis of books on collection development (2000-2014).

CSU ATI FRAMEWORK: POLICY (STRATEGIES/GOALS & SUCCESS INDICATORS)/PRIORITIES

CONTINUOUS PROCESS IMPROVEMENT WITH STRONG EXECUTIVE SUPPORT

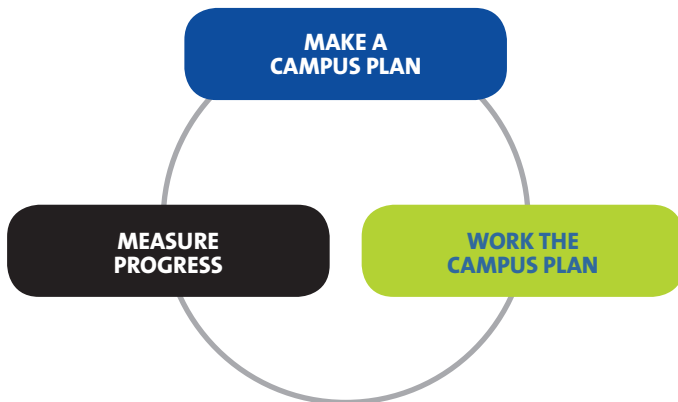


Figure 3: Framework for implementing the CSU Accessible Technology Initiative (ATI).

concludes that eliminating access barriers in EIT benefits all people, not only persons with a disability. For example, providing captioned videos can help students with different learning styles or English as a Second Language (ESL) learners.¹⁰ The policy also recognizes that ensuring accessibility early on, at the time of purchase, often reduces, or even eliminates, potentially costly accommodations that would have to be provided if users encounter barriers in EIT resources.

In 2006, the CSU Accessible Technology Initiative (ATI) was established (see Figure 3). The goal was to target the elimination of accessibility barriers with a focus in three areas: web-based resources, instructional materials, and the procurement of all resources to support teaching and learning. Key strategies for implementing the ATI include establishing strong administrative/executive support, ensuring continuous quality improvement, prioritizing projects/activities, identifying specific goals/success indicators, documenting each campus' progress, and driving vendor improvements to product accessibility support.¹¹

The ATI implementation activities take place on individual campuses and throughout the CSU system. To support the CSU system, the ATI office has established the CSU Accessible Technology Network (ATN), which leverages campus expertise in accessibility across the system. Selection of system-wide ATI implementation activities are driven by two factors: the pervasiveness of particular problems across the various campuses, as

identified in the CSU ATI Annual Reporting process, and the projected impact on the campus population.

One area that was originally identified as high impact and a challenge for campuses was the procurement of accessible EIT products. As a result, the CSU Accessible Procurement Process was developed as a collaborative effort among stakeholders from six CSU campuses and the Chancellor's Office as part of a system-wide effort to integrate accessibility requirements into a standardized accessible procurement process that could be adopted, or adapted, by each of the 23 CSU campuses.

CSU participants recognized that the successful development of an accessible procurement process begins with gaining and sustaining campus executive-level support and hiring or appointing an ATI Coordinator or ATI Project Manager. The development of standardized forms for information collection and documentation of the process verifying that key accessible considerations are addressed during the procurement process also played an important role.¹² By applying the CSU Accessible Procurement Process to the acquisition of accessible library materials, vendors would be alerted of the need to serve all students with their products.

A typical procurement process starts with the purchase request by a librarian. By completing the EIT Pre-purchase Form, the librarian documents the technical and functional requirements, intended users of the product, and the results of any market

research done to compare suitable products. The purchase requester is also responsible for obtaining accessibility-related information, such as a Voluntary Product Accessibility Template (VPAT), test results that verify the claims on the VPAT, and the vendor's accessibility statement.

VPATs are created by vendors to document, in a table-like format, the extent to which the various accessibility features required by U.S. Section 508 are supported by the products in question. While primarily created for use by federal agencies, they are also useful to non-federal institutions.¹³ Some publishers, such as Cengage Learning, OCLC, and ProQuest, readily provide VPAT results on their websites.¹⁴

When completed, the Pre-purchase Form, along with the accessibility documentation, is submitted to the campus ATI Coordinator for review. During the review process, which is guided by the EIT Review Form, the ATI Coordinator carefully examines the information provided on the Pre-purchase form and then determines which additional information might be needed to evaluate the product's accessibility. This information might include, for example, a VPAT review, vendor demonstration of accessibility features, automated or manual testing, or a code review.

It has been the experience of the CSU that the review usually uncovers accessibility issues that are not addressed in the VPAT. Based on the results of the review, the ATI Coordinator may request, from the vendor, an updated VPAT and an "Accessibility Roadmap," a remediation plan that addresses the accessibility issues with a timeline for repair. The updated VPAT and Accessibility Roadmap are used by the ATI Coordinator, by the purchase requester, and by Disability Services to create an Equally Effective Alternate Access Plan (EEAAP) to serve, seamlessly, students who may be adversely affected by product accessibility barriers.

Frequently, the vendor requests a meeting to discuss updating the VPAT and preparing the Accessibility Roadmap. The meetings of CSU representatives and vendors have been very successful in educating the latter about the impact of accessibility barriers on students, the importance of a timely product remediation schedule, and the significance of accurate accessibility documentation for the preparation of the EEAAP.

The purpose of the CSU Accessible Procurement Process is to select a product

What to ask vendors?

- Could we have a copy of your VPAT?
- Does your product conform to Section 508 and/or WCAG 2.0, Level AA?
- If not, what plan is in place to get it to conform? What are the timelines for these improvements?
- Has your product been tested for usability by people with disabilities using assistive technology?
- Could you please give a brief demo how your product works with a screen reader (such as NVDA)?
- Your website states that you are working on improving your product's accessibility. This statement has been there for at least a year. What specific progress have you made since then?

Figure 4: Sample questions librarians can ask vendors about accessibility.

that meets the needs of all users. On occasion, a product cannot be purchased until significant accessibility barriers are removed by the vendor. However, in most instances, commitment by the vendor to remove barriers and to aid with the preparation of a campus EEAAP is sufficient to allow the purchase to be made. As mentioned, product accessibility improvements resulting from this process benefit all campus users.

Currently, the CSU Accessible Technology Network is also using the process described previously to review the CSU system-wide library core collection contract renewals. The goal of this review is to raise the level of accessibility of library resources across several large vendors.

A PUBLISHER'S PERSPECTIVE

Not all e-resource vendors address accessibility equally. According to a 2010 study, 72 percent of the evaluated 32 library databases were rated as "marginally accessible or inaccessible."¹⁵ Even though vendors might believe that their products meet basic accessibility standards, few companies promote accessibility in their marketing efforts.¹⁶ One company that stands out as a positive example is Cengage Learning, a leading provider of innovative teaching, learning, and research solutions for the academic, professional, and library markets worldwide. Among librarians, it is, perhaps, best known for its Gale-brand databases.¹⁷

As technology changed, so did the way Cengage Learning sought to meet the needs of students with print disabilities. The days when accessible ASCII files of textbooks were copied onto CDs and mailed out to libraries are long gone. Responding to customer demand, more than 99 percent of Cengage Learning's print textbooks are now

available in an accessible digital format on CengageBrain.com.

Initially seeking compliance with Section 508, Cengage Learning today strives to conform to the more stringent WCAG 2.0 Level AA guidelines. Some examples of this effort include:

- Clearly coded heading structures that permit users who are print impaired to use their screen-reading software to navigate a page of content just like their sighted peers. This way, they can skim major sections of text without having to listen to each paragraph.
- Links to other areas of content that consist of meaningful, descriptive text so screen-reader users know where the link will take them, rather than hearing the infamous "click here."
- For images that are critical to the learning experience, text describing their purpose is provided—unless this can be easily inferred from the surrounding text.
- Closed captions and transcripts are provided for audio and video content.
- Using standard keyboard keys, individuals who have mobility impairments can navigate the screen without a mouse. Focus feedback lets them know where they are on a page.
- Sufficient color contrast between foreground and background content ensures that users who have low vision are able to read text easily.

While Cengage Learning strives to make digital electronic information products that work for anyone, anywhere, the company is faced with the challenges associated with ever-changing technologies—new mobile devices or updated versions of existing components such as operating

systems, browsers, or assistive technology. Competing products often vary in their built-in accessibility features, which further complicate the situation. For example, some screen readers, like certain versions of JAWS, can speak Basic Math content, while other screen readers, such as NVDA, cannot speak complex math content. Likewise, some mobile devices provide more support for accessibility than others.

Changes in technology present challenges and opportunities. Cengage Learning considers upstream accessibility efforts, communication, outreach, and collaboration as important strategies. The company continuously seeks to identify and evaluate opportunities for improving the accessibility and usability of its digital products.

Cengage Learning also integrates accessibility into product development activities. It has developed an established standard iterative assessment and remediation program to consistently and continuously move the dial towards better accessibility. To that end, the company conducts ongoing progressive audits performed by disability experts.

A critical driving force for product development at Cengage Learning is the voice of the customer (see Figure 4). Comments and suggestions about the accessibility of its products are valued and encouraged via a dedicated accessibility e-mailbox. Real users with disabilities test the products, and the company invites users of all abilities to share their suggestions for increasing the accessibility of its products.

Cengage Learning invites industry accessibility experts to train its staff, and it requires accessibility conformance from its vendors. The company seeks collaborative solutions with others in the industry by remaining active in the accessibility initiatives of the National Federation of the Blind and other accessibility advocacy groups. It continues to build relationships with the accessibility community and those committed to accessibility.

PARTNERSHIPS YIELD SUCCESS

Both librarians and vendors of electronic library resources play an important role in creating an online environment in which all students, including those with disabilities, have convenient and timely access to information. Librarians who are making collection purchasing decisions can apply parts of the CSU process even if their campuses do not have a formal accessible technology

initiative in place.

