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# Editorial

Peggy Johnson



As I prepared the first issue of the last volume of *Library Resources and Technical Services (LRTS)* I will edit, I decided to return once more to one of my recurring topics—writing for publication and, specifically, writing for publication in *LRTS*. People frequently ask me how they can write a paper that will be accepted for publication. The simple answer is “write a good paper that fits within the scope of *LRTS*,” but that response is insufficient for most would-be authors. In this editorial, I will offer targeted advice that will improve your chances of publication.

Read the professional literature, not just to learn the content but, equally important, to learn what makes a paper good. As you read, think about what you like about the paper, what makes it effective, and why you are reading it to the end.

Pick a topic in which you are interested and that will be of interest to our readers. Ideally, the topic should be something that has not been explored previously or that presents a new approach to solving a problem others have. The paper needs to answer the question, “so what?” Why should the reader care about your findings or your case study?

Any material submitted must be your own work. It should be original and not published or submitted for publication elsewhere. Avoid redundant publication (publication of a paper that overlaps substantially with one already published, is under editorial consideration, has been published, or is in press). Do not submit to the same or different journals more than one paper describing essentially the same research or project.

Research the topic in the literature and summarize your findings in a section of the paper called the literature review. This will help you avoid revisiting topics that have been addressed in the same way and permit you to build on the work of others. An effective literature review sets the context for your paper and is necessary in both research papers and case studies.

Follow *LRTS* stylistic guidelines for citing your sources. These are clearly spelled out in the “Advice to Authors” section of the *LRTS* website ([www.ala.org/alcts/lrts](http://www.ala.org/alcts/lrts)). Look at recent issues of *LRTS* and make sure the format of your citations matches what you see there. Almost nothing annoys reviewers and editors more than inadequate, inaccurate, or poorly constructed references.

Always properly cite the work of others as well as your own related work. The latter can be redacted in the submission to keep your name confidential during the review process. Plagiarism (the use or presentation of the ideas or words of another person from existing sources without appropriate acknowledgment of that source) and self-plagiarism are unacceptable.

Note at the time of submission whether the work is based on thesis or dissertation research, any earlier presentations of the work at meetings, or previous distribution through electronic means. This does not usually disqualify a work for submission, but the editor should be aware of the state of ongoing dissemination of the work. The information can be conveyed to the editor at the point of submission and does not need to appear in the paper at this stage.

Pay attention to the mechanics of writing. Apply the guidelines you learned in school about writing effectively. Work from an outline. Remember that a paragraph has an initial topical sentence. Paragraphs should consist of more than one sentence. Do not change tense or voice within a paper. *LRTS* preference is for third person.

Write clearly. Above all, your paper should be readable. Never use the passive voice where you can use the active voice. Avoid jargon and ponderous prose. Overly academic writing is deadly. Cut the boring parts.

Do not make undocumented assertions or assumptions. Never, for example, write “it is widely known that . . .” The reader wants to know who knows it. Even what may seem obvious needs to be documented. For example, “E-books are increasingly popular” needs a reference to the source of this statement, which might be data on increased sales.

If your paper describes a research study that uses statistics, consult with a statistician to make sure that the statistics are handled correctly. Most librarians do not have sufficient experience with statistical analysis to do it effectively. Pay attention to reliability and validity. If the research study used a survey, provide the survey in an appendix.

Describe the research method used clearly. This should both address questions of reliability and validity and serve to permit others to replicate your research at a later date.

Describe the setting in which a case study or research project took place to provide context for the reader. Do not overwhelm the reader with detail. Provide sufficient information to understand the case study or research project.

Write in an orderly manner. Tell the reader what you intend to do in the introduction and then do it. If you start by saying you will cover five points, the paper should address each of these points in the order they appear in your introduction. Write with a logical flow from point to point with

signposts, such as subheadings and section introductions.

Do not omit standard elements found in peer-reviewed literature. A paper should have an introduction explaining what the paper will cover (clearly stating the purpose) and why this research or case study is important or useful; a description of the research question or questions to be answered, assumptions to be tested, or the problem to be solved; a literature review; a description of research methods or case study; findings; analysis or discussion; and a conclusion that summarizes what the paper has covered.

Use illustrations (tables and figures) effectively. They should enhance or illustrate concepts or points made in the paper. Remember that *LRTS* publishes in black and white. Limit the number of illustrations to no more than six or (rarely) eight. *LRTS* will not publish twenty illustrations. Reference each illustration in the text and explain what it highlights.

Always double-check tables and figures. Do columns total accurately? Are the numbers in the illustrations consistent with those in the text? Does each table and figure have a title? If the illustration is taken from another source, that source should be cited at the bottom of the illustration.

Always double-check citations for accuracy. While reviewers and the editor will spot check citations including URLs, their accuracy is your responsibility. Remember that the reference for a quotation must give the specific page on which the quotation appeared.

Have a colleague read your paper. My advice is to avoid friends and relatives, who are less likely to point out flaws in logic and structure, although they often can help spot grammatical errors. Pay attention to what your colleagues, the paper reviewers, and the editor tell you.

Finally—and this is my most important advice—revise, revise, revise. Every paper can be improved.

## Erratum

“Looking Back, Moving Forward in the Digital Age,” by Daryl R. Bullis and Lorre Smith (v. 55, no. 4, Oct. 2011) contains errors on page 214 and in endnote 179. The sentence on page 214 citing the source in endnote 179 should be “O’Neill, Connaway, and Dickey discussed the quantitative measure of the audience level field in an OCLC record to assess the appropriateness of books for given collections.” The correct citation (endnote 179) should be

179. Edward T. O’Neill, Lynn Sillipigni Connaway, and Timothy J. Dickey, “Estimating the Audience Level for Library Resources,” *Journal of the American Society for Information Science & Technology* 59, no. 13 (Nov. 2008): 2042–50.

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# Literature of Acquisitions in Review, 2008–9

Jeanne Harrell

*In this review, the author discusses key trends in acquisitions found in the professional literature published in 2008 and 2009. During this period, the decline of funding for libraries led to more creativity in purchasing materials. The move from primarily print collections to more electronic journals, databases, and e-books became more pronounced. The Big Deals began falling out of favor because of shrinking library budgets. Workflow continued to change as skills required for print acquisitions adapted to the needs of electronic publications. Approval plans continued to survive in an environment where e-books were increasing in usage and popularity. The volatile vendor market escalated during this period causing consolidations of companies into “mega” companies. Electronic resources continued to create challenges for acquisitions librarians who were trying to find the best tools and workflows to manage the resources while also developing the ability to negotiate and interpret e-content licenses.*

This review of acquisitions literature is the successor to two previous reviews of acquisitions literature by Dunham and Davis published in *Library Resources & Technical Services*.<sup>1</sup> A major theme in the 1996–2003 review was the changes in acquiring and accessing library materials brought about by technology and use of the Internet. In the 2004–7 review, library budgets and the management of electronic resources became the dominant topics. During 2008 and 2009, topics that dominated the literature were continuing budget challenges, approval plans, workflow and management changes in acquisitions, the changing landscape of publishers and vendors, the Big Deal, and electronic resources, including an upsurge in electronic books.

## Research Method

The author searched Library Literature & Information Science Full Text (LLIS) and Library and Information Science & Technology Abstracts (LISTA) with Full Text, using “library” and “acquisitions” as keywords and limiting by the publication dates of 2008 and 2009. LLIS provided 239 citations and LISTA provided 822. The author also consulted ISI Web of Knowledge, retrieving 229 citations with the same search strategy. Sources used for this paper were limited to scholarly journal articles, conference proceedings, reports, and those published in English. The author included a selected number of articles related to serials acquisitions

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Submitted March 31, 2011; returned to author with request to revise and resubmit May 19, 2011; revision submitted Sept. 2, 2011; reviewed and accepted for publication Sept. 9, 2011.

because the acquisition of library materials addressed acquisition and management of all formats. The author selected sources for this literature review that were representative of the recurring themes.

## Library Acquisitions Services

### Budgeting

As library budgets continued to shrink and demands for library resources increased, acquisitions managers became more creative in obtaining library materials. Tafuri described the results of a survey focused on secondary online sources for purchasing and found that sources such as Alibris, Abe Books, and Amazon Marketplace were used for out-of-print materials while book vendors were still the source of current materials.<sup>2</sup> Tafuri also discussed print-on-demand services.

Setting appropriate allocations for various formats and subject disciplines in library budgets continued to be a challenge and varied widely from institution to institution. Because accountability for expenditures is a key part of reporting purchases, several articles found creative approaches to this important acquisitions function. Kaay and Zimmerman developed a percentage-based allocation formula for allocating funds.<sup>3</sup> Two elements in their formula were book price and circulation data.

Williams and Schmidt examined the practice of including the average cost of books per discipline as a variable in determining allocation formulas by looking at average price data from four sources: *The Bowker Annual*, previous acquisition cost data, Blackwell Price Reports, and Blackwell approval plan profiles.<sup>4</sup> Williams and Schmidt found that the Blackwell method yielded higher average prices. They suggested that other libraries should consider the advantages and disadvantages of the four methods, which included the difficulty of matching university academic departments to Library of Congress classifications, the inclusion of non-English materials, the inclusion of nonbook materials, staff time required to compile the data, the type of binding, and the currency of the data when attempting to determine average prices for use in allocating funds to various disciplines.

Walters suggested that because book prices increase at a slower rate than journals, undergraduate libraries should invest more of their budget in books that support the undergraduate than in research-based journal literature.<sup>5</sup> Walters suggested that the most reliable way to achieve sustainability was to renew emphasis on books instead of journals; to evaluate print and online resources systematically for both quality of content and sustainable access; and to be open-minded toward new formats, new pricing models, and new avenues for scholarly communications. Walters pointed out that academic libraries had to support a high level of research

activity by providing journal literature, but purchasing more books would likely bring the library collections into closer alignment with undergraduate coursework. Walters found that few academic libraries held copies of a majority of the *Choice* magazine's 700 Outstanding Academic Titles. Public libraries were reacting to declining budgets by purchasing fewer journals and increasing book purchasing. Walters viewed selective purchasing of journal titles, which would include the top tier journals and journals with the highest impact factors, as a reasonable approach to journal acquisitions. He also recommended careful scrutiny of licenses for online resources to ensure perpetual access. He noted use of Portico and open access journals as trends that should be monitored for their sustainability in providing scholarly communication. Walters discussed the distinctions between books and journals in terms of pricing and bundling. Increased cost for other institutions would be the result if an individual institution or several institutions cancelled journal titles to save money. When Walters analyzed the demand and cost from a more global view, he suggested that high demand for research in "journal centric" disciplines could make the serial cost crisis "intractable," but if the prices reflected the minor role of certain nonprofit journal publishers, then the problem of rising journal cost might be possible to address.<sup>6</sup> Walters suggested that the unbundling of journal articles would be helpful because libraries could pay for what they needed to access, but that was not likely a model that would meet publisher needs for revenue. Since books are discrete scholarly publications, purchasing single works was the chosen method of purchase in most cases.

