

Twenty-first Century Metadata Operations

Challenges, Opportunities, Directions

Edited by
Bradford Lee Eden



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Operations
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Introduction: Twenty-first Century Metadata Operations: Challenges, Opportunities, Directions

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It has long been apparent to academic library administrators that the current technical services operations within libraries needs to be redirected and refocused, in terms of both format priorities and human resources. A number of developments and directions have made this reorganization imperative:

- While purchased print resources will continue into the future, there will be less of them due to the availability and popularity of online and electronic resources that contain either exact or similar content.
- Every library purchases the same “stuff.” It is our special collections, our unique materials that no one else owns and for which there is little if any access either physically or bibliographically, that holds the key to survival for libraries into the future.
- Our current human resources in technical services have focused for too long on purchased print resources as the priority content; libraries need to redirect their scarce resources towards the organization and description of the unique information that each library holds in their special collections and archives, information that is not held anywhere else in the world.
- New directions in libraries, in the areas of metadata, digitization, and digital projects, hold the key to broader collaboration and cooperation in academia with faculty and students, as they struggle with challenges regarding access, curricula, information organization and description, and digital preservation of their created content.
- In the current economic and budget crises, libraries can no longer hire the needed expertise and talent to move forward into these new initiatives, at least not as broadly as they could have five years ago. They must retool and retrain current staff to assist in these initiatives, and make strategic decisions regarding what processes and workflows will no longer be maintained or supported. Technical services staff are uniquely qualified, with their attention to detail and

work in metadata standards, to assist libraries as scanning and metadata technicians to digitize and describe objects in the digital environment.

- Our legacy and proprietary integrated library systems (ILSs) cost too much and don't do what we want them to do; open source and Web 2.0 technologies are now advanced enough that, working in consortial and cooperative models, libraries can use combined human resources (especially in the network and programmer areas) to move, manipulate, inventory, purchase, archive/preserve, and provide access to their metadata and digital content in a much more consistent and efficient manner for their patrons, using different cost models and throughputs that are more efficient and cost-effective in the long run, while providing much more user-friendly and interactive search and discovery interfaces.
- Finally, it is through the retooling, retraining, and re-engineering of technical services staff and their skills from the analog/print world into the digital world (digitization, digital projects, metadata, etc.) that libraries have a chance to become players in the growing commercialization of accessibility in the information marketplace.

All of this does not take into account the shifting and ever-changing environments surrounding scholarly publishing, open access, social networking, our loss of market share in the information universe, declining state funding of higher education, the effect that the Google book digitization database will have on collection budgets and digital accessibility to print resources, how the Federal Research Public Access Act (FRPAA) will affect libraries' roles in the research and preservation/access process of government grants, etc., etc. Or the fact that libraries need to move into the roles of marketing and outreach.

Overall, there are a number of reports that every librarian should read and digest. The first is *No Brief Candle: Reconceiving Research Libraries for the 21st Century* (<http://www.clir.org/pubs/reports/pub142/pub142.pdf>); Anne Kenney's *Approaching an Entity Crisis: Reconceiving Research Libraries in a Multi-Institutional Context*, which is a response to the previous report (http://www.oclc.org/research/dss/ppt/dss_kenney.pdf); Diane Harley *et al.*, *Assessing the Future Landscape of Scholarly Communication: An Exploration of Faculty Values and Needs in Seven Disciplines* (http://escholarship.org/uc/cshe_fsc); and the University of Minnesota's *Multidimensional Framework for Academic Support* (<http://www1.lib.umn.edu/about/mellon/docs.phtml>). Two recent articles are also worthy of reading and discussion: "Toward a new Alexandria: imagining the future of libraries" *The New Republic* March 12, 2010 (<http://www.tnr.com/article/books-and-arts/toward-new-alexandria>) and "Gutenberg 2.0: Harvard's libraries deal with disruptive change" *Harvard Magazine* May/June 2010 (<http://bit.ly/c4m1cy>).