During the purchasing process librarians can ask the vendor questions about accessibility, require a VPAT, ask for a demonstration of the product that includes how the product works with assistive technology, and work with the purchasing department to include accessibility requirements in contracts. These actions send a strong message to vendors that serving each and every student is part of the campus mission and that their products must therefore be accessible to all.

One challenge for librarians is the lack of guidance provided by the professional literature in the area of collection development. With very few exceptions, the need to consider accessibility is not adequately explained and promoted, which helps to explain why currently so few collection development policies address the issue. Large-scale initiatives, such as the Accessibility Technology Initiative at CSU, provide an admirable model.

Even though most academic libraries operate without the support of such a larger initiative, they can still opt to adopt some of the processes for the selection of e-resources:

- Rewrite the collection development policy so that accessibility is included among the selection criteria.
- Implement the new policy so that accessibility is indeed considered during the selection process.
- Inquire about product accessibility when communicating with vendors; request a VPAT.
- Ask for a demonstration that shows how the product can be accessed and navigated with a screen reader.
- Add an accessibility requirement to the licensing agreement.
- Collaborate with the assistive technology unit on your campus to obtain a vendor-independent assessment of a product's accessibility/usability.
- Provide feedback to vendors about the reasons why their product was selected or not (especially if accessibility was a decisive factor).

Close collaboration with vendors is a crucial aspect of increasing the accessibility of e-resources. Vendors rely on the input provided by librarians. Many e-resource providers, such as Cengage Learning, are highly motivated to meet accessibility requirements. Requests for VPATs, demonstrations, special contract clauses, and Accessibility

Roadmaps will draw vendors into a conversation about accessibility and encourage them to design barrier-free products.■

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Who Needs a DAM Librarian?

» The evolution of information management now embraces digital content.*

BY DEBORAH FANSLAW

In a previous article, I presented a timeline that clearly illustrates the increasing frequency of advocacy for librarians in Digital Asset Management (DAM)—a sentiment echoed across the board by practitioners, consultants, vendors, DAM news media, and academics. To understand why the spotlight has been cast on librarians and the potential value that they can bring to the DAM field, one must first understand a bit about the disciplines and fields that live under the information management umbrella, the many types of information professionals that inhabit this professional landscape today, and where DAM is situated within this universe. With this understanding, the logic and wisdom of inviting and recruiting librarians into the DAM field will become more clearly evident.

So...you don't know the difference between a digital librarian, digital archivist, digital asset manager, and a digital curator? You're not alone. Dr. Marcia J. Bates (2007), a distinguished luminary in the world of library and information science (and a co-editor of "the book" on the Library and Information Science disciplines) wrote about the experience of trying to define and present a unified "map" of the information disciplines for the encyclopedia:

"Now, almost overnight, in the late twentieth and early twenty-first century, the information sciences have exploded into scientific and social validity...Ironically, however, that legitimacy has often been gained without much clarity on just what the information disciplines are all about."¹ (para. 8, 10).

Compared to the centuries-long development of "traditional" libraries and archives, which emerged to manage print content, the disciplines, fields, and professions that relate to the management of digital content are relatively young. Job titles for informa-



tion professionals are proliferating at a rate that won't likely be declining anytime soon as disciplines and fields specialize, converge, and evolve to meet the challenge of managing information within a variety of digital and hybrid environments.

How is a hiring manager to identify, recruit, and evaluate qualified professionals within this landscape?

Attempts to standardize job titles, academic programs, career paths, and terminologies are complicated by the fact that the information management discipline and its cognate fields are rapidly evolving targets with a seemingly infinite universe of potential applications. Still, wouldn't it be a valuable exercise to freeze time for a mo-

ment and view a snapshot of information professionals as they exist today—a field guide, of sorts? Let's have at it:

THE MODERN INFO PRO: A FIELD GUIDE

This guide will help you determine the type of information professionals you may encounter out in the wild. Should you set your sights on a desirable information professional and want to land one to help you get your digital assets in gear, you will be well equipped to understand the underlying skills that are endemic to all professionals within the information management family, as well as the domain specific skills that individual specimens are likely to possess as members of a specific species. Armed with

this knowledge, you will be able to leverage the skills of the specimen at hand most effectively to create an ongoing, cohesive information strategy within your organization.

Disclaimer: If you find yourself face to face with an information professional and you are tasked with evaluating his or her background and experience, be forewarned—although all information professionals share a common body of knowledge related to information management principles and practices, there is wide differentiation between species as a result of specialization and prior career experience, individual personalities, and the occasional mutation.

INFORMATION PROFESSIONAL TAXONOMIC CLASSIFICATION

Family: Hominidae

Genus: Information professional

Species: Digital Librarian, Digital Archivist, Digital Curator, Digital Steward, Digital Media Manager, Digital Asset Manager, Data Curator, Knowledge Manager, Records Manager, Content Manager, Information Architect, Digital Strategist, Information Technology Analyst... and many more species yet to be cataloged.

Description. Information professional is a peculiar group of species found within a wide variety of information-saturated habitats. Appearance varies; gone are the days of identifying information professionals by their buns, spectacles, and cardigans—modern information professionals are just as likely to have piercings, tattoos, and purple hair—and they even don suits now and then.

Their skill sets are as diverse as their appearance—and for the record, some have never even worked in a brick and mortar library, much less stamped a book. Information professional specimens often manifest the following dispositions: perpetual curiosity, creativity, technical fluency, a compulsive need to create order out of chaos, and an intense passion for connecting people with information.

Behavior. Information professional specimens from all species can often be seen raiding stashes of neglected content with unbridled enthusiasm while exclaiming, “No worries, I know just what to do with all of this...let’s centralize it, standardize it, catalog it, and share it!” More than a few specimens have been known to exclaim, “There must be a better way to make this information accessible!” They are often seen promoting the use of digital asset management systems to arrange, describe, manage, distribute, secure, preserve, and provide access to digital content.

Habitat. Traditional habitat: libraries, archives, and museums. Modern habitat: ubiquitous.

Range. Information professionals work on site and remotely, wherever there is data to be managed.

Lineage. Although all information management disciplines have the common intellectual territory of organizing and providing access to information for retrieval, the type of information collected, the organizational principles used, and the context within which information is created necessarily differs based on the strategies deemed most appropriate for providing optimal access to that information within specific communities.

INFORMATION MANAGEMENT DISCIPLINES

In a speech Dr. Bates delivered towards the end of her distinguished career (required reading for all information professionals), she noted that historically, the practice of information management and its disciplines developed in reference to the physical institutions that housed collections of information—libraries, archives, and museums (also affectionately known as LAMs) (Bates, 2012).

Library science. From its inception in the late 19th century, the discipline of library science has been fundamentally centered on organizing, managing, and providing access to collections of information for users (Estabrook, 2009). The methods, standards,

and practice of classifying and cataloging resources for the purposes of retrieval within information systems is well established within the library community. Because library collections historically consisted of mostly duplicate resources, efficiencies were realized through centralizing, standardizing, and sharing—not only the resources, but also the metadata used to describe and provide access to those resources (Taylor, 2009). Because of this, the strategies of centralization, standardization, and sharing have practically been imprinted within this species genetic code.

Information science. Originating around the turn of the 19th century (and known initially as the field of “documentation”), information science research was initially focused on scientific, technical, and medical information due to its base of practitioners within science and industry who were looking for ways to manage large amounts of data and resources. In contrast to librarians’ focus on managing collections, “Information Science is concerned with information itself and its representations—what information is; how to represent it; how to understand its functions; how it is used; and how to design systems to organize, classify, and retrieve information” (Estabrook, 2009).

Today, information science is focused not only on information, but also on the interaction between people and information systems.

Library and Information Science (LIS). The LIS discipline began in the United States. In the 1950’s, the disciplines of “documentation” and communication converged and became linked a decade or so later with the discipline of library science (Estabrook, 2009). The challenge of organizing information, creating tools for retrieval, and communicating with users represented common ground for all of these disciplines (see Figure 1).

The year 2005 saw the formation of the i-Schools Caucus, a group of LIS schools that, according to their website, “...share a fundamental interest in the relation-

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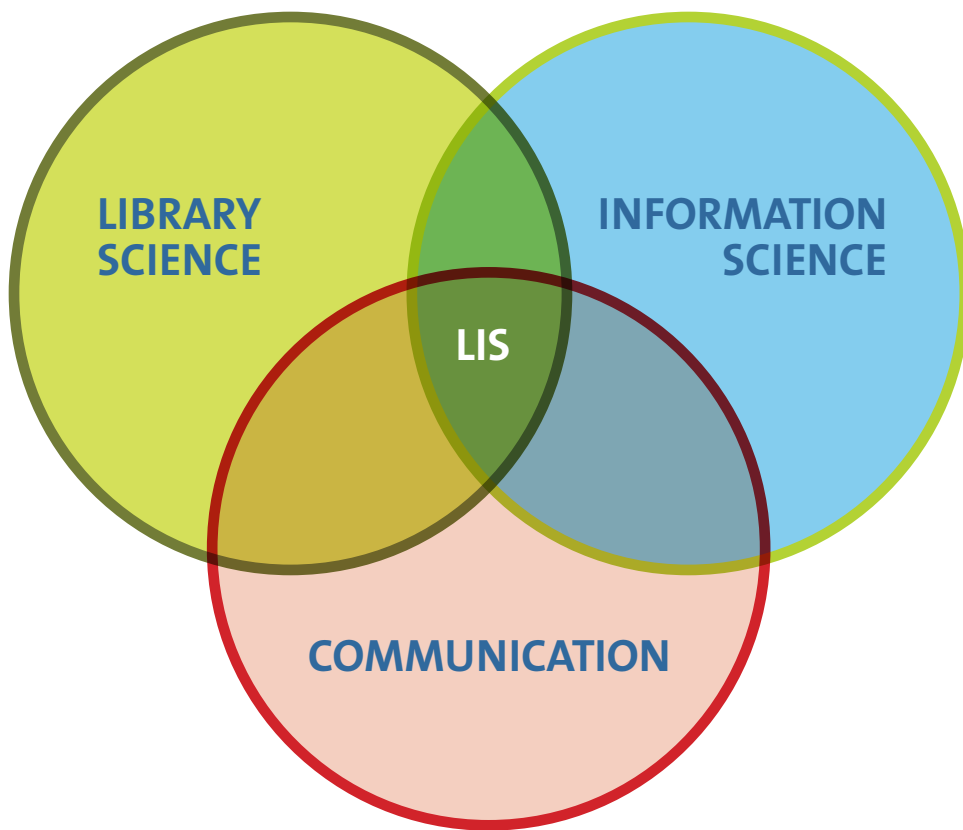


Figure 1: The evolution of library and information science.

ships between information, people, and technology.”