Walters published a second article describing a book fund allocation formula based on demand (e.g., course enrollment, number of faculty positions, number of undergraduate majors and graduate students in a department, etc.), cost of books in a field, and supply (i.e., number of publications), not on the initial estimation of weights or allocations.<sup>7</sup> He concluded by stating that the method he presented "does require the careful selection of variables that are appropriate to local circumstances."<sup>8</sup>

VanDuinkerken and colleagues described another approach to fund allocation that was developed to give the library patron more ability to select titles.<sup>9</sup> It also reduced the number of discreet library material fund allocations overall and simplified the budget and fund tracking. They listed several goals of the radical change to fund accounting at Texas A&M University. One goal was to meet the information needs of university-affiliated library users. This goal was met by a User Generated Fund, which was used to purchase titles that cost \$150 or less and were requested by affiliated library users. Titles costing \$150 to \$1,000 were purchased with the approval of a subject selector. A second goal was to minimize "subject silo" behaviors. This goal was met by eliminating more than two hundred separate subject

funds assigned to subject selectors. Requiring approval of a subject selector for requests more than \$150 allowed the subject selectors to guide collection building. A third goal was to provide data to support administrative and selector decisions and foster a “big picture” view of collections. This was accomplished by using integrated library system reports and approval plan vendor reports, which were monitored to ensure balanced collection growth. A fourth goal was to foster greater transparency in technical service processes. Simplification of the fund structure was another goal. This was accomplished by eliminating numerous individual subject allocations. This also simplified the ordering and tracking of one-time purchases. Another goal was to build trust in fellow subject selectors and library users and to encourage collaboration and empowerment for all involved in the process. This was accomplished by creating a library-generated fund for the subject selectors and a library proposal fund to address purchases of \$1,000–\$10,000. These purchase requests were reviewed by a Funding Governance Committee composed of collection development librarians and representative subject selectors. The simplified fund structure helped meet a goal to enable responding to shifting collection needs and organizational priorities because funds could be more easily used for any purchases deemed appropriate by library users or subject selectors. Eliminating individual subject allocations accomplished the final goal, which was to provide meaningful measures of success in collection development. Librarians no longer were pressured to expend artificial subject allocations or to meet spending deadlines tied to the end of the fiscal year.

Chan suggested a modified zero-based budget approach for use at the University of Hong Kong Libraries.<sup>10</sup> Chan addressed the challenges and strategies in reallocating resources from print to electronic publication within an environment of inflationary increases and reduced funding increases.

Badics suggested that libraries maintain use data on all titles, including print journals, cancel unused series, and prepare a list of potential cancellations.<sup>11</sup> He believed that this is a reasonable approach because libraries are being held accountable for their financial decisions, so usage data can support decision-making.

Wu and Shelfer used the solver function in the Microsoft Excel spreadsheet software to analyze “what if” scenarios for material budget allocation planning.<sup>12</sup> The two scenarios included one in which the materials budget increased and one in which the materials budget decreased significantly. In each scenario, the authors kept in mind the risk factors involved in dealing with those most affected negatively by budget cuts. Wu and Shelfer suggested the “Theory of Allocation Optimization,” which stated “the optimal local allocation outcome is a context-sensitive determination of the appropriate relative contributions of political influence

and data-driven evidence to the local allocation decision.”<sup>13</sup> By assigning numbers and weights to these factors, Wu and Shelfer suggested that libraries could plan ahead for various budget contingencies rather than simply reacting to budget realities.

Tucker described a project that assessed the monograph collection at the University of Nevada Las Vegas (UNLV) in which circulation statistics and in-house use of all monographs during a five-year period (2002/2003 through 2006/2007) for the nine colleges at UNLV were analyzed.<sup>14</sup> He also compared approval plan title use with use of titles ordered by subject librarians. Tucker found that use of monographs declined and approval plan books were used more than those selected by librarians. Tucker suggested that the fact that use of monographs was declining meant that the monograph budget should be adjusted accordingly. He also suggested that allocation by discipline in the monograph budget would be affected by circulation data.

### Approval Plans

Jacoby’s survey of college libraries in the United States examined the use of approval plans to purchase print books.<sup>15</sup> The 2006 survey, included as an appendix to her article, yielded information about trends over a five year period, from 2000 to 2005.<sup>16</sup> Jacoby targeted small and medium-size liberal arts college libraries for her survey, which was adapted from the survey instrument Blecic, Hollander, and Lanier developed to assess the use of approval plans in academic health sciences libraries.<sup>17</sup> Jacoby received 114 responses and was able to use 88 in the results. She found that the use of approval plans in college libraries has not declined. The number of libraries that considered setting up an approval plan or expanding the existing plan was higher than the number of libraries cancelling plans. The study found a direct correlation between the size of a library’s materials budget and its use of approval plans. Libraries with large materials budgets were more likely to have approval plans. The number of print books received on the plans decreased because of inflation and competition with electronic resources, but the approval plan continued to be a time-saving tool for subject librarians with increasing demands on their time. Jacoby also sought comments from four domestic approval plan vendors about the scholarly monograph market. Although challenged by the shift of library funding from print to online resources, three of the four were supplying e-books to their customers and actively making preparations to include e-books in their approval plans, anticipating their increasing role in providing scholarly content to academic libraries. Another trend revealed in the survey was the use of Internet bookstores. Most of the libraries (76 percent) used Internet bookstores for less than 25 percent of their book purchases, but 13 percent used Internet bookstores for

more than 50 percent of their books.

Czechowski shared her experience with attempting to refine an approval plan for a health sciences library that would reduce returns to less than 10 percent.<sup>18</sup> She concluded that this may not be possible because of the nature of the health sciences publications, but returning to notifications was not feasible because the subject librarians wanted the books in the library as soon as possible.

Cox, Cross, and Ballestro discussed music score approval plans.<sup>19</sup> They surveyed Association of Research Libraries (ARL) libraries with and without approval plans to determine their satisfaction levels. The consistent response was that the librarians were the ones to determine whether scores were part of an approval plan or whether they were ordered separately as firm orders. For some, approval plans meant a time savings and for others, approval plans meant inflexibility, loss of control, and the inability to bring in local, obscure, or out-of-print materials to the collection. The common thread seemed to be that the selection librarians were taking responsibility for obtaining the scores needed by the library in whichever method fit the particular institution.

### **Workflow and Management**

The 2008 *Fundamentals of Technical Services*, by Intner with Johnson, serves as a handbook for technical services managers in all types of libraries, offering guidance to acquisitions managers with recommended readings at the end of each chapter that enrich the basic concepts presented in the book.<sup>20</sup> One chapter presents various options for the administrative organization of technical services departments, with specific responsibilities listed. Another chapter is devoted to vendor relations, including various purchasing models, interactions with vendors, and evaluating vendor performance. Chapters also address staffing and budgeting as well as the impact of digital resources. The book offers an excellent overview with significant specific details included.

Zhu studied 110 job ads for heads of technical services and found the same basic expectations in place in the 1990s were equally valid in 2008.<sup>21</sup> He identified the four most sought skill sets to be computer and information technology skills, communication skills, knowledge of integrated library systems, and cataloging. Leadership skills were valued along with knowledge of current trends and issues in technical services.

Whittaker pointed out the fact that electronic resources have changed the ways that acquisitions librarians perform their responsibilities.<sup>22</sup> The mission—to provide information access and preservation—remained the same, but librarians must understand licensing models, system requirements, file compatibility, authentication, proxy servers, and interface design to be able to provide access to the information needs of library patrons. Whittaker noted several particular

challenges in the digital age. Creating pricing models that benefit libraries and the publishing world were suggested. Other challenges identified were ensuring interoperability between systems, formats that were flexible and scalable, and a need for industry-wide standards. Measuring the value of an electronic resource was seen as a challenge because mere usage data did not compare from resource to resource and did not measure value of the content. Whittaker emphasized that librarians needed to ask publishers and suppliers to meet their needs rather than just accepting the terms offered to them.

Anderson recommended that the business of acquisitions look to the future and make changes in the traditional print purchasing model.<sup>23</sup> Several trends predicted by Anderson could guide the workflow and management of libraries. He suggested that print materials would decrease in importance in research libraries so staff members need to direct more effort to the acquisition of electronic materials and less to the acquisition of print material, observing, “with increasingly rare exceptions, buying printed materials for a research library collection is like drilling more holes in the hull of a sinking boat.”<sup>24</sup> He made several predictions. Library patrons will use online public catalogs less and less, and the importance of MARC records will decline. Institutional repositories will grow in importance, along with unique library collections. Nonunique, conventionally published materials will decline in importance. His suggestions to meet these changes and to “future proof” the library addressed his predictions. He suggested that libraries need to produce better discovery tools and settle for simpler, less perfect MARC records or alternatives to MARC. Anderson suggested that institutional repositories should be developed to assist academic stakeholders. He also suggested that libraries need to begin redirecting staff time away from the acquisition and maintenance of nonunique, replaceable materials and toward the development of unique collections.<sup>25</sup>

The major emerging workflow changes were related to making workflows more effective from a financial standpoint and the changes necessitated by the increasing numbers of libraries that are moving from print to online access for journals and books. Blake and Stalberg studied serials and electronic resources workflow looking for more efficiency, clarity, and simplicity.<sup>26</sup> Their work offered ideas that can be used by other institutions. VanDuinkerken used the perspective of a public services librarian to update best practices in monographic acquisitions workflow.<sup>27</sup> Pomerantz and White presented a plan for altering the workflow using the Innovative Interfaces Millennium acquisitions module for budget management that would improve tracking of financial information about electronic resources.<sup>28</sup>

The cataloging workflow in libraries affected acquisitions workflow because acquisitions staff need the ability to

determine whether a title is already owned by the library to avoid duplication. If a title is purchased by the library, it needs to be added to the online public catalog promptly. An article by Mugridge and Edmunds described batch loading bibliographic records into the online public catalog as a means of making holdings visible that were previously not discoverable because they were not recorded in the public catalog title by title.<sup>29</sup>

Getahun and Keillor described a cost-benefit method to purchase monographs used at small to mid-size libraries.<sup>30</sup> The studies were completed at Luther Seminary Library and Bethel University Library and examined whether searching for the best price for an item was cost-effective. The studies confirmed that money was saved by using multiple vendors. The study compared the cost of monograph titles and order and receipt processing time for titles provided by online vendors and by book jobbers. Getahun and Keillor made a strong case for the use of cost-benefit analyses to provide libraries with fact-based rationale for negotiating terms with various vendors, to inform work practices and decisions, and to evaluate workflow and identify inefficiencies.