One might also want to peruse my contributions to the literature concerning this topic, including "Ending the status quo." *American Libraries* March 2008 (39:3), p. 38; and "The new user environment: the end of technical services?" *Information Technology and Libraries* June 2010 (29:2), p. 94-101. I have recently completed chairing the Enterprise-Level Collection Management Services task force as part of the University of California (UC) Libraries' Next Generation Technical Services (NGTS) initiative, charged to develop an operational infrastructure and technical services that can function at an enterprise level (i.e. system-wide) in support of efficient, non-redundant, and collaborative collection services. The charge was:

...to develop scenarios for enterprise-level collection management services that would support collaborative life-cycle management services for the collective information resources of the UC Libraries. The focus is on acquisition of information resources in all forms and the associated organization of meta-information that enables access by the end user. However, be sure to maintain a broad and holistic perspective that recognizes the role of these services is support of overall collection services including selection, management, archiving, and preservation.

Propose new approaches to technical services processes:

- that support total life-cycle curation for all materials in all UC library collections including special collections and digital materials
- that build upon existing successful system-wide collaborations and that use those successes as models for new collaborations
- that increase access to more materials and that eliminate backlogs and hidden collections
- that provide timely and effective access for the end user
- that cost less than existing processes

Compare multiple strategies such as:

- decentralized—essentially what we have now but with changes to significantly reduce costs and increase outputs
- centralized—all processing done in a single location
- regionalized—processing done at two locations, one in the north and one in the south
- hybrid—some tasks at a single location, e.g., additional operations similar to the Shared Cataloging Program

Compare the costs and outputs of each strategy with those for the existing UC technical services operations, including:

- benefits
- obstacles (technical, legal, financial, logistical, service, and HR)
- cost analysis including savings, transition costs
- impact on end user

Recommend which strategy or multiple strategies should be implemented and for what reason.

A daunting task, to be sure! More information on the recommendations of this task force, as well as current endeavors and initiatives related to NGTS within the UC Libraries, can be found at http://libraries.universityofcalifornia.edu/about/uls/ngts/docs/ngts_phase2.html, and future budget challenges for the UC Libraries can be found at http://libraries.universityofcalifornia.edu/planning/taskforce/interim_report_package_2011-05-00.pdf.

Which brings us to the topic of this book. All of the chapters detail some aspect of technical services reorganization due to downsizing and/or reallocation of human resources, retooling professional and support staff in higher level duties and/or non-MARC metadata, “value-added” metadata opportunities, outsourcing redundant activities, and shifting resources from analog to digital object organization and description. One chapter specifically discusses the concept of broader cooperative/collaborative sharing of technical services expertise and personnel locally and regionally, while another details a “one person does it all” librarian arrangement that has developed and blossomed at one institution. The first chapter by Mitchell *et. al.* examines evolving cataloging roles from a manager’s perspective at the University of Houston

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Libraries. Concepts such as open access, patron-driven acquisitions, batch cataloging, and locally-curated digital content are discussed, as well as ending the segregation between “cataloging” and “metadata.” The next chapter by El-Sherbini presents a number of models for sharing cataloging expertise, including the idea of centers of excellence, and the new initiative among OhioLINK libraries called CollaboraTeS. Valentino then details how the University of Oklahoma Libraries integrated digital library metadata creation into the workflow of the Cataloging Department. John Riemer discusses his philosophy of expanding cataloging department personnel into the digital arena through his experiences at the University of Georgia and the University of California at Los Angeles (UCLA). A re-visioning process for technical services workflows at the University of Northern Colorado is detailed by Leffler and Newberg in their contribution, followed by an interesting application of the balanced scorecard (BSC) technique for re-engineering the cataloging department at Hanyang University Library in Seoul, South Korea. Taber and Conger focus on “value-added” cataloging outside of normal library operations, by developing consultation services and assisting the University of North Carolina at Greensboro with their institutional repository. Cross-training of staff in various services and projects throughout the library at Northern Arizona University is described by Pat Headlee *et. al.* Providing extensive training for library technical services support staff in Enhance and NACO work at Kent State University is described by Lisius *et. al.*, with perspectives from management, expert cataloger-trainers, and a graduate student. Finally, the merging of technical and public services roles into one librarian position, namely the Cello Music Cataloger at the University of North Carolina at Greensboro, are detailed by the current librarian in that position, and how his strengths, talents, and connections assist him in bringing monies and resources into his library.