Archives & Records Management. The archives and records management disciplines are closely aligned and are popularly seen as complementary practices. Depending on cultural practices, they may be considered as one discipline or separately.

Records management. Emerging in the U.S. during the 1950’s and 60’s, the records management discipline (sometimes referred to as records information management, or RIM) arose as a response to the need for managing large volumes of administrative records and the content within them. Benedon (2010) defined a record as “...recorded information, regardless of medium or characteristic, made or received by an organization that is evidence of its operations and has value requiring its retention for a specified period of time” (p. 2133).

The records management discipline takes a whole lifecycle approach to the management of institutional records (from creation to final disposition), and emphasizes evaluation of the “...administrative, financial, legal, operational, and historical need for records” (Benedon, 2010, p. 2133).

Archival science. Developed in late 19th century France, the archival science discipline focuses on the practice of manag-

ing both public and historical archives. In contrast to records managers’ focus on current records, archivists focus on providing access to resources of enduring value, along with the context in which they were created. Issues of provenance, authenticity, and preservation are critical to maintaining this context.

Because archives usually contain unique items, standardization emerged relatively recently with the emergence of digital archives (Taylor, 2009). Because of the importance given to maintaining the innate arrangement of historical records, print based archival information has traditionally been organized first by provenance (origin), and then within hierarchical structures reflecting the original order of arrangement when acquired. In the digital world, of course, information doesn’t have to live in just one place; this 19th century European approach is often augmented by access to archival collections by virtue of a number of different facets.

Museum Studies (Museum Studies/Museology). Museum science first emerged as an independent academic discipline during the 1950’s and 1960’s (Schwarzer, 2009). Perhaps the most complex of the traditional cultural heritage institutions, museums often house not only collections of unique

visual materials and cultural artifacts, but oftentimes include libraries, institutional archives, and records management programs as well. Schwarzer (2009) states that although Museum Studies saw a great deal of growth during the 1990’s, debates continue regarding where it should be situated among related academic disciplines.

Information systems. Emerging in the 1960’s, the information systems discipline (sometimes referred to as management information systems, or MIS) is defined by the University of Sydney as “...an applied discipline that studies the processes of the creation, operation, and social contexts and consequences of systems that manipulate information...” (para. 1). As with all information management disciplines, the interaction between users and information systems is a central focus.

DISRUPTION AND ADAPTATIONS

After the arrival of the Internet in the early 1990’s, the need to provide digital access to library and archival collections prompted traditional librarian and archivist specimens to retool their skill sets to meet the challenge. Thus, “digital librarians” and “digital archivists” joined the information management family.

Digital librarianship. A logical extension of physical libraries, digital libraries as initially conceived were centered on building and preserving digital collections to support knowledge creation in the service of users. Calhoun (2014) stated:

“Digital libraries are: 1) a field of research and practice with participants from many disciplines and professions, chiefly the computer, information and library sciences; publishing; the cultural heritage sector; and education; 2) systems and services, often openly available, that (a) support the advancement of knowledge and culture; (b) contain managed collections of digital content (objects or links to objects, annotations and metadata) intended to serve the needs of defined communities; and (c) often use and architecture that first emerged in the computer and information science/ library domain and that typically features a repository, mechanisms supporting search and other services, resource identifiers, and user interfaces (human and machine” (p.18).

Digital archives. Galloway (2009) wrote, “Digital archiving emerged during the 1990’s as a compulsory support for digital recordkeeping in governments and digital publication in academia. Its concepts are

governed generally by archival theory, while many of its practices have increasingly been borrowed from library and general information science work with digital objects” (p. 1518).

Galloway asserted that the focus of digital archiving differed within libraries and archives communities due to the types of materials they contained, and the principles of information organization that developed to support retrieval within their respective contexts (2009). She emphasized the importance of combining both library and archival perspectives, and forecasted a convergence of the two fields.

SURVIVAL OF THE DIGITS

With the migration of data from analog to digital, the need to preserve digital information quickly became an issue of paramount importance. Digital preservation has always been part of research and practice within the digital library and digital archives communities; today, the topic is of great concern to organizations within every industry sector.

Digital preservation (DP). The topic of digital preservation has developed into its own research discipline (Chanod, Dobрева, Rauber, Ross, & Casarosa, 2010). Since the early 2000’s, national and international coalitions and programs have been established to help advance the field. Definitions of digital preservation stemming from two of these initiatives stress the active management of digital content over time:

- Library of Congress: Digital preservation is the active management of digital content over time to ensure ongoing access.
- Digital Preservation Coalition: [Digital Preservation] refers to the series of managed activities necessary to ensure continued access to digital materials for as long as necessary.

RANGE EXPANSION

It didn’t take long for the private sector to get in on the action of leveraging longstanding information management principles with new technologies to help manage information within the corporate world. Throughout the 1990’s, additional Information Professional species developed within the private sector whose practices involved the application of information management principles within specific business contexts:

Knowledge Management (KM). In the mid-1990’s, knowledge management’s first proponents were consultants who success-

fully raised awareness of knowledge as a corporate asset. Consultants saw intranet technology as a key enabler for capturing, managing, and sharing knowledge within organizations. The focus of knowledge management practice naturally expanded to include user needs, and eventually encompassed knowledge external to organizations (Koenig & Neveroski, 2011).

Information Architecture (IA). Two librarians, Peter Morville and Louis Rosenfeld, published “the polar bear book” in 1998—and the field of information architecture was born. In reference to the first edition, Morville and Rosenfeld stated, “Information Architecture for the World Wide Web is about applying the principles of architecture and library science to web site design.” Information Architecture is currently situated within the fields of user experience and web design, and is defined in three parts by the Information Architecture Institute:

- The structural design of shared information environments.
- The art and science of organizing and labeling web sites, intranets, online communities, and software to support usability and findability.
- An emerging community of practice focused on bringing principles of design and architecture to the digital landscape.

Hybrid Speciation and Convergence
As the digital libraries, digital archives, and digital preservation disciplines continue to mature, Galloway’s prediction is indeed coming true. New interdisciplinary programs, coalitions, and initiatives have emerged and continue to evolve that combine the knowledge and expertise developed within all of these communities.

Digital curation. Higgins (2011) aligns the development of digital curation as a discipline with the establishment of the Digital Curation Center (DCC), a UK based organization whose DCC Curation Lifecycle Model aptly illustrates the concept of both managing and preserving assets. Higgins (2011) noted:

“In the UK the strategic emphasis for long-term management of digital material gradually moved from passive preservation to active curation. After a period of definition and consolidation, the subject now boasts a growing international professional base, a developing research agenda, practical tools and collaborative projects and a workforce trained to Higher Education level” (p. 84).

Abbott’s (2008) definition of digital curation as “...the management and preservation of digital data over the long-term” can be seen as an expansion of the Library of Congress’s definition of digital preservation, with the inclusion of the “active management” component (para. 1). Initially focused on the curation of research data, the discipline of digital curation has grown to encompass an international community of organizations and practitioners within all industry sectors, and it continues to evolve today.

Digital stewardship. Butch Lazorchak (2011), a digital archivist involved with the National Digital Information Infrastructure and Preservation Program, described the somewhat subtle differences between digital curation and digital stewardship:

“‘Curation’ is a useful concept for describing the evolving whole-life view of digital preservation, but concentrates on underpinning activities of building and managing collections of digital assets and so does not fully describe a more broad approach to digital materials management...Enter ‘stewardship.’ ‘Stewardship’ concepts evolved out of the environmental community, but that community’s idea of holding resources in trust for future generations has long resonated in the digital preservation community” (para. 7). ‘Digital stewardship’ satisfyingly brings preservation and curation together in one big, happy package, pulling in the lifecycle approach of curation along with research in digital libraries and electronic records archiving, broadening the emphasis from the e-science community on scientific data to address all digital materials, while continuing to emphasize digital preservation as a core component of action” (para. 11).

Within the Simmons School of Library and Information Science’s description of their Digital Stewardship Certificate, it is stated, “Digital stewardship represents an emerging interdisciplinary field of study and practice linking the information disciplines.” Noting that the terms “digital curation” and “digital stewardship” are frequently used interchangeably, Cloonan and Mahard (2010) described the rationale for choosing digital stewardship as the preferred term: “At Simmons, we decided to use the term digital stewardship because we want students to think about the social, cultural, economic, and political environments in which collections reside” (p. 2).