Ward examined the acquisition of foreign language materials for a large research library, offering a model that could help with acquiring this often challenging material.<sup>31</sup> Because this type of purchasing required more human intervention, it tended to take longer and be less automated. Acquisitions staff were the first to see the orders and later receive the materials; therefore they needed foreign language expertise to ensure that correct titles were ordered and verified at receipt. Ward suggested working closely with vendors and using vendor-supplied records to improve the workflow.

Hulm reported on four presentations at the 2008 ALA Annual Conference in Anaheim that addressed the workflow issues related to the movement from print to electronic.<sup>32</sup> Librarians, vendors, and integrated library system providers were actively developing procedures to merge print and electronic workflows. Some mainstreaming of ordering and reporting workflows were appearing, but electronic resources presented an additional set of procedures that did not merge easily with print procedures. The presenters addressed some successes with managing the electronic resources in ways that made the process more automated and less burdensome on library staff while simultaneously enhancing access for library patrons.

## Content Providers and Content

### Book Sellers and Vendors

The publishing marketplace continued to shrink as publishers and vendors merged. This was a particular concern

as libraries sought to sustain access to journal titles moving from publisher to publisher and vendor to vendor. Communication between libraries, publishers, and vendors has never been more critical to supplying resources to library customers in a transparent and seamless manner from the point of view of the customers. Jagodzinski wrote a history of university presses and their role in a digital, open access environment.<sup>33</sup> Adaptability was cited as the key to the survival of university presses.

Vendors' online tools have become more integral to the workflow in acquisitions and collection development processes. The advantages and disadvantages of this relationship were explored by Bowdoin and Barricella in a presentation at the Charleston Acquisitions Conference in 2007.<sup>34</sup> A major concern noted by Bowdoin and Barricella was the consolidation of business to a single vendor. Although this practice had advantages, it also could negatively affect the strength of a library collection. The individual online databases of the various vendors varied and none of them offered all available publications. Purchasing from multiple vendors and publishers enriched the mix of available titles, but added that disadvantage of requiring selectors and library staff to learn multiple online tools to purchase titles. This required multiple workflows for the multiple sources. It also required searching multiple online vendor databases, which added time to the process and increased the possibility of duplication of titles. The importing of records from various vendors also was complex, requiring difficult, detailed setup, but would ultimately result in the saving of time and effort. The quality of vendor records was an issue that varied widely from vendor to vendor. Bowdoin and Barricella identified eleven advantages to the online vendor tools. Among these were the speed of ordering and receiving materials, reduction of keying errors because subject selectors and acquisitions staff were selecting an existing title in the database, on-demand reports of order and receipt history as well as expenditure data in a variety of formats from HTML to Excel to PDF, and the ability to print invoices and statements directly from the online database. Stock level information and status of a title was cited as a distinct advantage as well as the ability to easily cancel an order. Sharing title notification information on the online database has eased the lives of subject selectors and acquisitions staff and a large amount of paper was eliminated by the online option.

Hane discussed the financial challenges facing libraries, resulting in significant cuts in acquisitions.<sup>35</sup> She reported that publishers and vendors were trying to survive in the difficult financial market by freezing prices in some cases and that newspapers were going digital to attract more readers.

Tonkery, of EBSCO Information Services, wrote an overview of the effect of electronic resources on publishers, agents, users, and libraries.<sup>36</sup> Publishers have benefitted



from the electronic environment because they converted their titles from print to electronic and many had projects to convert backfiles of journal titles. Electronic submission and peer review streamlined the publication process. Subscription agents have seen radical change to their environment. Print subscriptions declined dramatically so agents redesigned their online resources to accommodate the market. Agents were better able to provide services that publishers and libraries would be hard pressed to provide, although some of the workload has shifted back to the library staff because of licensing and access demands. Title-by-title support was essential to the efficient managing of electronic, as well as print journals. In the electronic age, customer service became even more important as needs from libraries and publishers have become immediate needs that have to be addressed instantaneously. Tonkery noted that library users were the winners in the electronic market, although they continued to want more. As Tonkery observed, "All of this opportunity is in front of us, but we are still looking for long-term financial solutions to support the information infrastructure."<sup>37</sup>

### The Big Deal

As budgets have tightened, more questions have arisen about the Big Deals, which were developed as all-inclusive publisher packages offering special pricing with lower unit prices and controlled price increases. They normally included serial titles that previously had been recurring subscriptions for the libraries and additional previously unsubscribed titles. Big Deals usually locked the library into a comprehensive list of titles and resulted in the inability to manage local collections. One of the problems involved in these Big Deals was the movement of titles from publisher to publisher, requiring considerable time by acquisitions staff and librarians to track the movement of individual titles.

Several articles in *The Serials Librarian* highlighted the issues, alternatives, and current status of this pricing model that was popular in previous years as a means to provide access to large numbers of titles for one price. Carlson and Pope surveyed how libraries were responding and what alternatives were being explored.<sup>38</sup> Rolnik analyzed whether the Big Deal is a good deal and decided that it might even be a great deal because libraries gained access not only to titles to which they subscribed but also to the rest of the previously unsubscribed titles from a given publisher.<sup>39</sup> The multi-year agreement also capped price increases in most cases. This helped with budgeting because the libraries knew what the cost of the deal would be from year to year. Big Deals also allowed smaller institutions, especially those in consortia, to make considerable gains in titles that they could now provide to their authorized users. The disadvantages of the Big Deals included the fact that a consistently large portion

of the materials budget was consumed by payments to relatively few large publishers. This decreased the flexibility in managing the serial budget and the ability to choose high quality over lower quality publications. Rolnik noted that Big Deals locked small publishers out of the market because not enough money was left in the serials budget after the Big Deal invoices were paid. Another negative effect was the possibility that quality could be secondary to the increasing volume of unsubscribed content.

Best asked if the Big Deal was dead.<sup>40</sup> He noted that the Big Deal was continuing to evolve even as it began to fade in popularity and that some publishers offered flexibility in dropping little-used titles in the packages when licenses are renegotiated. Cleary described why the Big Deal continued to exist in libraries despite shrinking budgets.<sup>41</sup> The advantages of bundling e-journals together into publisher collections included increased access to information for the subscribing institution's clients, purchasing cost-effectiveness, and streamlined workflows. Libraries were moving from a philosophy of "just in case" to a more popular philosophy of "just in time" in whatever format was available. Cole discussed the electronic deals and the benefit offered to the end users.<sup>42</sup> She identified ways to gain the most benefits possible from the Big Deal and suggested potential developments that can allow the deals to be managed more effectively.

Wolfe and colleagues described the process of creating and managing Big Deal purchases in a North American Serials Interest Group (NASIG) 2008 program.<sup>43</sup> This particular deal involved an agreement between SpringLink and PALINET.

### Electronic Resources

Yu and Breivold's edited collection of twenty informative articles provides a comprehensive review of major issues related to electronic resources.<sup>44</sup> The chapters are written by authorities in the field of electronic resources, licensing, electronic resources workflow management, usage statistics, Electronic Resource Management Systems (ERMS), and include a history of electronic resources. As Jewell pointed out in the foreword, the book is as useful for beginners in electronic resource management as for seasoned electronic resources librarians.

A program sponsored by the ALCTS Collection Management and Development Section at the 2008 ALA Annual Conference in Anaheim addressed the movement of print to electronic access. Luther set the stage by stating that only 5 percent of ARL libraries subscribed to journals in electronic-only format in 2002 and the number surged to 37 percent in 2006.<sup>45</sup> Print-only subscriptions dropped from 64 percent to 30 percent during the same period. She predicted that publishers would move to e-only subscriptions

and slowly phase out print publishing in the next five to ten years. Emery's presentation described the switch from print to electronic at the University of Texas.<sup>46</sup> She noted that the electronic format was gaining popularity and the cost of justifying duplicate formats was becoming more difficult. The University of Texas began the switch with large packages and then proceeded with smaller packages and publishers. Portico, a dark archive, emerged and the University of Texas was able to target the publications covered by Portico for e-only subscriptions. Subject specialists also were offered incentives to move to e-only by receiving credit toward new subscriptions for the cancellation of a print duplicate.

Bucknall addressed the move from print to electronic from his perspective at the University of North Carolina–Greensboro.<sup>47</sup> He began by referencing two 2004 reports that clearly indicated the advantage to electronic formats. One was Schottlaender and colleagues' "Collection Management Strategies in a Digital Environment," and the second was Schonfeld and colleagues' *The Nonsubscription Side of Periodicals*.<sup>48</sup> The first used usage data to support patrons' preference for electronic resources in a study where the ratio was 6,000 print uses to 97,000 electronic uses. The second report argued that life cycle cost for print materials would be significantly higher than the electronic. Bucknall asserted that too much time was spent managing serials when more time should be devoted to building better information gathering tools for users.

From a vendor's perspective, Springer's Owen reported that e-only subscriptions were common among academic library consortia.<sup>49</sup> E-only offered the best option by reducing the amount of time needed for library, publisher, and subscription agent intervention and management. She identified the challenges concisely. Licensing took time and required more staffing. Libraries opposed Big Deals, e-book packages, and multiyear commitments. Recurring funds for these commitments was always an issue.