The editor hopes that these contributions to the literature will assist both catalogers and library administrators with concrete examples of moving technical services operations and personnel from the analog to the digital environment.

Agile Cataloging: Staffing and Skills for a Bibliographic Future

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One of the foremost challenges facing technical services in academic libraries is integrating digital resources and services with existing work without a concomitant personnel expansion. The library's bibliographic data are manipulated and delivered through myriad systems and services, including proxy servers, electronic resource management systems, federated search and link resolver tools, integrated library systems, bibliographic utilities, and dozens of external data providers. In this increasingly complex environment, libraries require flexible data management and flexible staffing, which in turn relies on a reservoir of informed staff and managers who understand the many pieces of the technical services puzzle. This article discusses efforts at the University of Houston Libraries, a mid-size research library, to enhance organizational capacity for evolving cataloging roles and to foster organizational relationships that support progress in technical services functions.

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At the University of Houston Libraries, strategic planning in technical services focuses on two primary areas: organizational capacity and organizational relationships. Organizational capacity refers to the ability of the organization to absorb new kinds of work. The library must maintain positions at appropriate levels, and hire or train for increasingly sophisticated skill sets. In the past, position announcements for cataloging staff emphasized ability to

follow direction and pay close attention to detail; more recent job descriptions ask for data manipulation skills and evidence of judgment, initiative, and technological aptitude. A major role for cataloging managers, and for technical services managers more broadly, is to facilitate the relationships among technical services functions and between technical services and the rest of the library. Underpinning both of these efforts is the need for a holistic understanding of the data environment in which catalogers and other technical services personnel now operate.

Modern processes for acquiring, managing, and discovering library content are complex and interdependent. Online content in particular involves a great deal more process than any format the Libraries have dealt with in the past, and brings with it new support systems and services. Experience with complex standards and massive bibliographic databases positions catalogers well for managing new kinds of data on a production scale, but a considerable learning curve remains. As their work changes, catalogers can benefit from a greater understanding of their own data supply chain, and in turn use their knowledge to refine and improve the flow of bibliographic data to and from the library.

As the work of technical services changes, the staffing structures within it must change also. In the future, the bright lines between functional areas will be increasingly blurry. In place of specialized, functionally isolated work units, the University of Houston Libraries are moving toward a development/production model that emphasizes continuous training, versatility, and personal autonomy. A nimble development team will explore new tools and processes, experiment with workflows, recommend training agendas, and build documentation for broadly distributed production work as new projects evolve into mainstream services.

LITERATURE REVIEW

The pressures that now bear on technical services to be pragmatic, responsive, versatile, and technologically proficient are part of a larger trend in the academic library environment. In a 2009 article "Building Library Collections in the 21st Century—The New Organization Librarian" William Cohen discussed the need for libraries and their vendors to face proactively the challenges of the current economic environment.¹ Cohen stressed that effective change is the result of addressing real problems, rather than changing for the sake of change or to seem current with what other organizations are doing. As a means of determining what needs are most significant, he mentioned the importance of formal survey tools like LibQual that will resonate with institutional administrations, as well as the need for engaged and outward-looking staff.