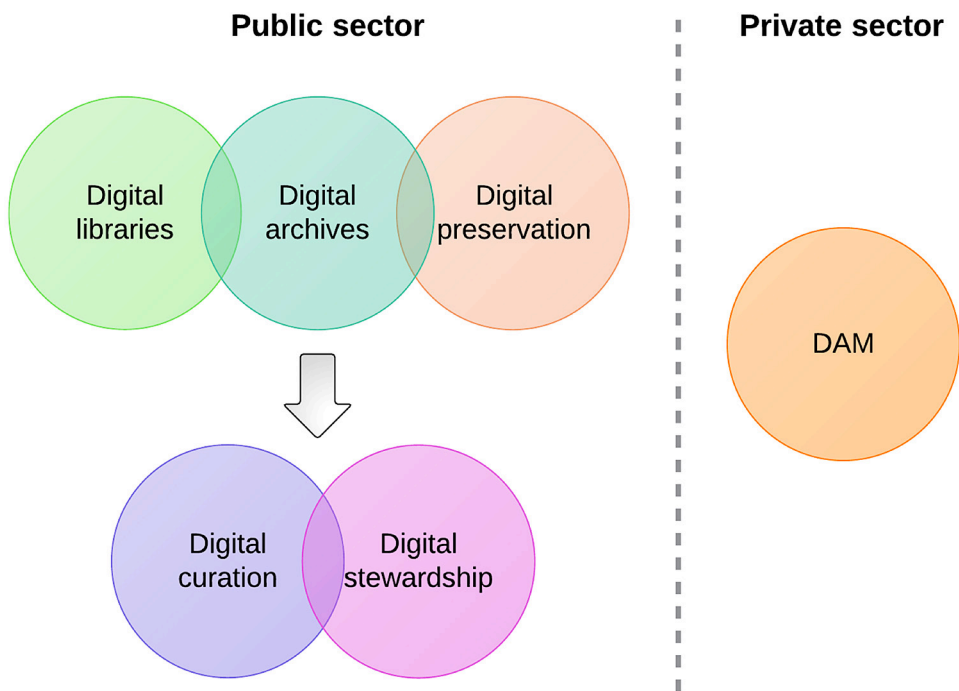


Figure 2: The management digital assets in the public and private sectors.

DAM EMERGES

Researchers and practitioners within both of these emerging disciplines have a huge pool of knowledge from which to draw based on the earlier work of the digital library, digital archives, and digital preservation communities. A significant body of knowledge and best practices has been published related to the management and preservation of digital assets by researchers and practitioners within the information management disciplines—only time will tell how the information professions will leverage this

knowledge and what new species may develop in the future.

Every information management discipline is grappling with the challenge of managing digital assets, although within different institutional contexts. So where is DAM positioned within this array of disciplines?

DAM as practiced within the corporate sector has emerged and developed in parallel to the fields of digital librarianship and digital archives—and it continues to mature alongside the overlapping disciplines of digi-

tal curation and digital stewardship within the cultural heritage sector (see Figure 2).

As further evidence of DAM’s status as part of the information management family, let’s take a look at some definitions:

Information disciplines. Information disciplines, or the “collection disciplines” as Bates refers to them, cut across all subject domains. As a “meta-discipline,” they are focused on the collection, organization, retrieval, presentation, and preservation of information. Researchers and practitioners within these disciplines are interested in information seeking, information transfer, and information products (Bates, 2007).

DAM. In a recent DAM Guru interview, DAM consultant John Horodyski shared his definition: “DAM consists of the management tasks and technological functionality designed to enhance the inventory, control and distribution of digital assets (rich media such as photographs, videos, graphics, logos, marketing collateral) surrounding the ingestion, annotation, cataloguing, storage, retrieval, and distribution of digital assets for use and reuse in marketing and/or business operations” (DAM Guru Talk, para. 3).

Based on these definitions, DAM can be seen as a field (and emerging discipline) under the information management umbrella that focuses on managing specific types of information (rich media) within a specific organizational context (marketing/business operations).

Bates (2007) asserted that “...what distinguishes the information disciplines is that our “home” universe of study and observation is the universe of documentation” (para. 26). According to Bates, the universe of documentation consists of recorded information—including rich media (fig. 5). This unequivocally positions DAM within the intellectual territory of the information management disciplines.

No matter the semantics, professionals within all of these disciplines and fields are grappling with similar challenges—how to effectively acquire, manage, preserve, repurpose, and provide access to digital assets for various purposes. Indeed, the DAM Foundation Salary Survey administered in 2011 confirmed that practitioners across industry sectors are all performing similar tasks that require the same skills. It is for this reason that DAM consultants, practitioners, and even a few vendors have advocated more strongly within the past few years for the recruitment of qualified librarians and archivists within the DAM field.

Information Management

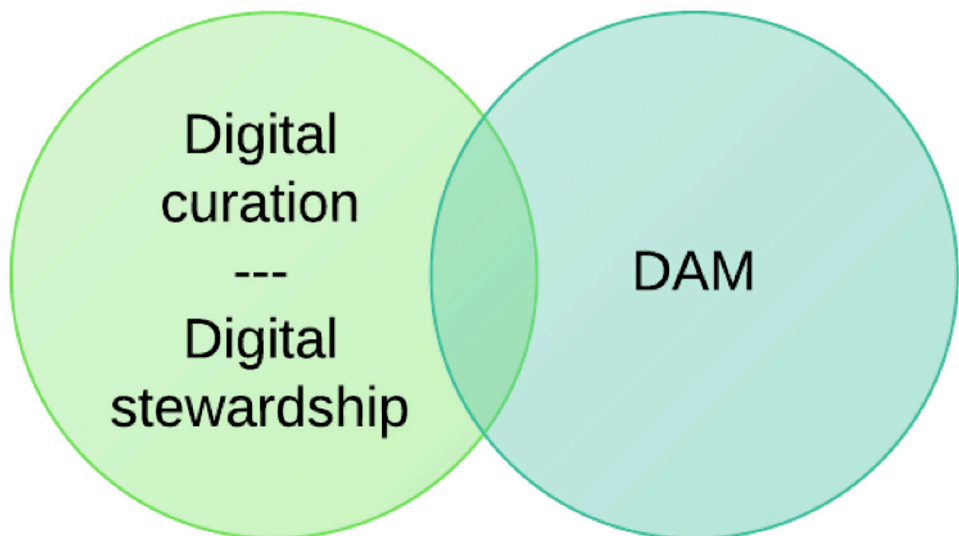


Figure 3: The evolution of information management.

With a professional organization, a peer-reviewed journal, a thriving community of practice, and educational programs in development, DAM seems to be on the path to becoming a discipline in its own right (see Figure 3). As David Diamond suggested, to not leverage the rich trove of research and best practices amassed within DAM's allied disciplines and honed by its practitioners within the cultural heritage sector would be a detriment to the continued advancement of DAM as a profession.

SILENCE OF THE LAMS AND DAMS?

Diamond's clarion call signifies that the time is ripe for strengthening communication, education, and collaboration between information professionals who are engaged in applying information management principles to the practice of managing digital assets within both the public and private sector. We have a lot to learn from each other. ■

*Reprinted from the December 2014 issue of DAM News (<http://digitalassetmanagementnews.org/features>). Used with the permission of the author.

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Serving Students Coming From or Traveling Abroad

» The strategic academic library can add value to the experiences of international students, non-native (L2) speakers of English, and U.S. students preparing for study abroad.

Photo by William R. Kennedy



BY KATHLEEN STEIN-SMITH

An academic library's external services, especially reference services and research or information literacy instruction, are critical to the success of all students. But they are especially critical to three groups of students on U.S. campuses: students whose home country is outside the United States, non-native (L2) speakers of English, and U.S. students traveling abroad.

Undergraduate and graduate students from countries around the world typically arrive on campus with different levels of proficiency in English. They may be regularly admitted students with the level of English proficiency needed to succeed in academic coursework, conditionally admitted students with a lower level of English proficiency, or students on campus specifically to study English.

This variety in admission status highlights differences in research needs at the undergraduate and graduate levels as well as across disciplines. These students also may have had a variety of relationships with libraries in their home countries. The nature of that interaction can present a challenge to campus librarians in the design and implementation of effective reference and instruction services.

Students classified as L2 speakers of English may be recent immigrants or others who have been educated previously outside the U.S. They can experience a level of culture shock similar to that of international students when faced with their first research assignment and their first encounter with a U.S. academic library.

For students preparing for study abroad, the library can provide materials and programming to assist in developing the stu-

dent's knowledge about the target culture. As defined by David Livermore, cultural intelligence (CQ) includes four steps, the second of which is "CQ knowledge," or defining what cultural information is needed to fulfill an interest in a cross-cultural assignment.¹ The library can play a significant role in adding to this knowledge base through its collection, programming, and hosted events.

WHO STUDYING WHERE?

According to the 2013/2014 Open Doors report, "the number of international students studying in the U.S. grew by 8 percent over the prior year and is now at a record high."² According to the report, 886,052 international students studied at U.S. colleges and universities in the 2013-2014 academic year. Of that number, 274,439 are from China (31 percent), and 102,673 are from India (11.6 percent).

» **Library resources also include opportunities for international and local students to interact with each other and faculty, staff, and alumni. Examples are “Food for Thought” talks on a variety of topics delivered by librarians, and Faculty and Alumni Speaker presentations.**

A scan of the numbers over the past ten years reveals that China and India have consistently occupied the top two positions in terms of numbers of students studying in the U.S. In the 2013/2014 report, South Korea, Saudi Arabia, Canada, Taiwan, Japan, Vietnam, Mexico, and Brazil complete the top ten countries.

In addition, U.S. census data confirms that one in every five U.S. residents, or 61.8 million people, do not speak English at home. Of this number, “25.1 million (41 percent) told the Census Bureau that they speak English less than very well.”³ When arriving on campuses, these students are often at the L2 level of English proficiency.

Compared to students in other countries, relatively few U.S. students study abroad. In the 2011-2012 academic year, the total number was 273,996, with the United Kingdom, Italy, Spain, and France at the top of the destination list. Since 2007, China has replaced Australia in fifth place.⁴

THE FAIRLEIGH DICKINSON UNIVERSITY (FDU) EXPERIENCE

According to the *FDU Factbook*, for the Fall 2014 semester, 353 undergraduate students from 52 countries and 789 graduate students from 44 countries began studying on the Metropolitan Campus, bringing the total number of international students at Metro to 1,142.⁵ In addition, FDU’s Petrocelli College offers several programs, including *Puerta al Futuro*, *MiraeRo*, and *Cheng Gong*, for students transitioning from their native language—Spanish, Korean, and Chinese, respectively—to English as their language of instruction. Lastly, ELS Educational Services, a division of Berlitz, offers English courses to students on campus specifically to develop their English language skills generally to the level needed for admission to a U.S. university.