Steinle, from Duke University Press, reported from the perspective of a university press, and enumerated the cost factors for producing both the electronic content and the print content.<sup>50</sup> After surveying customers, Duke University Press concluded that it would need to continue offering both formats to meet the specific needs of its customers. Steinle contended that this also is a workflow issue because staff that worked on print materials (ordering, receiving, tracking, and binding) need to be retooled to become electronic resources staff with new expectations and new skills. Ho and Toth prepared an annotated bibliography for this program.<sup>51</sup>

Albitz wrote a primer on licensing and managing electronic resources for academic institutions.<sup>52</sup> Her step-by-step approach is valuable in working through licenses and copyright issues. She stressed the importance of understanding one's institution when reviewing licenses so they

meet local needs, requirements, and restrictions.

Harris published a second edition of *Licensing Digital Content: A Practical Guide for Librarians* in 2009.<sup>53</sup> This guide has been well received by the library community and is widely used as a training tool for librarians who are new to the intricate features of licensing electronic resources. Business officers in libraries also can find this guide valuable as they work with librarians, vendors, and university attorneys.

ERMS continued to be a frequent topic. Collins wrote a review, based on survey responses, of nine ERMS products available in 2008.<sup>54</sup> She discussed CUFTS ERM (an open source ERMS developed by Simon Fraser University), EBSCOs ERM Essentials, Ex Libris' Verde, Colorado Alliance's Gold Rush, Harrassowitz's HERMIS, Innovative ERM, Serials Solutions 360 Resource Manager, SwetsWise eSource Manager, and TDNet Open ERAM. Whittaker pointed out that the cost of setting up a useful ERMS costs more than just the software.<sup>55</sup> Populating the ERMS with data to make it valuable to the organization had to be a consideration in the cost of an ERMS.

Riding described the draft National Information Standards Organization (NISO) Cost of Resource Exchange (CORE) Protocol intended to facilitate the exchange of financial information between systems, such as an ERMS and integrated library systems (ILS).<sup>56</sup> According to Riding, using CORE-enabled systems will allow libraries to retrieve cost information from their ILS or other acquisitions system to populate the ERMS financial subsystem. Needleman also shared information about this new protocol.<sup>57</sup> Note that CORE, while originally intended for publication as a NISO standard, was ultimately approved as a NISO recommended practice in 2010.<sup>58</sup>

Smith conducted an interesting study of the overlap of print and electronic backfiles that can inform decisions about whether to retain print backfiles or rely on their online equivalent.<sup>59</sup> She noted that print and microfilm, long the preferred medium for archiving journals, were giving way to the online approach, which saves shelving space and allows more flexibility for library patrons. Smith conducted a second study of the format overlap of the *New York Times* to determine whether deselection of print and microform formats in favor of online access would yield benefits for Adelphi University Libraries.<sup>60</sup> She determined that the three formats met separate needs and should be retained, but noted that this decision would vary from institution to institution. This study supports the need to make case-by-case decisions related to format overlap.

Clement and colleagues described the steps in a successful cancellation projects at the University of Kansas and Lamar University.<sup>61</sup> Previous cancellation projects involved faculty reviewing lists and librarians cancelling what the faculty recommended, but the authors found that

cancellation projects have become more complex. Big Deals have complicated the decision-making process. More planning and data collection are required and the timetable is longer. The librarians agreed that faculty input and support are important; therefore the decisions at both institutions were collaborative.

### E-Books

E-books have become increasingly important in all types of libraries as an alternative to print books for many reasons. Authors identified many advantages of e-books, one of which was that they do not take space on shelves when libraries cannot afford to build new buildings to house them. E-books are accessible remotely at any hour of the day or night, based on licensing details. Disadvantages often included screen size and usage limitations. Vassiliou and Rowley attempted to define the term “e-book” and gave an overview of e-books, including the marketplace, various characteristics, and pros and cons.<sup>62</sup> Taylor reported that this format was increasingly important for public libraries as well.<sup>63</sup>

Sprague and Hunter took a closer look at e-book usage data for titles provided by the University of Utah’s major e-book suppliers and determined that usage of titles purchased from Ebrary, NetLibrary, and Books 24x7 was low, although usage of cataloged titles was higher.<sup>64</sup> The authors found that about 20 percent of the cataloged e-book titles had been accessed. Additional use studies were suggested by the authors to determine the best ways to use e-books to assist library patrons with research.

Slater reviewed several hundred books at Oakland University that were available both as print and e-books.<sup>65</sup> He determined that collections selected locally receive greater use than those selected at the consortia level. He also found that use of a particular title in one format did not correlate with usage of that title in the other format. Comparing the use of NetLibrary and Safari Technical E-books at Oakland University indicated that Big Deal consortia purchases were used sufficiently to justify continuing this type of purchase, but locally selected collections, such as the Safari Technical E-books collection, had much greater usage. Slater suggested that e-book collecting efforts should focus more resources on adding locally selected collections instead of consortia purchases.

Shelburne conducted a survey at the University of Illinois Library to determine usage patterns and acceptance factors for e-books.<sup>66</sup> Her study indicated that e-book usage was increasing rapidly and that student attitudes toward e-books were positive overall, but issues related to levels of access and usage rights remain. The primary difficulties were the difficulty of reading from the screen, navigation issues, and problems locating materials and searching in general.

Shelburne noted problems with Digital Rights Management (DRM) and with Internet access along with other technical difficulties such as the need for special readers and poorly scanned pages. Shelburne recommended that libraries work with publishers to encourage them to offer acceptable purchasing models and license agreements. Perrone’s article about e-books in Italy indicated that the increase in usage of e-books is an international phenomenon.<sup>67</sup>

Kovač, in *Never Mind the Web*, discussed the history of the printed book in contemporary societies and its relation to other media.<sup>68</sup> He opined that the print book has continuing value and has not been replaced by digital technologies and e-books.

### Conclusion

Libraries continued to face major challenges related to funding and management of prolific electronic resources during 2008 and 2009. Librarians sought various models to allocate funds appropriately based on a variety of strategies and reported on these strategies in the acquisitions literature. Approval plans continued to be popular with large libraries, even in a time of declining buying power. The workflow and management needs of libraries reported in the literature of 2008 and 2009 changed significantly because of the growing need for knowledge and expertise in dealing with the shift from print to electronic resources.

Vendors and publishers sought to deal with a shrinking, volatile market, trying to keep up with the demands of libraries for online databases to manage their monographic purchases and offering Big Deals as a solution to providing large numbers of titles (subscribed and unsubscribed) for a relatively low cost. Because budgets were shrinking, this approach began losing its appeal. Libraries were less willing to pay for unwanted titles to keep subscriptions at a lower cost per title. Big Deals were still a hot topic, but with funding shortfalls, libraries had to make difficult decisions. Libraries continued to struggle with ERMS to manage electronic resources more effectively as they reduced printed journals in favor of electronic formats. The changing vendor market also affected what libraries could purchase and how they could purchase it, but approval plans and the Big Deal continued to be used widely although under more scrutiny. E-books were a hot topic, gaining in popularity despite licensing and platform issues. They were not universally accepted as the best format for monographs, but were gaining popularity as a method for obtaining access to information on a “just in time” basis.

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# Broken Links and Failed Access

## How KBART, IOTA, and PIE-J Can Help

Sarah Glasser

*This paper highlights three industry initiatives currently working on ways to improve access to licensed electronic content. The three initiatives are KBART, IOTA, and PIE-J. Background information on OpenURL, link resolvers, and knowledge bases, as well as detailed descriptions of the access problems the initiatives were developed to solve, is provided. Understanding these initiatives can help those involved in the electronic serials supply chain improve their own work, communicate effectively with others, and advocate for adoption of best practices. Together, these initiatives hold great promise for a future with fewer broken links and improved access for users.*

Libraries today rely heavily on electronic full-text content. Users like electronic access, but become frustrated when links to content do not work. The OpenURL standard ushered in a new and much improved way of linking to licensed electronic content, but despite broad adoption of OpenURL, links still fail and access to licensed content still eludes users more often than librarians would like. Even when links resolve correctly, users sometimes are unable to find what they seek because of how journal content is displayed on provider websites. This paper discusses some of the reasons behind failed access and describes in detail three industry initiatives currently working on ways to improve access to electronic content. The three initiatives are recommended practices for Knowledge Bases and Related Tools (KBART), a two-year research project aimed at Improving OpenURLs Through Analytics (IOTA), and recommended practices for the Presentation and Identification of E-Journals (PIE-J). While these initiatives will not solve all access problems, they offer solutions to specific, known causes of electronic access failure. Understanding exactly what they do can help those involved in the electronic serials supply chain improve their own work, communicate effectively with others, and advocate for adoption of best practices by publishers and other content providers. To fully understand the initiatives, background information is presented on OpenURL, link resolvers, and knowledge bases, as well as detailed descriptions of the access problems the initiatives were developed to improve. The ultimate goal of this paper is to enhance understanding of the work being done by KBART, IOTA, and PIE-J to provide those who deal with electronic access issues with the information they need to effect change and ultimately bring better service to users.

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Submitted April 27, 2011; returned to author May 22, 2011 with request to revise and resubmit for second review; resubmitted August 7, 2011, and accepted for publication Sept. 19, 2011.

The author would like to thank her contacts at each of the three initiatives, Chad Hutchins from KBART, Adam Chandler from IOTA, and Cindy Hepfer from PIE-J, for their support and feedback during the writing of this article. The author would also like to thank Howard Graves and Pamela Harpel-Burke, both of Hofstra University, for their advice, encouragement, and proof reading.

## Literature Review

### OpenURL Linking

The initial (version 0.1) OpenURL syntax was developed in the late 1990s by Herbert Van de Sompel, who introduced it with Oren Beit-Arie in 2001.<sup>1</sup> The current version, version 1.0, became a National Information Standards Organization (NISO) standard in 2004 and was reaffirmed in 2010.<sup>2</sup> OpenURL was developed to solve the “appropriate copy” problem. The appropriate copy problem refers to the need to link users to incarnations of content to which their institution subscribes.<sup>3</sup> Electronic content may be available in more than one place (publisher website, electronic journal aggregator, etc.). End users need to be directed to the copy they have permission to access (i.e., content licensed through their institution). Before the creation of the OpenURL framework, reference linking “involved hard-coding links between one content provider and another.”<sup>4</sup> Such linking was referred to as “non-context-sensitive” linking and was problematic because it did not take into account the context of the user who followed the link.<sup>5</sup> As a result, users were sometimes linked to the “wrong” or “inappropriate” copy of an article, i.e., one that they did not have permission to access.