In "Exploring the Future of Academic Libraries: A Definitional Approach" Pongracz Sennyey, Lyman Ross, and Caroline Mills proposed that the library

needs to rethink its position at the confluence of physical space, collections, and services.² The authors noted that the shift toward digital collections has eroded the correlation between information and location, and the role of the library as a warehouse of content has diminishing relevance. Furthermore, as the means of accessing digital content become more numerous and variable, the use of the library as the primary avenue to access becomes less important and the association of the library to its collections becomes less clear. Finally, as more outsourcing occurs and the amount of routine processing and clerical work decreases, library staff must be redirected to other purposes.

Others have proposed even more ambitious changes to the role of the library. In "Transforming the Library: The Case for Libraries to End Incremental Measures and Solve Problems for Their Campuses Now," Janice Simmons-Welburn, Georgie Donovan, and Laura Bender advocated for transformational change to effectively realign the library with its parent institution.³ The authors addressed a number of aspects of the transformed library: a transition away from growth-centric peer comparisons in favor of a more direct focus on student success and other institutional goals; leveraging the virtual space through institutional repository development and other campus partnerships; support for collaborative research and learning; and greater engagement with information policy.

Some argue that libraries move away from their traditional functions at their peril. In an opinion piece for *Inside Higher Ed* entitled "Reviving the Academic Library" Johann Neem suggested that modifying and expanding the mission of the library will result in the demise of the library itself. In his view, the changes currently being implemented by libraries will result in the creation of "vague learning environments"⁴ that ultimately compromise student success. Instead, Neem urged libraries to sustain their historical role in collecting and preserving information for the benefit of students and faculty.

A recent study in *College & Research Libraries* indicated that university presidents and provosts do not share Neem's views. The article entitled "Attitudes of Presidents and Provosts on the University Library" shared the results and conclusions of interviews conducted with the provosts and presidents of six universities regarding their views of the library. Particular emphasis was placed on eliciting their view regarding the centrality of the library to the broader institution.⁵ The authors found that the automatic fiscal support for the library that existed previously is no longer guaranteed: "although leaders recognize the symbolic value of the university library, it is the functional role of the library in service to the university's mission that ultimately garners budgetary support."⁶ Institutional leaders stressed the importance of enhancing library contributions to the academic environment and campus life through an expanded virtual presence, redesigned study spaces, and the provision of creature comforts such as food and drink. The study also revealed that institutional leaders question the value of traditional comparative assessment measures in favor of other methods designed to reveal how successfully the

library is serving the needs of faculty and staff at the institution: "Their bottom line was that the library needs to determine what the university values, and how to speak about those things to make clear the contributions of the library toward enhancing or furthering these values."⁷

Neem's argument notwithstanding, it is apparent that libraries are moving away from traditional acquire-and-warehouse processes toward a role that is more closely aligned with the strategic directions of the parent institution, more service-driven, and much more digital. In this environment, bibliographic metadata is far more than a surrogate for the physical collection. It is the raw material for exposing library collections through a variety of systems both local (e.g., library catalogs, e-resource knowledgebases, digital asset management systems) and global (e.g., worldcat.org, Google Scholar, Flickr Commons). Metadata produced and managed by the library is not merely an instrument for local control of collections, but an active component of a larger bibliographic ecosystem.

In a provocative Talis white paper on Library 2.0, Ken Chad and Paul Miller lamented the fact that library applications are inflexible and redundant, noting that "a plethora of local, regional, national and even international systems run on a variety of different platforms"⁸ and fail to take advantage of the Web-scale efficiencies enjoyed by entities like Google and Amazon. Barbara Tillett of the Library of Congress echoed these sentiments, noting that the cataloging community needs to invest in effective tools for cross-walking, updating, and sharing bibliographic data.⁹ These measures are also prominent in the 2008 report of the Library of Congress Working Group on the Future of Bibliographic Control. "On the Record" describes the Library of Congress' strategic priorities, which include efforts to improve the efficiency of metadata production, repurpose metadata for multiple functions, and allocate greater responsibility to cataloging partners, including vendors, publishers, and members of cooperative cataloging programs.¹⁰ Case studies collected in 2004,¹¹ 2007,¹² and 2009¹³ suggest that academic libraries of various sizes, both public and private, have already moved in this direction. Most technical services units have streamlined their cataloging operations, both internally and by outsourcing, while extending bibliographic access beyond the catalog to other discovery tools and portals. Electronic resources have become mainstream, and many of the libraries surveyed have expanded their cataloging roles to encompass digital collections.