ADDING VALUE TO THE INTERNATIONAL STUDENT EXPERIENCE

The strategic academic library must serve all these constituencies. The library should strive to offer collections, services, and

programs to respond to the needs of each group as well as individual students.

At the beginning of each semester, the Frank Giovatto library on the FDU Metropolitan Campus welcomes many international students who are often traveling abroad and in the U.S. for the first time. Generally, they have a lot to learn not only about their new program of study, but also about U.S. higher education in general and the role of U.S. academic libraries in particular.

Giovatto librarians are fluent in French, Spanish, Italian, and Chinese. Most have lived or studied abroad and they work closely with departments that provide services directly to international students. When invited, the librarians participate in orientation events for new international students. Also available are walk-in opportunities for instruction on library research and information literacy as well as instruction appointments for entire classes or individuals. Other classes allow international students to hone their information literacy and library research skills across disciplines.

Since exploring careers and searching for career opportunities are important to international students, the library maintains an active print and online collection of career resources. The library collection also includes an extensive array of print, online, and media resources from around the world and on many global locations and international issues.

Library resources also include opportunities for international and local students to interact with each other and faculty, staff, and alumni. Examples are “Food for Thought” talks on a variety of topics delivered by librarians, and Faculty and Alumni Speaker presentations. The library also offers Language Tables hosted by volunteer librarians, faculty, staff, and graduate students, which have so far included instruction and instructor-created library support materials in Arabic, Chinese, French, Italian, Korean, and Spanish as well as English.

Informal opportunities include Game Nights, during which participants can play a variety of board games, and engage with

jigsaw puzzles on a variety of themes. Piano recitals and art exhibits have featured international students and staff.

The library also provides a welcoming place where international students can feel comfortable in a setting conducive to learning and research, intellectual conversation, and social interactions.

NON-NATIVE (L2) ENGLISH SPEAKERS ON CAMPUS

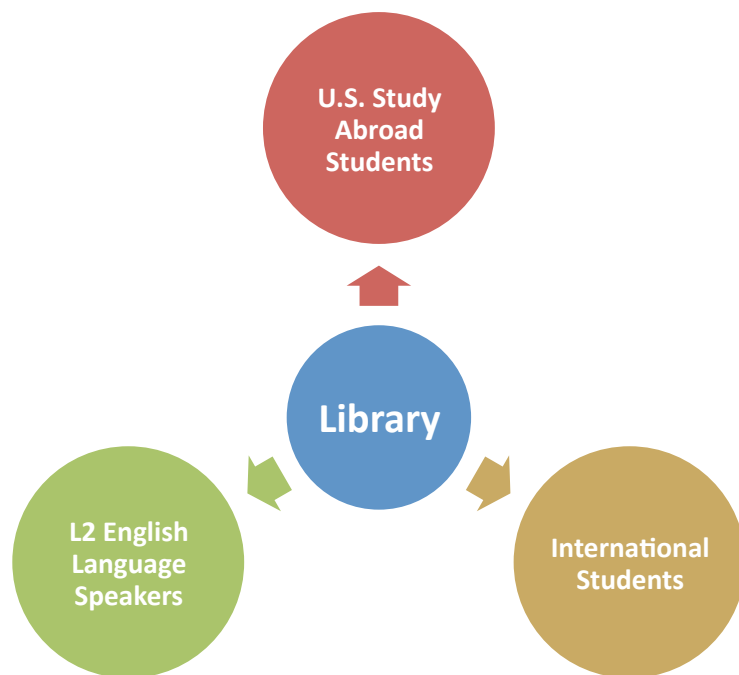
The first language of many students on campus is not English. While they may live locally, their needs resemble those of international students. Although library instruction is available in Spanish, there have been relatively few requests for this service, mainly because the language of instruction at the university is English. Transitioning to English, therefore, even in courses taught in the students’ first language, is the primary goal.

Librarians at the Giovatto library have developed a series of nineteen online research guides on a variety of topics, which can be viewed at <http://view2.fdu.edu/metropolitan-campus/libraries/giovatto-library/giovatto-library-research-guides/>. These guides have proven to be useful to both local and international students.

STUDENTS STUDYING ABROAD

A part of FDU’s mission is the “preparation of world citizens through global education.”⁶ To meet that goal, it is important for the library to play a role in preparing students to study abroad. The Giovatto library’s collection includes books, magazines, journals, and media that are international in nature supported by a browsing collection of newspapers and magazines in other languages.

The library also routinely offers programs on international topics, including “Food for Thought” talks on Italy, France, and China. Librarians also participate in programming for the university’s International Education Week. Each semester the library hosts an English-style afternoon tea for students interested in learning more about and possibly registering for a semester or a shorter



stay at Wroxton College, FDU's campus in the U.K. During these events, students can speak and interact with the Dean of Wroxton College, the FDU Director of Study Abroad, and Wroxton alumni.

As a part of staff development, librarians can also visit and study at the UK campus. While there, they experience in a week what the study abroad students experience over a semester, allowing them to respond effectively to student inquiries.

While studying abroad, students can interact with online library resources through chat and email on the library's webpage. At Wroxton College, the librarian and other campus faculty, staff, and administrators offer guidance and assistance in adjusting to and making the most of the study abroad experience. They teach students in the classroom, assist them in the Library, and accompany them on local, regional, national, and international travel during their study abroad.

The library at Wroxton College is housed in historic Wroxton Abbey. Students have access to a beautiful and inspirational library with a print and online collection appropriate

to the campus curriculum, including more than 100,000 e-books and 20,000 online journals.

CHALLENGES AND FUTURE DIRECTIONS

The academic library can often overlook two challenges: empowering international students through library instruction; and empowering U.S. students to effectively consider and prepare for study abroad.

The role of the academic library is to provide information through the library's collections and to develop library research skills. Its programs must be designed to enable all students to effectively navigate the globalized world.

It is especially important for libraries to offer an information literacy program that includes a progressive sequence of instruction adapted to the current level of library skills of the students. That program should be developed to meet the disciplinary research demands of student majors and graduate studies.

Libraries can play an important role in providing collections and services. But they can also provide a "third space" where both

international students and U.S. students preparing for study abroad can find the information, support, and learning environment they need for success. ■

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FOOTNOTES:

- ¹ David Livermore, Global Thinker and Author: Cultural Intelligence. <http://davidlivermore.com/cq/>
- ² Institute of International Education. <http://iie.org/Who-We-Are/News-and-Events/Press-Center/Press-releases/2013/2013-11-11-Open-Doors-Data>.
- ³ High Immigration Levels Cause Dramatic Increase in Non-English Speakers in U.S. <https://www.numbersusa.com/news/high-immigration-levels-causes-dramatic-increase-non-english-speakers-us>
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South by South What?

» **Get outside the library echo chamber by participating in conferences that attract innovative thinkers from other disciplines.**

BY CARSON BLOCK

Here's a bold statement you should consider as you plan your 2015 professional development: if you're not getting outside of your usual environment, you're not really doing your job.

It's a trap for all professions. We become so tethered to our day-to-day experiences that our world becomes very small, and we forget that there is a wide world of possibilities that exist outside of the library echo chamber. What do library issues look like to those from other disciplines and industries? What can we learn from others—and what can we share?

That concept was the central driving force for me when I went to the South by Southwest Interactive conference for the first time about four years ago. A friend suggested it as a possibility to keep up with emerging technologies (and indeed it was). So I ponied up the significant registration cost (registration fees are well beyond the norm for library conferences) and crashed on the couch of a dear friend to see what SXSW was all about.

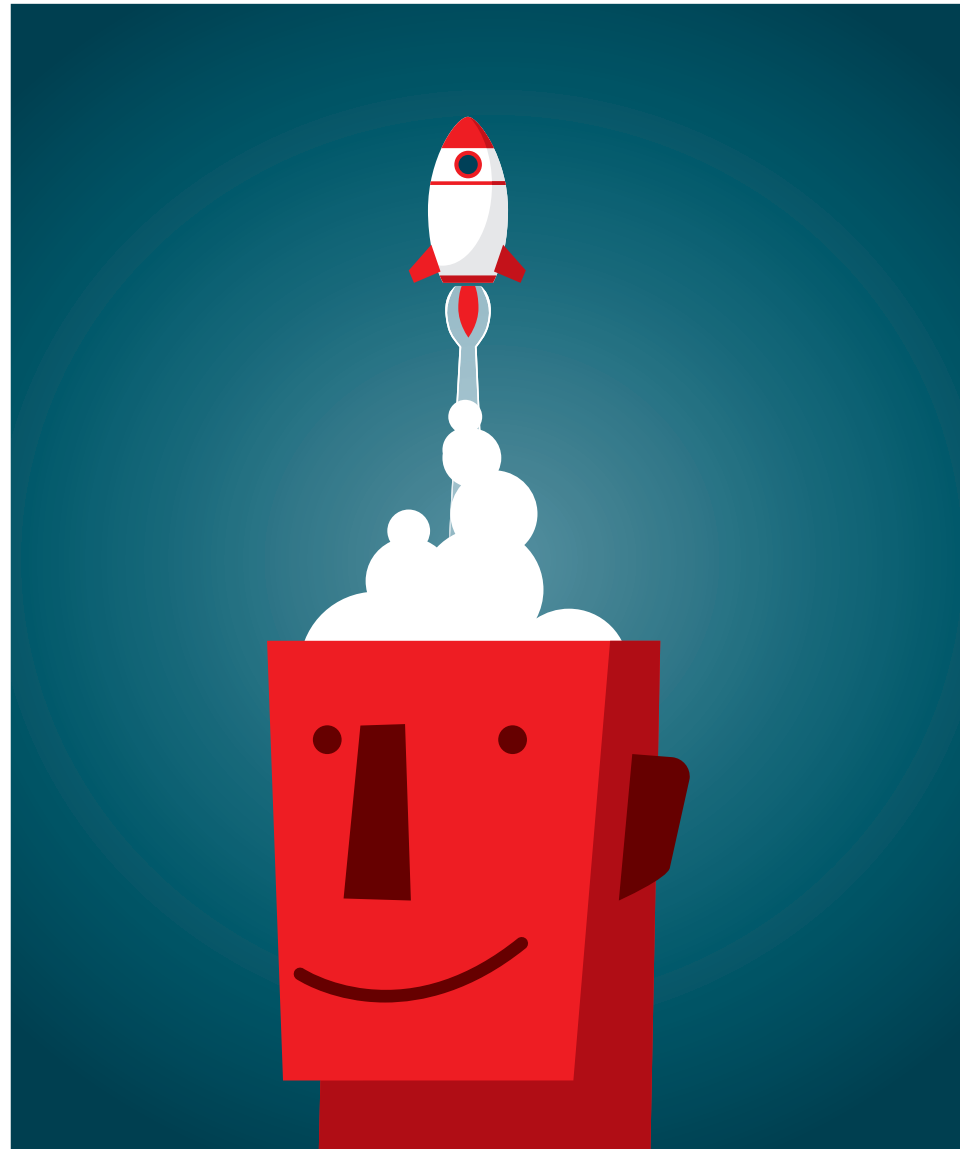
The experience changed my life.