The system of Digital Object Identifiers (DOIs) was being developed around the same time as the OpenURL and led to the formation of the International DOI Foundation (IDF) in 1997.<sup>6</sup> DOIs are persistent, unique links assigned to digital content such as electronic journal articles. Each DOI is “paired with the object’s electronic address, or URL, in an updateable central directory, and is published in place of the URL in order to avoid broken links while allowing the content to move as needed.”<sup>7</sup> While DOIs offer persistent links that resolve even when content moves (because of, for example, a publisher or platform change), the DOI system has no mechanism to select the “appropriate copy” for particular users, and is therefore subject to the same appropriate copy problem that the OpenURL framework addressed. DOIs typically link to the publisher’s site, regardless of whether the user has permission to access the content on that site.<sup>8</sup> If a user has access to content through, for example, an aggregator database but not at the publisher’s website, the DOI system alone has no way of knowing this. The OpenURL framework, on the other hand, is a dynamic linking model that can perform context-sensitive linking, “whereby links are flexible and able to take into account the user’s institutional affiliations and the licenses of that institution.”<sup>9</sup> OpenURL created a linking mechanism that takes into account what the particular user is allowed to access. By doing this, OpenURL solved the appropriate copy problem.

Realizing the limitation of DOIs with regard to the appropriate copy problem, DOI developers adjusted the

system to work with OpenURL.<sup>10</sup> Today the DOI system has the ability to identify a user’s institutional affiliation and, using the OpenURL framework, send the request for electronic content through the institution’s local link resolver instead of to the publisher’s site. This solution, offered only to library affiliate members of CrossRef, the official DOI registration agency, provides “appropriate copy” resolution of DOI links.<sup>11</sup> While DOI was originally part of the appropriate copy problem, it now works together with OpenURL to connect users to licensed electronic content they are authorized to use.

The OpenURL standard specifies a particular syntax for the transport of content-specific metadata, such as International Standard Serials Number (ISSN), volume, issue, start page, and article title, as well as the user’s institutional affiliation (to know what the user has permission to access). When a user clicks on a citation from, for example, an abstracting and indexing database, the OpenURL builds a URL string that uses the bibliographic metadata from the citation to “check all of the library’s holdings and retrieve the full text if a match is found.”<sup>12</sup> Because this link is where the OpenURL linking process begins (the source), it is referred to as the “source link” or “outbound link.” The structure of an OpenURL source or outbound link is illustrated in the following URL:

```
http://anylibrary.anyresolver.com/?genre
=article&sid=[source ID]&issn=[ISSN]&title=
[journal name]&atitle=[article title]&volume
=[volume]&issue=[issue]&space=[start
page]&date=[yyyy]13
```

The brackets indicate place holders for specific citation data. For simplicity’s sake, this example utilizes version 0.1 of the OpenURL syntax; version 1.0 is similar but more complex.

Two key components of successful OpenURL linking are the link resolver and the knowledge base. The OpenURL standard defines the specifications and syntax of the OpenURL (for example, “atitle” means “article title”), but it is the link resolver, together with the knowledge base, that processes the information and ultimately provides users with links to appropriate copies.

A link resolver is “a software tool that deconstructs an OpenURL, separates out the elements that describe the required article, and uses these to create a predictable link to the appropriate service(s) identified by the user’s library.”<sup>14</sup> The “link to the appropriate service” is the link that takes users to the licensed full-text content, wherever it may reside (publisher’s website, aggregator, etc.). Links to target content (as opposed to links from a source citation) are referred to as “target links” or “inbound links.”

A knowledge base is “an extensive database . . . that contains information about electronic resources, such as

title lists, coverage dates, inbound linking syntax, etc.”<sup>15</sup> “Inbound linking syntax” refers to the information on how to construct the target or inbound link, the link to the content at the target website (e.g., publisher’s website). Individual libraries customize the knowledge base so that it reflects their particular holdings. Libraries do this by activating their subscribed or licensed content within the knowledge base. Activated titles are those the library users are entitled to access; they are the “appropriate copies” for that particular library’s users. Libraries must be careful to activate only the content they have licensed.<sup>16</sup> Although the link resolver does the linking, it relies on the knowledge base for information regarding which copies are “appropriate” (those activated) and for the metadata necessary to create a successful link to content (target link). Figure 1 outlines the basics of OpenURL linking.

When a user clicks on a citation (the source), a source OpenURL is generated (see above). The link resolver then deconstructs the OpenURL, parsing out the metadata (ISSN, atitle, etc.) and matches it to the information in the knowledge base (to determine whether the library has access to the content, i.e., whether there is an “appropriate copy”). If a match is found, the link resolver generates a results page with target links to the appropriate copy or copies. The link resolver creates the target links using the link-to syntax (the formula used to construct target links) and bibliographic metadata that is stored in the knowledge base.

To summarize, OpenURL is a framework that specifies syntax for context-sensitive reference linking. The link resolver is the software that does all the linking. Using the specifications and syntax of the OpenURL standard, the link resolver pulls apart the OpenURL source link (created from a citation), searches for a match in the knowledge base (which is customized by individual libraries so that it reflects the particular library’s exact holdings), and, if a match is found, creates a target link to the full text using metadata in the knowledge base.

With OpenURL, the actual link to electronic content is no longer hard-coded or static, but rather flexible and dynamic. It is specific to the particular user’s permissions and thus the target URL will be different for different users. OpenURL linking solved the appropriate copy problem and was deemed a great breakthrough for library reference linking. Since its ratification, the OpenURL framework has been widely adopted within the scholarly information supply chain.<sup>17</sup>

### Causes of Failed Access

Despite the advent and wide adoption of OpenURL and DOIs, linking problems still occur. In their study on link resolver accuracy rates, Trainor and Price found that links failed nearly a third of the time (29 percent).<sup>18</sup> An earlier

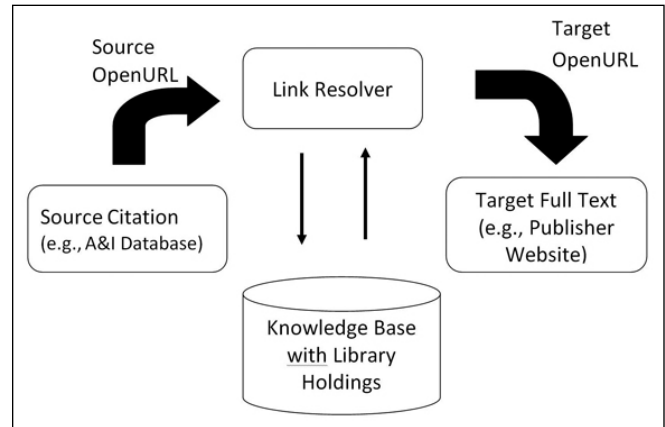


Figure 1. Overview of OpenURL linking

Source: Adapted with permission from both Rafal Kasproski, “NISO’s IOTA Initiative: Measuring the Quality of OpenURL Links” (presentation, North American Serials Interest Group Annual Conference, St. Louis, Missouri, June 2–5, 2011, [www.slideshare.net/rkaspro/iota-nasig-2011-measuring-the-quality-of-openurl-links](http://www.slideshare.net/rkaspro/iota-nasig-2011-measuring-the-quality-of-openurl-links) (accessed June 1, 2011) and James Culling, *Link Resolvers and the Serials Supply Chain: Final Report for UKSG* (Oxford: Scholarly Information Strategies, 2007), [www.uksg.org/projects/linkfinal](http://www.uksg.org/projects/linkfinal) (accessed June 1, 2011).

study by Wakimoto, Walker, and Dabbour found that 20 percent of the full-text link options generated by their institution’s OpenURL link resolver were erroneous, “either because they incorrectly showed availability (false positives) or incorrectly did not show availability (false negatives).”<sup>19</sup> Both false positives and false negatives are forms of link failures. The broken link is the result of a false positive. While broken links are frustrating, false negatives are more elusive and arguably more troublesome. With no link to content appearing at all, false negatives represent a kind of unknown failed access that “can be more damaging to the user.”<sup>20</sup> False negatives also represent paid content that is not being discovered and thus not being used. This both reduces the library’s return on investment and leaves users dissatisfied.<sup>21</sup>

While the Wakimoto, Walker, and Dabbour study seems to have resulted in a lower rate of link failures than the Trainor and Price study (20 percent versus 29 percent), Trainor and Price make a compelling argument for the reassignment of the Wakimoto, Walker, and Dabbour category “Correct—required search or browse for FT [full text]” from the “correct group” to the “error group,” stating that “When the target full text item or abstract with full text links is not presented on the target page, most users and even many librarians perceive the resolver as having failed.”<sup>22</sup> This reassignment raised the total link resolver error rate for the Wakimoto, Walker, and Dabbour dataset to 35 percent.<sup>23</sup>

Link failures can occur in various stages along the



OpenURL linking chain. If the metadata from the source citation is incorrect or incomplete, the link resolver may not be able to match it to the information in the knowledge base. If the metadata in the knowledge base is incorrect or incomplete, a match will similarly fail. Moving through the OpenURL linking chain, errors also can occur at the target website. Trainor and Price refer to these three main causes of link failures as source URL errors, knowledge base inaccuracies, and target URL translation errors.<sup>24</sup>

#### Metadata Problems

Chandler of Cornell University documents examples of link failures caused by problematic metadata sent from the source citation to the link resolver (source URL errors).<sup>25</sup> Source URLs are created using the metadata from the source citation (see figure 1). If these metadata are incorrect or incomplete, the link resolver cannot match the information to the metadata in the knowledge base and the OpenURL chain breaks. In an attempt to ascertain why so many of the links from a particular abstracting and indexing database failed, Chandler manually reviewed a sample set of source OpenURLs. He found numerous metadata problems such as “malformed dates, volume and issue numbers combined into one field, reliance on the pages element instead of the start page element for linking, lack of identifiers, etc.”<sup>26</sup> These metadata problems were causing the OpenURL links to fail.

Another area of link failure reported in the literature concerns the accuracy of the metadata stored in the knowledge base. Knowledge base vendors obtain metadata for licensed content from content providers, usually in the form of title lists.<sup>27</sup> The quality of the data in the knowledge base “depends on the quality of the data that are supplied by the content providers.”<sup>28</sup> If the data are inaccurate, incomplete, or inconsistently formatted, they enter the knowledge base with these deficiencies. If not corrected or otherwise normalized by knowledge base developers, the problematic data propagate throughout the OpenURL supply chain, causing failed access to licensed electronic content.