In addition to the challenges of technological change, shrinking library budgets have created pressure for cataloging units. For a 2009 article entitled "Perceptions of the Future of Cataloging: Is the Sky Really Falling?" Robert Ivey conducted a study on four trends articulated in a 1997 article by Richard Meyer¹⁴ that have produced significant changes in the nature of cataloging work because of budgetary constraints: declining acquisitions, outsourcing, lowered costs for traditional cataloging, and an increasing variety of information resources to control.¹⁵ Howley's longitudinal study of technical

services operations at mid-sized academic libraries described significant changes in the size and scope of cataloging units over a 14-year period.¹⁶ While individual libraries differed in their responses to the challenges facing technical services, common themes among the respondents included diminishing personnel resources for cataloging operations, additional workload occasioned by the emergence of electronic resources, and a shift toward more systems-related work to support efficient data processing and electronic access and discovery. In "A White Paper on the Future of Cataloging at Indiana University," Jackie Byrd et al. identified several trends that impact cataloging functions: increased online resources and open-access online publications, mass commercial digitization ventures, decreased budgets, increased reliance on outside vendors, and new developments in library services.¹⁷ Although the task group predicted that the need for cataloging expertise would increase over time rather than diminish, the paper acknowledges that "the economic realities affecting the future of academic libraries are felt deeply in the cataloging unit."¹⁸ Glasser concurred that increased workloads and decreased resources have forced technical services to scrutinize processes and workflow, prioritize responsibilities, identify inefficiencies, and consider outsourcing and reorganizing departments.¹⁹

Rich studies have been conducted on competencies and skills twenty-first-century catalogers must possess. A 2001 study by Abdus Sattar Chaudhry and N. C. Komathi indicated that knowledge of cataloging tools and resources were the most important requirement even though knowledge of Internet and digital systems were beginning to be in demand.²⁰ More recently, Sylvia Hall-Ellis used content analysis to determine the expected competencies for catalogers: education, theoretical knowledge of cataloging tools, knowledge of bibliographic description including non-Machine Readable Cataloging (MARC) metadata schemes, cataloging competencies including descriptive cataloging, authority control, classification schemes, subject analysis, multilingual proficiencies, as well as communication skills and interpersonal skills for leadership, supervision, and training.²¹ In "Cataloging Professionals in the Digital Environment: A Content Analysis of Job Descriptions" Jung-ran Park, Caimei Lu, and Linda Marion identified emerging roles for catalogers in the digital environment.²² They pointed out that proficiency in the digital environment, from computing skills to an understanding of digital objects and their metadata, is as critical a skill set for today's catalogers as traditional cataloging knowledge and skills.

In "The Changing Face of Cataloging Positions at Academic Institutions: What Skill Set Is Needed, and How Can Students Prepare?" Sally Glasser studied the changes that have occurred in cataloging as a result of automation.²³ She notes that the cataloging process has grown more efficient as it has evolved from manual card cataloging to cooperative copy cataloging, but catalogers have confronted new challenges and increased responsibilities as electronic formats have become more prominent. Ingrid

Hsieh-Yee examined developments in the information environment since the emergence of Google.²⁴ To compete with search engines, online public access catalogs (OPACs) and library databases have enhanced their functionality with federated search, social bookmarking, faceting, and other Web 2.0 conventions for information organization. In her view, external challenges have spurred important innovation within the library community, and she urged cataloging professionals and cataloging education to stay pertinent and competitive.