SXSW DEFINED

But first, a little context. What is SXSW (aka "Southby")? Most people know it from its beginning as a music conference. Over the years it has grown to include film—and my favorite—interactive conferences, a place where the creators of our digital present and future gather to present, learn, socialize, and experience things together.

Twitter was launched years ago at SXSW, and last year one of the many featured speakers was Edward Snowden, speaking via video from an undisclosed location. The producer of the first 3D printed firearm was there. Neil Young talked about his new Pono "high quality" digital music service. Nicolas Cage was a wild presence, and Robert Duvall reflected on a lifetime of filmmaking and debuted a new film. There is not enough space here to list the programs.

Although the speakers are a draw, prob-



ably the greatest resource of the conference comes from others who are attending. It's the equivalent of being in a big, big convention center (that happens to cover a good-sized section of downtown Austin, TX) full of what are usually the smartest people in the room. The results are at times overwhelming—but in a good way. And there is beer and barbecue!

AND LIBRARIANS, TOO?

A pivotal experience at my first SXSW came in meeting others and talking about what

we did for a living. When I said I worked in libraries, the typical reaction was something like this:

Random Southbyer: "Libraries? Aw dude, I love libraries. What is your library job?"

Me: "Technology, I'm a Tech."

Random Southbyer (Cocked, puppy dog head): "Dude, what do you mean? There is no technology in libraries"

Me (inside): "Nooooooooooooooooo!"

Those interactions—and all of the missed opportunities for libraries within this nexus

SXSW 2015—Library panels this year include:

SXSW Interactive:

- Anythink: The Brand that Sparked a Revolution <http://panelpicker.sxsw.com/vote/34170>
- Librarian Meetup <http://panelpicker.sxsw.com/vote/42934>
- Big Data startups should Hire Librarians <http://panelpicker.sxsw.com/vote/42080>
- Coworking, Creating, Doing Business @ your library <http://panelpicker.sxsw.com/vote/38580>
- When New Businesses Hatch at The Public Library <http://panelpicker.sxsw.com/vote/38272>
- Librarian Meetup <http://panelpicker.sxsw.com/vote/42934>

SXSWedu:

- Connected Learning Networks in Austin <http://panelpicker.sxsw.com/vote/31307>
- Play & Learn: Games and Instructional Practices <http://panelpicker.sxsw.com/vote/37677>
- Schools & Libraries Together: Rethinking Learning <http://panelpicker.sxsw.com/vote/36491>

Want to know more? Check out this site:

<http://www.slideshare.net/CarsonBlockConsultingInc/sxswlam-at-internet-librarian-2014>

of technology, film, marketing, culture, and music prompted me to successfully submit a panel discussion topic for the following year. It was called “The Great Library Swindle: Your Rights are at Risk” and was designed to enlighten the technology community about the many issues faced by libraries.

The crowd for my panel was small (I was happy with the 50 people who attended—competition is fierce for attention, and there are a lot of sexy programs to choose from). But I was lucky that the right people were in the room.

One was Harry McCracken, then editor at large at Time magazine, who wrote the “Technologizer” column for the magazine (now his own blog). I was beyond humbled when he not only wrote about the session, but even issued a call to action at the end: <http://techland.time.com/2012/03/11/sxsw-the-fate-of-libraries/>.

As a result, my goal for the session was met in ways I couldn’t imagine—not just for the wonderful people who attended, but for the many more who were reached later.

MOVING FORWARD

Of course, I’m not the only library person to attend and present at Southby. I deeply respect and appreciate the people who paved the way, such as Jessamyn West, creator of

librarian.net, who spotted the potential of libraries many years earlier and began the evangelism, and to others, including Andrea Davis, who brought a whole new level to the concept of “interactive.”

Today, an all-volunteer, exceptional group of library, archive and museum professionals called #sxswLAM consists of a growing membership that includes the American Library Association, Public Library Association, the #ideadrophouse, the Texas Library Association, the Ontario Library Association, the Digital Library Federation, the Digital Public Library of America, the Library Test Kitchen, Urban Librarians Unite, EveryLibrary, and of course my company, Carson Block Consulting Inc. Interest in and growth among this group doesn’t happen by accident—in truth, we’re working year-round.

Our goal? Libraries are also creators in the digital age. We want to share with and learn from other creators. It’s as simple—and profoundly effective—as that. Connect with us here: <http://www.sxswlam.com/> and on Facebook: <https://www.facebook.com/groups/sxswLAM/>

Many have asked how the #sxswLAM group is organized. A core team of volunteers (#LAMcore) contributes to key needs. My assistant and I provide overall coordination efforts; Stacie Ledden (Anythink

Libraries in Colorado) helps coordinate our communication and branding; Mel Gooch (San Francisco Public Library) and Sharon McKellar (Oakland Public Library) coordinate volunteers for work before and during the conference; John Chrastka (EveryLibrary PAC) is in charge of fundraising; Andrea Davis (Knowledge Management, The Forest Trust, Switzerland) coordinates our local site activities during the conference, and Cindy Fisher (University of Texas librarian) is a guiding force—and so many others who have made #sxswLAM such a success.

The 2015 program will take place from March 13th to the 17th again in Austin, TX. The website, <http://www.sxsw.com/interactive>, provides details and lists of sessions and speakers: you’re likely to recognize some of the leading-edge people in libraries who are involved in the many presentations.

The intense media and participant attention has also attracted sponsorship of the library efforts at the conference from visionary companies such as Proquest, Innovative Interfaces Inc., and Mobile Beacon.

CROSS-GENERATIONAL CONNECTIONS

For me, participation in SXSW Interactive has also become a deeply personal experience. Last year, I brought my family, including my two teenagers. My son and his engineering-bound friend walked away inspired by the maker movement and were thrilled to rub elbows with innovators such as the editor of Make magazine. My daughter, an aspiring filmmaker, created an award-winning video only months after the conference, and this year returns as one of the youngest film panelists (see Underage@SXSW: No Parties, No Problem!” <http://panelpicker.sxsw.com/vote/35022>).

GETTING OUTSIDE

What will happen to you when you get outside of the library echo chamber? If my experience is any indication, the sky is the limit.

I hope you’re interested in getting outside of your own echo chamber, perhaps by joining the growing library presence at SXSW (if so, please get in touch). But even more, I hope you’re inspired to step out into other new worlds that libraries can learn from—and share with. Please invite me! ■

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Common Ground

» Exploring the linked data models of the Library of Congress and OCLC

BY CAROL JEAN GODBY AND RAY DENENBERG

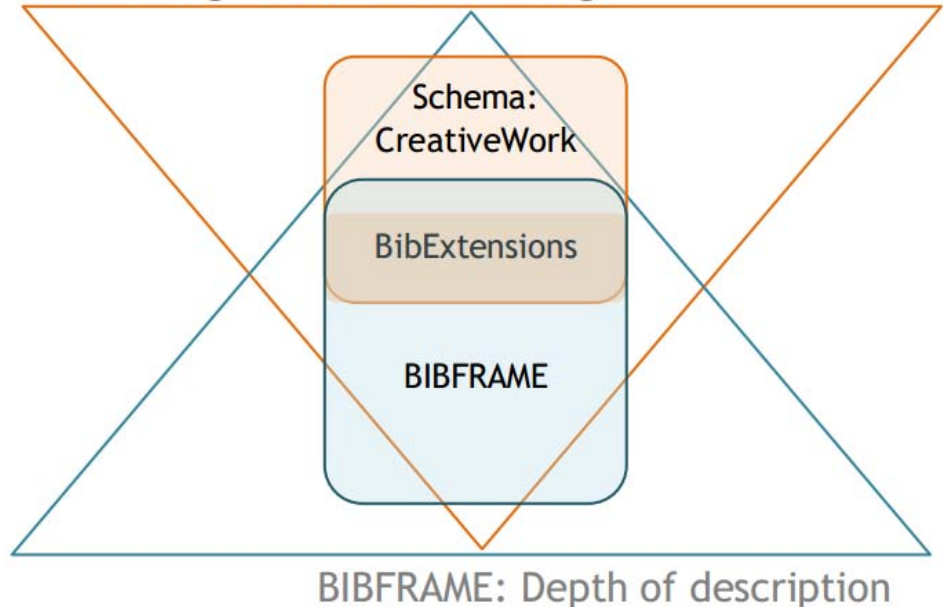
Since 2011, OCLC researchers have been experimenting with Schema.org as a vehicle for exposing library metadata to Web search engines in a format they seek and understand. Schema.org is sponsored by Bing, Google, Yahoo! and Yandex as a common vocabulary for creating structured data markup on Web pages. OCLC's experiments led to the 2012 publication of Schema.org metadata elements expressed as linked data on 300 million catalog records accessible from WorldCat.org.¹

In 2011, BIBFRAME was launched by the Library of Congress (LC) as an initiative to develop a linked data alternative to MARC, building on the Library's experience providing linked data access to its authority files, which began in 2009.² Among BIBFRAME's aims were (1) to supply search engines with descriptions of library resources in a form they could use, (2) to promote the application of concepts defined in the FRBR and RDA models, and (3) to offer an extensible solution for the description of resources in the broader cultural heritage community. A BIBFRAME high-level model was developed to provide a framework for development.³

During the latter part of 2012 and throughout 2013, the LC BIBFRAME modeling and development team formulated principles to guide the creation of the BIBFRAME vocabulary. A prepublication draft was evaluated by the BIBFRAME Early Experimenters, which included the British Library, and Deutsche Nationalbibliothek, George Washington University, the National Library of Medicine, OCLC, and Princeton University. One outcome was a first edition of the BIBFRAME vocabulary and the first BIBFRAME descriptions, which were algorithmically generated by LC and OCLC from millions of MARC records.