Writing of the knowledge base “sitting behind the linking service,” Mischo and colleagues note that “keeping the metadata populating the database complete, such as accurate identifiers (ISSN, CODEN, ISBN, PubMedID, OAI), current target addresses (including URLs), and complete threshold information (full-text coverage), is critical to getting the user to the full-text resource in as succinct and efficient a manner as possible.”<sup>29</sup> They go on to state that, “Without accurate ISSN, ISBN or other identifying numbers, the critical matching of citation information to data stored within [the] knowledgebase could not occur. Often, without the corresponding match point, the linking service

displays no full-text results. There are times when this is inaccurate and full-text access is available.”<sup>30</sup>

Chen puts the blame squarely on content providers for sending inaccurate or incomplete title lists to knowledge bases and other serials management tools.<sup>31</sup> He traces numerous link errors back to metadata deficiencies such as inaccurate title information, incorrect identifiers (ISSN, ISBN), incorrect coverage information, and embargo ambiguities, concluding that “Content providers need to realize the serious consequences of misinformation.”<sup>32</sup> Donlan similarly bemoans the difficulty of obtaining accurate title lists from content providers, the time involved in getting the metadata corrected in the knowledge base, and general user frustration with broken links.<sup>33</sup> She concludes that “all these problems illustrate how important it is that content providers create accurate metadata in order to generate the OpenURL.”<sup>34</sup> In analyzing the erroneous links in their study, Wakimoto, Walker, and Dabbour found that “the vast majority of false negatives were the result of incorrectly reported holding information from database vendors.”<sup>35</sup>

A report commissioned by the United Kingdom Serials Group (UKSG) identified numerous incidences of compromised OpenURL linkage resulting from inaccurate, incomplete, and inconsistent metadata from content providers.<sup>36</sup> The report underscored the significance of the knowledge base in OpenURL linking, noting that “it is essential that the data residing in knowledge bases is current, accurate and reliable if users are to discover and access the content that is selected and acquired for them by librarians.”<sup>37</sup> Furthermore, the report noted a lack of understanding among some content providers of the importance of accurate metadata and, specifically, the significance of the data they send to knowledge bases, which feed the link resolvers, which in turn drive traffic to content. In concluding, the UKSG report called for the development of a “code of practice” in the knowledge base supply chain because “at the end of the day, libraries are depending on the data provided to offer a reliable service to their patrons.”<sup>38</sup>

These examples show that links fail when the metadata that fuel the OpenURL linking process are of poor quality. Accurate metadata are necessary for OpenURL linking to work. This fact exposes a limitation of the OpenURL framework. Perhaps the reason so many links fail is that the OpenURL model assumed the “metadata embedded in the OpenURLs would be inherently consistent and accurate.”<sup>39</sup> As the examples above show, this is not always the case. KBART and IOTA, explained in detail below, focus on metadata deficiencies that have kept the OpenURL framework from reaching its full potential of providing seamless reference linking to licensed electronic content. Specifically, IOTA is working on ways to decrease source URL errors and KBART is working on ways to decrease link failures because of knowledge base inaccuracies.

### Provider Website Problems

OpenURL link failures are not the only cause of failed access to licensed electronic content. Another kind of failed access relates to the way journal titles are presented on provider websites (publisher websites, electronic journal websites). In such cases, links resolve, but bring users to a webpage that is so confusing they cannot find what they are seeking. One particularly acute problem relates to the practice of listing former journal titles under the current, newer title. Hawkins and colleagues give the example of a student who finds a citation for a 1922 article in the *American Journal of Hygiene*.<sup>40</sup> Further clicking brings the student to the webpage for the *American Journal of Epidemiology*. After a somewhat Kafkaesque journey through cyberland, the user eventually discovers that the *American Journal of Epidemiology* was published under the title *American Journal of Hygiene* before 1965. The 1922 article was available, but it was listed under the (nonexistent) 1922 volume of the *American Journal of Epidemiology*. This provider essentially ignored the previous journal title and placed all content under the newer title. This practice causes failed access. Reynolds and Hepfer give a similar example of user search difficulties and note that, “unless journal websites list all the titles under which content was published, user access to desired content is considerably diminished.”<sup>41</sup> They argue further that no one wins in this situation: “not the library, the publisher, the vendor, and certainly not the researcher!”<sup>42</sup>

Cole touches on the difficulty of dealing with journal title changes in libraries, the complexity and continuous changes of the cataloging rules, and how these issues relate to the representation of title history in the electronic environment.<sup>43</sup> He concludes that while they need not follow the catalog code, “Publishers and aggregators need to provide access to both the older and newer titles of serials that have changed titles. . . . What is important is the provision of access for the end user.”<sup>44</sup>

Publishers and other content providers may be unaware of the confusion and access barriers they cause by listing former titles on the webpage of the current title. From a marketing or design point of view, placing all the content under the current title may seem to be a “simpler and more elegant arrangement than breaking the content into the various pieces that placing it under multiple changed titles might entail.”<sup>45</sup> Indeed, “In a publishing environment it makes sense that the focus for promotion and Web site design is on current titles and products.”<sup>46</sup> While this may be true, it is problematic for the researcher. Citations to articles will refer to the journal title that was in effect when the article was published. A researcher has no way of knowing from the citation that the journal has since changed titles. This means that a researcher looking for an article that appeared under a former journal title will look for the article under the former

title. If the researcher cannot find content listed under the former journal title, access is compromised.

In conclusion, while listing all content of a journal under its current title may seem to be a convenient way to provide content to users, this practice essentially ignores previous titles, buries them within the website, and ultimately causes failed access to content. PIE-J, explained in detail below, addresses this issue and is working on a best practices document for the presentation of journal titles on content provider websites.

### Initiatives Addressing Failed Access

Having highlighted the access problems that KBART, IOTA, and PIE-J were created to improve, this paper will now move to a detailed explanation of each initiative. The initiatives work under the auspices of national organizations. KBART is a joint initiative between UKSG and NISO, while IOTA and PIE-J work solely under NISO. UKSG is a British organization that “exists to connect the information community and encourage the exchange of ideas on scholarly communication,” and NISO is an American standards organization that “identifies, develops, maintains, and publishes technical standards to manage information in our changing and ever-more digital environment.”<sup>47</sup> Both organizations encourage collaboration between all sectors of the information community (content providers, libraries, software developers). Consistent with the goals and principles of these two organizations, the working group of each initiative consists of broad stakeholder representation (publishers, platform providers, aggregators, knowledge base vendors, librarians, etc.).

#### KBART

The creation of KBART in January 2008 was a direct result of the findings of the UKSG report *Link Resolvers and the Supply Chain*.<sup>48</sup> As mentioned earlier, the report underscored the significance of the knowledge base in OpenURL linking and noted a need for education about how data provided by content providers to knowledge bases directly affects the efficiency of OpenURL linking. The report found numerous linkage errors because of inadequate data sent from content providers and noted that no standard guidelines existed for data transfer from content providers to knowledge base vendors. KBART was formed to remedy this situation.

KBART was specifically charged with improving “the supply of data to link resolvers and knowledge bases, in order to improve the efficiency and effectiveness of OpenURL linking.”<sup>49</sup> Since its creation, KBART has worked to alleviate “problems in the information supply chain that relate to the data supplied to knowledge bases.”<sup>50</sup> This is a very specific goal that deals directly with the OpenURL linkage problems

described earlier. By recommending best practices for the accurate and timely exchange of holdings metadata from content providers to knowledge bases, KBART strives to improve OpenURL linking and decrease the incidences of failed access.

The KBART working group completed phase 1 of its work in January 2010 with the publication of *KBART: Knowledge Bases and Related Tools: A Recommended Practice of the National Information Standards Organization (NISO) and UKSG*.<sup>51</sup> The publication contains specific guidelines and instructions for enabling the accurate and timely exchange of holdings metadata from content providers to knowledge base developers. Designed to be intuitive and easy to implement, KBART hopes that “by making some small adjustments to the format of their title lists, content providers can greatly increase the accessibility of their products,” libraries can enjoy a higher return on their investment, and users will experience fewer link failures.<sup>52</sup>

The KBART report encourages content providers to include sixteen specific fields as columns in a tab-separated metadata file and, for consistency, to use the field labels specified in the report (see table 1). In deciding on these sixteen elements, the goal was to “collect only the information that is most useful, rather than a large number of fields that become too overwhelming for content providers to support.”<sup>53</sup> The recommendations address common metadata problems such as the reuse of ISSNs; title inconsistencies (misspellings, the incorrect use of former or subsequent titles); inaccurate or outdated coverage dates; inconsistent date and enumeration formats; inaccurate, inconsistent or missing coverage descriptions (e.g., abstracts, selected full text, exclusion of graphics); and embargo period ambiguities. The report also includes recommendations for metadata file naming as well as the method and frequency of data transfer.