PRIORITIES IN CONFLICT

The trends that emerge in the literature point to the need for libraries to emphasize locally relevant, value-added resources and services, which might include such varied activities as developing an institutional repository, maintaining the library's unique links and holdings for electronic resources, and providing thoughtful stewardship of endowments and donor gifts. Libraries must also present their collections in a manner that meets users' increasing expectations for speed, convenience, and ease of use. Many of these expectations must be met by back-of-the-house operations: acquisitions, electronic resource management, cataloging, and Web support. Balancing these simultaneous imperatives to provide more and faster services and to be responsive to the local constituency, require that cataloging, technical services, and the library as a whole confront and take steps to resolve several areas of tension.

The most obvious of these conflicts is the push for more efficient and streamlined processes amid an increasingly complex data environment. The contours of the library are becoming blurrier and more far-flung, yet there is an expectation that the library will deliver its resources in a cohesive manner that does not force users to navigate separate information "silos" such as the catalog, the institutional repository, library research guides, and the e-resource portal. As technical services librarians well know, a seamless user experience belies the enormous infrastructure needed behind the scenes to manage content, metadata, and systems. Technical services managers must find ways to mitigate the complexity of their workflow without compromising service delivery.

Libraries must also negotiate the balance between efficiency and control. Throughout the library supply chain from selection to cataloging, there is a trend away from library-mediated functions. Services like approval plans and article delivery are supplanting traditional collection development functions, and libraries have come to rely heavily on third parties for e-resource management, cataloging, and discovery. These service relationships are commonplace; indeed, no modern research library could function without its service partners. While efficiency dictates that the library must give up some control

of its collection-building process, it cannot relinquish responsibility for the end product. For example, the UH Libraries have access to several large aggregator databases as a member of the statewide TexShare consortium. The content providers determine what journals are made available through their databases. The ever-changing coverage is tracked by SerialsSolutions, and the library receives monthly MARC record updates. Although the library is essentially a bystander to this massive exchange of data, it cannot remain passive. From the user's perspective these are library resources, and the library is ultimately responsible for their delivery. Instead of licensing and cataloging thousands of individual titles, the library has shifted its effort to moving MARC records in and out of the catalog in a timely manner, and reporting errors to the data providers so they can be corrected at the source. This is a much more efficient process, but also one in which the cataloger remains actively engaged with both users and service providers.

The third tension that must be reconciled is the balance between data management and communication. With the performance of so many systems reliant on the quality and flow of data, it is tempting to turn inward and concentrate efforts on data management. After all, a library that does not have confidence in its data cannot provide reliable services to its users or satisfy the accounting requirements of its parent institution. In reality, however, the success of technical services relies on relationships: conversations with both internal and external stakeholders about their needs and objectives, productive communication with suppliers and service providers about what is possible, and the continuous education of staff to grow with a changing environment. Without these relationships, technical services cannot be certain its priorities and direction are aligned with needs of its customers and the service capabilities of its suppliers.

BACKGROUND ISSUES

The University of Houston Libraries have been fortunate to avoid staff cut-backs in the current economic downturn; however, the technical services division at the UH Libraries, as elsewhere, is expected to achieve ever more productivity, deliver ever more diverse content, and manage an ever wider array of tools and processes. In 2005–2006, technical services underwent a dramatic contraction and reorganization. During that period, the perils of a too-lean and too-fragmented technical services operation became apparent. As a consequence of the university's funding model, the UH Libraries sometimes face staffing pressures that are not reflected in the materials budget. On occasion, technical services units have been in the strange circumstance of having positions frozen while simultaneously pursuing "big deals" and other big-ticket purchases; this was the case mid-decade. While the acquisition of traditional materials continued apace, the volume of electronic content

expanded dramatically. Suddenly overwhelmed by its core business functions, technical services' attention was focused on responding to short-term needs rather than exploiting the benefits of alternative directions.