Another outcome of the Early Experimenters Group was a position paper written by OCLC describing the relationship between BIBFRAME and OCLC's models derived from [Schema.org](#). *The Relationship between BIBFRAME and OCLC's Linked-Data*

Schema.org: Breadth of coverage



Godby, for OCLC Research. 2013.

*Model of Bibliographic Description: A Working Paper*⁴ was published in 2013 and made available from the BIBFRAME home page.

The analysis highlighted lexical correspondences between the vocabularies defined by BIBFRAME and Schema.org enhanced with a small set of extensions proposed by OCLC; identified places where the underlying models were immature and could diverge; and concluded that, given the use of cases motivating the two efforts, the two models should be complementary. The paper pointed out that the coverage of Schema.org is necessarily broad but shallow because library resources must compete with creative works offered by many other communities in the information landscape. Conversely, the coverage of BIBFRAME is deep because it contains the vocabulary required of the next generation standard for describing library collections.

In the past year and a half, OCLC has focused on the tasks related to the use of Schema.org: refining the technical infrastructure and data architecture for at-scale publication of linked data or library resources in the broader Web, and investigating the promise of Schema.org as a common ground between the language of the

information-seeking public and professional stewards of bibliographic description. BIBFRAME has focused on publishing additional vocabulary and facilitating implementation and testing. These new developments prompt the need to re-examine the relationship between LC and OCLC models for library linked data. This [article] is an executive summary of a more detailed technical analysis that will be released later this year.

BIBFRAME SINCE 2013

In late 2013, the Early Experimenters Group concluded its work and in early 2014 the BIBFRAME Implementation Testbed⁵ was formally established. Its purpose is to encourage development of BIBFRAME test implementations; monitor implementation progress; discover errors, inconsistencies, and shortcomings in both the implementations and in the BIBFRAME model and vocabulary; and provide a forum for the development of BIBFRAME vocabulary and tools. Over the past year, 17 organizations have participated actively in this effort.

In addition, there has been lively discussion on the (public) BIBFRAME listserv.⁶ Since BIBFRAME is expressed in RDF (the W3C-developed Resource Description

Recommendations for Closer Alignment

Much of the common ground between the Library of Congress (LC) and OCLC linked data models has not yet been exploited because of solvable technical and conceptual barriers. What follows are prescriptions for future collaboration, but many are addressed in the forthcoming technical analysis. They include:

OCLC

- Develop and test the technical solutions for capturing the granularity expressible in BIBFRAME but not OCLC/Schema model and demonstrate that OCLC can import and export BIBFRAME without loss of information.
- Publish an acceptance criterion that defines the scope of BiblioGraph and propose terms defined in BIBFRAME that satisfy them.

LC

- Produce BIBFRAME descriptions that refer to OCLC's Work identifiers.
- OCLC and LC in Partnership
- Develop and test an implementation of a common model of one or more resource types held by libraries that are not easily described in BIBFRAME or in Schema.org, such as maps or audiovisual materials.
- For any given vocabulary term (defined as either an RDF class or property) required for library data and not in Schema, analyze and compare its usage within BIBFRAME and BiblioGraph. Is it in both vocabularies and are the definitions similar? Can the BIBFRAME term be used in conjunction with Schema (in the same manner as a BiblioGraph term)?

Framework), listserv discussion has covered issues pertaining to RDF and linked data, as well as issues pertaining to the BIBFRAME model and vocabulary. To assist experimentation with the BIBFRAME model, LC has provided tools available for open download such as MARC to BIBFRAME transformers and a simple input editor,⁷ and has also encouraged the community to share any software components they develop. Testing, implementation, and discussion have produced corrections and improvements to the BIBFRAME vocabulary, and LC continues to work with implementers for future enhancements.

Later in 2015, LC will publish a revised vocabulary and launch a pilot project to test whether the BIBFRAME vocabulary supports the capability for catalogers to do original cataloging, including authority work. In the pilot, LC catalogers will test the creation of cataloging data in BIBFRAME using the BIBFRAME Editor. Catalogers will create BIBFRAME descriptions for a variety of materials, in a variety of languages. LC Name/Title and Title MARC records will be converted into BIBFRAME Works and stored in a RDF triple store. Bibliographic records will be converted and matched against the Works, with subjects

and other properties merged. A search/display tool will be put on top of the triple store, as well as the BIBFRAME Editor.

Similar pilot projects are being planned at other institutions such as Stanford and Cornell. The details of these pilots are not finalized; however, there will be cooperation and sharing of information and results within the community. The pilots are expected to provide an opportunity to evaluate many of the issues that will be raised by the transition from MARC to BIBFRAME.

OCLC'S EXPERIMENTS WITH SCHEMA.ORG SINCE 2013

Since 2013, the linked bibliographic data accessible from WorldCat.org has been upgraded and republished, and the linked data models of the FAST⁸ and VIAF⁹ authority files have been redesigned with references to classes defined in Schema.org for fundamental concepts such as "Person," "Organization," "Creative Work," and "Topic." In addition, the first draft of WorldCat Works has been published,¹⁰ which represents Work-level descriptions produced from the latest version of OCLC's FRBR-inspired clustering and data-mining algorithms operating on library authority files and WorldCat

catalog records.¹¹ As a result, nearly 200 million "Work" clusters are now modeled as linked data using Schema.org and associated with persistent URLs.

Jeff Mixer and Jean Godby, who are members of OCLC's linked data modeling team, have also been collaborating with Montana State University's Dean of the Library Kenning Arlitsch and Semantic Web Research Director Patrick O'Brien to examine issues of discoverability and visibility of library resources in general-purpose search engines such as Google. One outcome is a model of some of the contents of institutional repositories, expressed primarily in Schema.org.¹² This model will be refined by Arlitsch and O'Brien. All of these projects are built on Schema.org and the most focus on the generation of linked data from legacy standards with the goal of publication in a format that can be consumed by general-purpose search engines.

OCLC's linked data experts envision a need for an extension vocabulary tailored to Schema.org that fills in gaps required for the description of resources managed by libraries. In the linked data markup published on WorldCat catalog data in 2012, these extensions were described in the "library" vocabulary, a small draft ontology maintained at OCLC and developed with an awareness of Schema.org that was not explicitly formalized. These extensions are now accessible from <http://BiblioGraph.net>.¹⁴

The underlying BiblioGraph vocabulary contains terms defined by those with a professional commitment to bibliographic resources description that are understandable and potentially useful outside their narrow communities of practice. Designed as a proving ground for demonstrating the potential impact of candidate extensions to Schema.org, it has the same look and feel of Schema.org and is integrated with a copy of the most recent version of the Schema.org vocabulary.

The BiblioGraph.net website is maintained by OCLC, but the ontology that populates it will be managed as a community resource. The concept was inspired by the work of the Schema Bib Extended Community Group,¹⁵ which was convened by OCLC Technology Evangelist Richard Walls and sponsored by the World Wide Web Consortium to evaluate the suitability of Schema.org as a standard for bibliographic description by librarians, library systems developers, and publishers, and to commend amendments, if necessary.

ALIGNING BIBFRAME AND THE OCLC/SCHEMA MODELS

In 2013, the relationship between BIBFRAME and OCLC's models based on Schema.org was visualized in the accompanying figure.

At the highest levels, OCLC's linked data model is similar to BIBFRAME, particularly in the definition of entities such as Work, Instance, Organization, and Person. This redundancy reflects a convergence of two projects that have different motivations and use cases. LC is developing BIBFRAME for data exchange in the linked data environment, taking into account the linked existing formats for resource description, as well as interactions with search engines; it must be designed as a persistent standard for library resource description.

By contrast, the linked data models being developed by OCLC optimize descriptions of library resources for discovery on the Web beyond libraries, using the vocabulary designed for consumption by general-purpose search engines. If the promise of Schema.org markup is realized, the outcome should be measurable as increased click-through rates or other evidence of improved visibility for libraries on the Web.

Nevertheless, the overlap between the two projects is anticipated to be only partial. The vocabulary defined in Schema.org and BiblioGraph aims to be broadly understandable to the information-seeking public and may not include many of the details defined in BIBFRAME, which aims more to address the needs of long-term curation by libraries and other cultural heritage institutions.

THE TECHNICAL ANALYSIS

In the technical analysis planned for release later in 2015, Ray Denenberg and Jean Godby compare RDF descriptions conforming to the OCLC/Schema model with corresponding BIBFRAME descriptions, focusing on the two key BIBFRAME entities, Work and Instance, and the relationship between them. Other primary BIBFRAME concepts such as Authorities, Annotation, Subjects, Titles, Identifiers, and Agents are also discussed.