KBART offers content providers a simple metadata exchange format that is easy to follow, easy to implement, and easy for knowledge base developers to process. While many content providers already successfully exchange metadata, others are unsure how best to proceed. KBART offers “entry-level guidelines and instructions” for the timely and accurate exchange of essential holdings metadata.<sup>54</sup> The benefits of adopting the KBART best practices span

**Table 1.** KBART’s Field Name Recommendations for Metadata Transfer from Content Providers to Knowledge Bases

Field Title	Description
publication_title	Publication title
print_identifier	Print- format identifier (i.e., ISSN, ISBN, etc.)
online_identifier	Online- format identifier (i.e., eISSN, eISBN, etc.)
date_first_issue	Online Date of first issue available online
num_first_vol_online	Number of first volume available online
num_first_issue_online	Number of first issue available online
date_last_issue_online	Date of last issue available online (or blank, if coverage is to present)
num_last_vol_online	Number of last volume available online (or blank, if coverage is to present)
num_last_issue_online	Number of last issue available online (or blank, if coverage is to present)
title_url	Title- level URL
first_author	First author (for monographs)
title_id	Title ID
embargo_info	Embargo information
coverage_depth	Coverage depth (e.g., abstracts or full text)
coverage_notes	Coverage notes
publisher_name	Publisher name (if not given in the file’s title)

Source: UKSG, KBART 5.3.2.1.: Data Fields and Labels, [www.uksg.org/kbart/s5/guidelines/data\\_field\\_labels](http://www.uksg.org/kbart/s5/guidelines/data_field_labels) (accessed June 1, 2011).

the entire electronic serials supply chain: content providers enjoy a reduction in cost of their customer service, an improved reputation, and increased traffic to their content; knowledge base developers spend less time retrieving missing metadata and reformatting data into a single normalized format; and libraries benefit by “maximizing the usage (and therefore the return on investment) of the content they license, and [improving] the experience and success rate of their users as they navigate the research network.”<sup>55</sup>

While KBART’s phase 1 work focused on metadata exchanges for journals, phase 2 focuses on more advanced, complex issues such as metadata for consortia, open access content, e-books, and conference proceedings.<sup>56</sup> Phase 2 also includes work on an information portal that will provide educational resources such as background information on the OpenURL and the serials supply chain, “how to” guides, and selected links to pertinent literature. KBART continues a robust outreach effort to educate and inform the community, and to increase the number of publishers that adopt the practices recommended in the phase 1 report. At the time of this writing, forty-seven publishers and organizations have endorsed KBART.<sup>57</sup>

## IOTA

The IOTA working group was formed by NISO in January 2010 “to investigate the feasibility of creating industry-wide,

transparent and scalable metrics for evaluating and comparing the quality of OpenURL implementations across content providers.<sup>58</sup> Like KBART, IOTA is concerned with link failures resulting from problems with the metadata that fuel the OpenURL. IOTA's goal is to measure source OpenURL quality across content providers to pinpoint problematic areas that can then be the focus of improvement efforts. By using metrics to automatically and systematically evaluate OpenURLs, IOTA strives to supply objective, empirical data on exactly where metadata problems exist so that content providers can efficiently and effectively target efforts to improve OpenURL linking.

IOTA has its origin in the study by Chandler referenced earlier.<sup>59</sup> As mentioned above, Chandler manually reviewed a sample set of OpenURLs and found numerous typical metadata problems. These kinds of problems cause links to fail. Fixing these problems would increase successful OpenURL linkage, instantly increasing users' access to licensed content (and decreasing their frustration with failed access). By systematically and objectively identifying precise areas of metadata deficiencies, IOTA hopes to "inform vendors about where to make improvements to their OpenURL strings so that the maximum number of OpenURL requests resolve to a correct record."<sup>60</sup>

As of July 2011, the IOTA OpenURL reporting system contained more than 15 million OpenURLs from fifteen institutions and content providers.<sup>61</sup> The reporting system analyzes the element frequency and patterns contained within OpenURL strings. Users can run reports that show, among other things, which elements (e.g., article title, ISSN, etc.) are present in the OpenURLs. Such a report could, for example, reveal that the OpenURLs from a particular content provider, "provider X" do not contain a particular OpenURL element such as "spage" (the start page number for the item). This can be compared to other providers. If a high percentage of other providers include the element, this could be a cause of unsuccessful OpenURL links from provider X. Another kind of report can show element patterns, such as the format used for the date of an item. Date formats vary from four digit year formats (2011) to formats that indicate the month with or without the day and with or without hyphens (e.g., 2011-06, 2011-06-20, 20110620). The IOTA reporting system can analyze the OpenURLs and show, for example, that provider X uses the date format YYYY-MM-DD (2011-06-20), while most providers use the year only (2011). This may or may not be the cause of Open URL link failures, but equipped with this knowledge, provider X could focus its attention on this area, make any necessary changes, and improve OpenURL linkage (and thus traffic) to its content in a cost-effective way. In short, such reports allow vendors to see weaknesses in their source OpenURL strings, make targeted improvements, and thus increase access to their content (and decrease broken links).

KBART and IOTA are both working to decrease OpenURL link failures that are caused by metadata deficiencies. IOTA works to decrease source URL errors by analyzing the data that enters the OpenURL chain from the source citation, while KBART focuses on decreasing link failures because of knowledge base inaccuracies by improving the flow and accuracy of the metadata that content providers send to knowledge bases.

### PIE-J

PIE-J differs from KBART and IOTA because it is not focused on link resolver errors. Formed by NISO in 2010, PIE-J addresses access barriers that arise from the manner in which electronic journals are presented on provider websites. PIE-J's official charge is

to develop a Recommended Practice that will provide guidance on the presentation and identification of e-journals, particularly in the areas of title presentation and bibliographic history, accurate use of the ISSN, and citation practice, that will assist publishers, platform providers, abstracting and indexing services, knowledgebase providers, aggregators, and other concerned parties in facilitating online discovery, identification, and access for the publications.<sup>62</sup>

Expected to be published in the first half of 2012, the recommended practice will specifically address the issues of varying titles for different formats, accurate title history information, citation practices, and accurate use of ISSNs. The ultimate goal is to ensure that electronic content can be reliably discovered, cited, and accessed over time.

As described earlier, provider websites sometimes lead users down a confusing path by placing content that was published under former journal titles together with content published under the current title. This practice impedes access when users search for content using historically correct citations from abstracting and indexing services, bibliographies, published works, and other research tools. These citations use the title a journal carried at the time the particular article was published. Users need to be able to find the article with the citation in hand. For this to happen, electronic journal websites must accurately and uniformly present all the titles under which content was published. In short, content providers should present former journal titles "with enough prominence on the website to be easily visible and well enough indexed to be accessible via a search engine."<sup>63</sup>

Insufficient identification of former titles also can affect current citation practices, another issue PIE-J is addressing. Many journal websites today offer online citation tools that purport to generate accurate article citations. When older content is placed on websites under the newer title, the

citation tool often generates a citation using the journal's current title. This is not correct and, left unattended, will impede future access.

Lacking any standards or guidelines for the presentation and identification of electronic journals on websites, the information regarding title history, title variation, and ISSN history is not always unambiguously supplied. PIE-J's goal is to review the problem and provide guidelines in the form of a set of NISO-recommended practices on how providers can best mount title history, including ISSN history, on their websites to facilitate identification, access, and reliable citation practices over time. While PIE-J does not address OpenURL linkage issues, their recommendations on the accurate use of ISSNs would, if widely adopted, improve linking.

### Next Steps

This paper highlights three industry initiatives that are working on solutions to specific, known causes of electronic access failure. The initiatives are supported by national organizations in the United States and United Kingdom (NISO and UKSG) and the working groups consist of representatives from all areas of the electronic serials supply chain (publishers, other content providers, knowledge base vendors, librarians, etc.). This cooperative effort indicates that stakeholders throughout the electronic serials supply chain take these issues seriously and are willing to work together toward the common goal of improving access to licensed electronic content. This is good news, because "it is crucial that the effort to develop best practices has the support and buy-in of publishers, content providers, and librarians."<sup>64</sup>

Support and buy-in of all constituencies must continue. Armed with the knowledge of exactly what KBART, IOTA and PIE-J do, librarians, content providers, knowledge base vendors, e-journal website designers, and others can communicate effectively about electronic access, make improvements on their end, educate others, and advocate for support or endorsement of the initiatives. Librarians should ensure that only licensed or free content is activated in their institution's knowledge base. Publishers and other content providers are encouraged to adopt the KBART best practices and remain informed about the forthcoming PIE-J best practices document. All are encouraged to add their log files to IOTA and use IOTA to check their links and those of other vendors and institutions. Only with wide adoption, will these efforts effect real change.

Another area of failed access improvement is being discussed, though it is not yet being formally addressed. It concerns the third cause of OpenURL link failures, identified by Trainor and Price as target translation URL errors.<sup>65</sup> These are OpenURL errors that occur when the inbound or target OpenURL link does not resolve at the target

(publisher website, for example). This is the last stage in the chain of OpenURL linking. At the time of the writing of this paper, working group members from IOTA and KBART were discussing a joint project to address this third area of OpenURL errors.<sup>66</sup> This is an area to watch in the future.

### Conclusion

This paper described three industry initiatives aimed at improving access to licensed electronic content. By explaining exactly what KBART, IOTA, and PIE-J do in the context of the access problems they were created to solve, this paper strives to help those struggling with access issues and encourage all affected parties (librarians, content providers, knowledge base vendors, etc.) to work toward the common goal of improving access to licensed electronic content.

KBART and IOTA focus on metadata inaccuracies that affect the efficacy of OpenURL linking. Their identification of metadata deficiencies as a cause of OpenURL link failure exposes a limitation of the OpenURL framework and explains, at least in part, why so many OpenURL links still fail. Dynamic linking requires accurate and consistent metadata to function to its full capacity. In other words, a direct relationship exists between metadata quality and link failures: when the metadata quality is low, links fail, either completely or partially. Improve the quality of the metadata that fuel the OpenURL process and linking will improve as a result. IOTA is working on improving the metadata that is sent from the source citation (the first stage of OpenURL linking) and KBART is focusing on the importance of accurate metadata within the knowledge base (the second stage of OpenURL linking). While these are not the only causes of OpenURL link errors, addressing the metadata inadequacies in these areas will result in more successful OpenURLs and less failed access. As Stevenson and Hutchens write, "Users simply want systems that work."<sup>67</sup> KBART and IOTA are working toward the goal of making the OpenURL framework work better.

PIE-J does not directly address linkage problems but rather focuses on access issues related to the way in which electronic journal titles are presented and identified on provider websites. PIE-J is concerned with the frequent content provider practice of placing content published under former journal titles under the current title. When journal title and ISSN history are not clearly presented, users' ability to find and access what they seek is diminished. PIE-J is working toward the creation of a NISO-recommended practice that will guide providers on how best to present journal title and ISSN information on websites to facilitate identification and thus successful access to licensed electronic journal content. Although PIE-J does not directly address linking problems, because the ISSN is such an important element

in successful OpenURL linking, improved use of ISSNs on electronic journal websites will increase the number of successful links to those websites.

All parties stand to benefit from the work being done by KBART, IOTA, and PIE-J: users get better service, librarians get a better return on their investment, and content providers get more traffic to their content, which leads to increased usage (a criterion often used in library purchasing decisions) and a better reputation. This is a win-win situation for all. The issues surrounding these initiatives are complex but important. Their exact goals and purposes are different but related. Their work is complementary. All three share the goal of increasing successful access to licensed electronic content, and together they hold great promise for a future of fewer broken links and more successful access.