A second issue arose during that time that continues to shape departmental and divisional planning to this day. Five years ago, responsibility for electronic resources was concentrated with a small number of individuals, mostly experienced department managers. During its existence the electronic resource team was expert and highly effective; but when several of its members shifted into new roles or left the organization, the team's intensive focus, shared understanding, and confident decision making were diminished. Admirable efforts were made to document processes and decisions, but no documentation can substitute for the judgment and skills of a cohesive team of specialists. Managers in the technical services division are still in the process of apportioning the functions that were once carried out by this small team widely and deeply across cataloging, acquisitions, and collection development. Ideally, many individuals will have the skill and authority to pick up portions of this mission-critical function in the event of a vacancy anywhere in the process.

The UH Libraries learned valuable lessons from that period, first and foremost that innovation needs to be continuous, so that change is not governed by panic. Change that is truly strategic, with significant and lasting impacts within and across functional areas, should be undertaken thoughtfully. Instant gratification is rarely possible; new processes, particularly those that involve multiple units or external service providers, require broad buy-in and cooperation. To achieve processes that are efficient and sustainable over the long term, it is often necessary to invest in substantial development, testing, and training at the outset, particularly if the process involves automated data transfer.

Technical services does not necessarily need more staff, but it needs the right skills at the right levels, and a staffing structure that can flex easily into new roles during seasonal work patterns and shift to new responsibilities as old ones diminish. There is a strong argument to be made against isolated specialization in favor of broad exposure to the full spectrum of library data and systems. The unit-level management layer—project and program coordinators—is critical to positioning the library for this kind of flexibility. These managers, who have considerable autonomy over their functional units and are expected to coordinate with their peers within and across the division, do the heavy lifting of training staff, examining and retooling workflows, and coordinating project-based work. In many instances, department managers are too far removed from the daily work, and have too many diverse functions reporting to them, to be optimally effective in this role.

THE CURRENT ENVIRONMENT

In the past, technical services relied on a fairly routine process for content delivery. The process typically began with selector-mediated requests; indeed, the use of the term “selectors” to refer to subject-area specialists, a convention seemingly impervious to the passage of time, is a testament to primacy this function once held. Based on these requests, the acquisitions unit placed orders, received, and paid for materials. After materials arrived and were received, the cataloging unit cataloged and processed them, and forwarded them to their designated location. To a great extent, this was a continuous, one-way process that proceeded along a very similar trajectory regardless of the format of the material or the source from which it was acquired. Certainly there have always been exceptions to this rule—archival collections, for example, are processed and described quite differently from other library materials—but the great majority of incoming materials followed this path.

The advent of electronic resources changed the landscape. Journal aggregators introduced the problem of transitory collections that require continuous management, and the growing array of electronic products, many of them encompassing dozens or hundreds of individual titles, created an instantaneous and staggering new workload. Outsourced cataloging services, approval plans, and other tools for minimizing item-by-item effort have been in place for some time, but the pressures brought by electronic resources brought a new urgency to the quest for efficiencies.

As staffing levels in technical services have plateaued and subject specialists have turned their focus to more intensive and personalized outreach to faculty and students, the infrastructure to support a laborious, title-by-title process simply does not exist in any part of the chain. The UH Libraries are now seeing a wholesale shift to batch- and profile-based requests, orders, and cataloging. While all of its mainstream physical and electronic collections are subject to this type of automation, the UH Libraries have found that several emerging modes of delivery are posing unique challenges for cataloging functions: open access, patron-driven acquisition, batch access to e-resources, and local digital collections.

Open Access

The digital age has opened new avenues of content available to libraries at no direct cost. This article will not attempt to address the seemingly infinite variety of open access models, except to note that the realm of open access includes everything from highly cited scholarly content to low-budget niche publications that might never have found distribution in print. From a metadata standpoint, some open access publications are virtually