A set of dialogs. Each concept is the subject of a focused dialog that asks two questions. First, are the persistent identifiers assigned to the corresponding concepts in the two models mutually consumable? If so, it is possible to conclude that though the models have different internal details and are expressed in different vocabularies, they are describing the same objects. As a

result, a BIBFRAME Work description, could, for example, contain a "same as" assertion to an identifier published in the OCLC Works Service and an OCLC/Schema description of a resource described in WorldCat catalog data could refer to a BIBFRAME Instance.

Second, the authors ask whether a BIBFRAME description can be reformulated in the OCLC/Schema model (and vice versa) without loss of information. This question is especially important to OCLC because an affirmative answer implies that it is possible to address the need of a data aggregator to import and export BIBFRAME data even if the internal linked data model is expressed in a different vocabulary.

The high-level conclusion is that the alignment shown in the Figure is still accurate and is perhaps even more defensible than in 2013 because the primary BIBFRAME concepts are now more consistent with the corresponding concepts defined in the OCLC/Schema model. Moreover, given BIBFRAME's term for the description of music and maps that have no counterpart either in Schema.org or in BiblioGraph, the new analysis provides a much-needed empirical demonstration of the differences in granularity between the two models and offers technical solutions for managing it. This difference was presented merely as a theoretical possibility in 2013.

Representing the FRBR Group 1 hierarchy. BIBFRAME and OCLC's models both take a simplified view of FRBR. Both models define RDF classes for Work entities, and while a BIBFRAME and OCLC Work are not entirely the same, the analysis reveals that they are quite compatible. Both models encode FRBR Expression entities as RDF properties, or relationships. Both also recognize Manifestation entities, though in different ways: BIBFRAME defines the Instance RDF class to represent a Manifestation entity, while the OCLC model induces Manifestation and Item entities using a combination of RDF type assignments from schema:CreativeWork and schema:Product, as described in the aforementioned 2013 publication.

BIBFRAME has defined a set of 30 content-to-content (i.e., Work-to-Work) relationships derived from MARC and RDA, which are consistent with OCLC's modeling assumptions and can supplement a model of creative works derived from Schema.org. In addition, people, places, and organizations, which are typically described in library authority files, are represented

not as curated strings or as concepts but as real-world objects in the LC and OCLC models. Thus the referents of many top-level BIBFRAME RDF classes, including Work, Instance, helditem, and the subclasses for Authority, are ontologically similar enough that the corresponding URIs are mutually consumable between BIBFRAME and OCLC's models. This claim could not be made with confidence in 2013.

Differences. The analysis reveals at least three high-level differences in the models. The first was alluded to previously: BIBFRAME defines RDF classes for Work and Instance, while OCLC defines classes for Work but not for Instance. As noted, this difference does not present an incompatibility.

Second, an Authority entity is formally defined as an RDF class in BIBFRAME, but not in OCLC's models. In OCLC's linked data models, "Authority" is simply an informal name of any resources that contains vetted information about people, places, organizations, concepts, and other entities that are important for the description of the entities that populate library resource descriptions. However, RDF data stores representing the contents of library authority files are otherwise compatible and contain descriptions of the same objects. In the BIBFRAME model, the RDF class `bf:Authority` is defined largely to facilitate the description of subjects. This issue will be explored more deeply in the forthcoming technical analysis, as will the treatment of subjects in general in the LC and OCLC models.

Third, the BIBFRAME RDF class defined for the Annotation entity has no counterpart in OCLC's models. Nonetheless, the BIBFRAME Annotation now contains structured data that can describe reviews, summaries, cover art, and holdings—and most have alternative and more parsimonious formulations in the OCLC/Schema model. The BIBFRAME Annotation class is being carefully reviewed in light of the work currently being conducted by the World Wide Web Consortium on Web Annotations.¹⁷

As expected, the analysis revealed differences in granularity. For example, if a review has an author or publisher, or if a piece of cover art has a provenance, BIBFRAME describes the object with a structured data value, defining an RDF subclass of the Annotation class with properties. The most obvious corresponding description in Schema.org typically contains only a simple data value such as a string literal or URL and cannot represent such details.

The same issue arises in the description of several BIBFRAME concepts, such as title and identifiers. In BIBFRAME, a title can be expressed as a string literal or as a structured resource (including main title, subtitle, part number, and several other information elements), which an OCLC title is always expressed as a string literal (via the property `schema:name`). But since both models allow titles to be expressed as literals, there is sufficient compatibility. Identifiers are more complex and will get comprehensive treatment in the forthcoming technical analysis. OCLC's linked data experts are exploring generic solutions for expressing BIBFRAME's additional granularity in Schema.org, while also engaging in debate about whether it is always necessary.

The vocabulary of discovery and curation. Of course, BIBFRAME descriptions can also be more detailed because they include the specialized vocabulary required by professional creation. For example, the analysis compares a hand-crafted BIBFRAME description of a celestial map held in the Library of Congress with an algorithmically generated description of the same object in the OCLC/Schema model. The BIBFRAME description contains the technical terms `bf:cartographicScale`, `BF:cvarctographicEquinox`, and `BF:cartographicAscensionAndDeclination`. The OCLC description does not contain these terms because OCLC source record does not represent this information and these concepts are not defined in Schema.org or BiblioGraph. They illustrate BIBFRAME's focus on vocabulary development to support upgraded machine-understandable descriptions of the resources uniquely held by libraries, such as maps, sheet music, audiovisual materials, and archives.

The OCLC/Schema model can refer to this description and enhance its own simply by adding a "same as" assertion containing the BIBFRAME URI. But to generate comparable descriptions or to pass them through OCLC's data processing stream without loss of information, the OCLC/Schema model must use the BIBFRAME vocabulary directly. This is the "depth of description" mentioned in the Figure that is supplied by BIBFRAME and will perhaps always be missing from a data model optimized for discovery.

BiblioGraph is mentioned throughout the

technical analysis as a vehicle for promoting the vocabulary of expert description to the vocabulary of discovery, and it may have a role in the description of the celestial map. For example, "map" has been defined as a resource in Schema.org, but the list of defined properties is too sketchy to meet the stewardship needs of librarianship. But the BIBFRAME terms are defined as RDF properties that can be theoretically positioned in the `schema:Map` class using BiblioGraph as a testing ground.

A representation in BiblioGraph can be interpreted as a claim that other communities of practice might have a need for these terms, which makes them candidates for eventual absorption into Schema.org. Among library standards experts, much analysis is required to determine which terms have commonly understood semantics and which are specialized, and perhaps it could be concluded that `bf:cartographicScale` is a candidate for broader use, while the others may not be.

Nevertheless, BiblioGraph is designed as a place to consolidate the results of this analysis. ■

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FOOTNOTES:

- ¹ OCLC. 2012. "OCLC adds Linked Data of WorldCat.org." 20 June. <http://www.oclc.org/en-US/news/releases/2012/201238.html>.
- ² Library of Congress Linked Data Services: Authorities and Vocabularies. <http://id.loc.gov>.
- ³ Library of Congress. 2012. Bibliographic Framework as a Web of Data: Linked Data Model and Supporting Services. Washington, DC: Library of Congress. [http://www.loc.gov/bibframe/pdf/](http://www.loc.gov/bibframe/pdf/marclid-report-11-21-2012.pdf)

[marclid-report-11-21-2012.pdf](http://www.loc.gov/bibframe/pdf/marclid-report-11-21-2012.pdf), <http://www.loc.gov/bibframe/pdf/marclid-report-11-21-2012.pdf>

- ⁴ Godby, Carol Jean. 2013. *The Relationship between BIBFRAME and OCLC's Linked-Data Model of Bibliographic Description: A Working Paper*. Dublin, Ohio: OCLC Research. <http://www.oclc.org/content/dam/research/publications/library/2013/2013-05.pdf>.
- ⁵ BIBFRAME (BF) Implementation Testbed: <http://www.loc.gov/bibframe/implementation/testbed.html>.
- ⁶ To subscribe to the BIBFRAME Listserv (version 14.5) see <http://listserv.loc.gov/cgi-bin/wa?SUBED1=bibframe&A=1>
- ⁷ BIBFRAME Editor: <http://bibframe.org/tools/editor>.
- ⁸ FAST (Faceted Application of Subject Terminology) Linked Data. Last updated 9 January 2015. <http://experimental.worldcat.org/fast/>
- ⁹ VIAF: The Virtual International Authority File: <http://viaf.org>
- ¹⁰ OCLC. 2014. OCLC Releases WorldCat Works as Linked Data. 28 April. <http://oclc.org/news/releases/2014/201414dublin.en.html>.
- ¹¹ OCLC Research. 2015. "OCLC Research Activities and IFLA's Functional Requirements for Bibliographic Records." Accessed 22 January. <http://www.oclc.org/research/activities/frbr.html?url=159763>.
- ¹² Mixer, Jeff, Patrick O'Brien and Kenning Arlitsch. 2014. "Describing These and Dissertations Using Schema.org." *In 2014 Proceedings of the International Conference on Dublin Core and Metadata Applications*. 138-146. <http://dcevents.dublincore.org/IntConf/dc-2014/paper/view/269/238>.
- ¹³ OCLC Research. 2014. "Measuring Up: Assessing Use of Digital Repositories and the Resulting Impact' Project Receives IMLS Grant." 21 October. <http://www.oclc.org/research/news/2014/10-21.html>.
- ¹⁴ BiblioGraph.net: <http://bibliograph.net>.
- ¹⁵ See http://www.w3.org/community/schemabibex/wiki/Main_Page.
- ¹⁶ This image originally appeared in the report reference above in note 4.
- ¹⁷ W3C Web Annotation Working Group: <http://www.w3.org/annotation>.

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