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# Preservation in the Digital Age

## A Review of Preservation Literature, 2009–10

Karen F. Gracy and Miriam B. Kahn

*This paper surveys research and professional literature on preservation-related topics published in 2009 and 2010, identifies key contributions to the field in periodicals, monographs, and research reports, and provides a guide to the changing landscape of preservation in the digital age. The authors have organized the reviewed literature into five major areas of interest: tensions in preservation work as libraries embrace digital resources, mass digitization and its effects on collections, risk management and disaster response, digital preservation and curation, and education for preservation in the digital age.*

This review article critically examines the literature of preservation published during a two-year period, 2009–10. Almost a decade has passed since the last review of the preservation literature appeared in *Library Resources and Technical Services*, covering the period of 1999–2001.<sup>1</sup> In the interim, the evolution of the preservation field noted by Croft has accelerated, encompassing whole areas of practice that were in their infancy at the turn of the twenty-first century. In her review, Croft identified ten areas of emphasis in the literature: clarifying preservation misconceptions triggered by the publication of Nicholson Baker's *Double Fold*; the continued importance of the artifact in the wake of new digital reformatting technologies; remote storage; mass deacidification; physical treatment and commercial binding; contingency planning, environmental control, and integrated pest management; unique formats (including audiovisual media); preservation reformatting; educational endeavors; and digital technology and preservation.<sup>2</sup> While the impact of digital technologies was briefly addressed by Croft, primarily as the technique poised to replace microfilming as the reformatting method of choice, little attention was devoted to the development of theory and techniques for preserving born-digital materials or even the preservation of those digital surrogates resulting from the conversion of analog materials.<sup>3</sup>

In a remarkably short period, the professional discourse has changed utterly from the world described by Croft. Digitization is no longer an emerging tool; it is the established and often preferred method for reformatting.<sup>4</sup> The emergence of Google as a key player in mass digitization of collections forced a shift in priorities for many libraries away from building and maintaining physical collections toward an emphasis on the creation of access avenues through the licensing of burgeoning digital collections of journals, books, and multimedia. These advances

Submitted July 5, 2011; tentatively accepted for publication, pending modest revisions August 15, 2011; revision submitted September 20, 2011 and accepted for publication.

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coincide with other trends in library collections practices, including reducing the footprint of collections to make room for more seating in the library and more service areas and increased collaboration on last-copy print archiving.

Meanwhile, journal articles, research reports, conference proceedings, and technical literature reporting the latest development in digital preservation and the closely related area of digital curation have flowered in the last decade, resulting in a refocusing and broadening of the field to encompass new tools, techniques, and issues. In addition, recent developments in preservation education—particularly in the areas of digital preservation and curation—have resulted in discussion of how best to address needs for education and training as librarians and archivists care for hybrid collections of both analog and digital material.

### Scope of the Review

While scanning the literature for this project, the authors initially cast a wide net to assess the degree to which the field has changed and expanded in the last decade. Techniques used to identify relevant literature included searching in relevant databases (such as Library Literature and Information Science Full Text and Library, Information Science and Technology Abstracts), scanning tables of contents of pertinent journals, examining publishers' websites to identify recent new monographs, collecting reports from organizations known to be involved in preservation-related research, and monitoring electronic discussion lists devoted to preservation and digital preservation issues.<sup>5</sup> This search uncovered more than 600 English-language sources published in the two-year period covered by this review. While the emphasis is still on research-oriented publications, changes in knowledge dissemination within the preservation field required the inclusion of many more electronic resources than were covered in past reviews, particularly in the areas of digital preservation and curation. This paper summarizes developments reported in the following genres: research articles, book chapters, and monographs; theoretical articles, book chapters, and monographs; substantial think pieces, including editor's introductions to journal issues and books; research reports; and certain articles appearing in the technical and professional literature (excluding some types of literature, detailed below).

The authors compiled a subject bibliography, available online, which includes citations to those materials that could not be reviewed in this paper given space limitations of the journal.<sup>6</sup> Categories of resources included in the online bibliography, but not this review, include technical leaflets, conference proceedings, audio and video (multimedia) resources, and web resources such as blogs and portal sites. The authors specifically excluded the following resource

categories from this review and the supplementary online bibliography: book reviews; announcements; brief news articles (such as one would find in *American Libraries*, *Library Journal*, *LC Information Bulletin*, *D-Lib Magazine*, etc.); brief editorials and opinion pieces, except for substantive editor's introductions as noted above; and reports on reformatting projects, unless they have been identified by the authors as case studies in best practices for digitization.

The authors organized the literature into five major areas of interest: The Physical and the Virtual: Libraries and Collections in Transition; Mass Digitization and Its Impact on Preservation Activities; Risk Management; From Preservation to Curation: Lifecycle of Digital Materials; and The New Preservationist.

### The Physical and the Virtual: Libraries and Collections in Transition

One overarching trend that has influenced the practice of preservation in libraries and archives during 2009–10 is the continuing, quickly accelerating transition of collections from the traditional library, where physical objects are primarily managed onsite, to the hybrid library. In the latter model, legacy collections continue to be maintained, often at offsite storage facilities, but development and growth of electronic collections are increasing rapidly.<sup>7</sup> These adjustments to the focus of collections and the nature of the library have significant repercussions for preservation activities and programs.

Despite the emphasis now being placed on digital collections and the virtual library, physical collections are still present and will continue to be around for many years, particularly archival and special collection material. Traditional methods of stabilizing the physical object for handling and use are still important to the well-being of collections and essential to researchers. Conservators continue to work on objects, paper, books, and textiles in an effort to repair and retard natural deterioration or provide appropriate housing for long-term storage. Thus the literature of preservation continues to address key issues surrounding the care of the physical artifact. In this section, and the following two sections, the authors address the preservation of the physical object and the maintenance of physical collections.

The literature also exposes the struggles of preservationists and conservators to integrate the demands of digitization and digital preservation with the responsibilities that physical preservation work already presents. Digital endeavors in the library alternately contribute to and compete with traditional preservation work in terms of resources. New projects either stand in isolation as concerns about the physical condition of materials and their longevity or are paired with a digital component to provide access

to the intellectual content. This interconnectedness makes a review of the physical or traditional side of preservation literature difficult to separate from the new digital preservation initiatives, although in this literature review the authors sometimes sorted the literature in a way that may make activities in the field seem more circumscribed than they are in practice.

### The Physical Artifact

The research and professional literature that deals with physical preservation and conservation reflects the maturity of this field in dealing with its perennial challenges: how best to safeguard collections by improving storage conditions and reducing damage from misuse, how to carry out treatments aimed at increasing the lifespan of circulating materials, and how to stabilize and protect fragile materials. Many articles merely synthesize and restate established information and standards for the preservation and conservation field.<sup>8</sup> These articles tend to be aimed at international audiences and new practitioners, providing rudimentary guidelines and standards for preservation and increasing the longevity of collections. Topics such as inherent vice and the need for stable environmental conditions are discussed in detail, with appropriate suggestions for reducing external causes of deterioration. (The Society of American Archivists' *Glossary of Archival and Records Terminology* defines inherent vice as "the tendency of material to deteriorate due to the essential instability of the components or interaction among components."<sup>9</sup>) While the studies and projects may be new, the information imparted and results presented are familiar to long-time practitioners in the field.

The underlying imperative for many of these basic articles is the need for a preservation program or policies in all libraries. Most provide ammunition for instituting or continuing preservation programs that focus on longevity for collections, training in care and handling or basic repair techniques, and often, justification for preserving digital collections.<sup>10</sup> While these articles accomplish the goal of conveying core preservation knowledge, they frequently do not discuss the costs of implementing preservation programs in an era of stagnant or shrinking budgets and insufficient staff resources.

### Treatments and Binding

While all conservation literature published in the last two years is outside the scope of this review, the authors wish to draw readers' attention to several key resources that will be of interest and direct them to the web bibliography for a more complete list of articles in this area. *Restaurator*, and various publications of the American Institute of Conservation and the International Institute for Conservation of Historic and

Artistic Works, continue to be significant sources of information about conservation work. Other sources that are new on the conservation scene are several electronic journals (*CeROArt*, *E-Conservation Magazine*, and *e-Preservation Science Journal*) that often include articles on library and archival material, particularly paper-based objects.<sup>11</sup>

Conservators often write about ethical issues surrounding the selection of appropriate treatments. Articles about treatments usually contain descriptions of conservation of individual items together with vibrant discussions of decision-making and techniques and their associated risks to the integrity or aesthetics of the object in question. For example, Brückle considers the benefits and risks associated with bleaching of paper documents and notes how conservators must always balance a treatment's desired aesthetic outcome with its potential for harm to the physical structure of the object: "Deciding on a bleaching treatment requires the conservation expert to foresee the results of prospective treatment both technically and aesthetically, a prognosticative ability that *always* functions as an advance screening tool by which the risk of treatment can be minimized."<sup>12</sup>

Surveying and documentation continue to be cornerstones of good conservation and preservation practice. As Fischer writes, "Documentation is considered a basic requirement and an essential component of any conservation measure."<sup>13</sup> Conservators such as Hanus and colleagues and Liu and Wang also describe surveys of the condition and content of materials under consideration for conservation treatment and how the results of those surveys play a critical role in the identification of at-risk materials and the selection of objects for conservation.<sup>14</sup> The most focused conservation articles deal with specific treatments accompanied by histories of the object or its cultural significance.<sup>15</sup> Depending on the article's audience, additional details include provenance, arrangement, and even how digitization efforts influence the conservation treatments.<sup>16</sup>

Conservation treatments in the form of repairs or application of chemicals for various purposes, such as the removal of adhesives or pollutants, or to counteract the deleterious effects of high levels of acidity in materials continue to be an important tool in the preservation toolkit when item-level action is required. Paper conservation scientists focus on such topics as corrosive inks, removal of pressure-sensitive tape, paper bleaching, document flattening, paper strengthening, deacidification, and cleaning techniques.<sup>17</sup> In their study of book conservation techniques in research libraries, Baker and Dube note an increased blurring of the lines for treatment of materials.<sup>18</sup> They observe that conservation work on specific items is now integrated into a workflow of best practices. Rare and valuable artifacts are treated individually when needed by specialists; otherwise, hands-on treatments focus on increasing the longevity of collections and making standard repairs where necessary.

Significant works in the area of historical binding have recently become available, including books by Etherington, Leutz, Lindsay, and Miller.<sup>19</sup> Etherington gives historical context for the integration of bookbinding knowledge into conservation. Interviews conducted by Leutz provide insight into current binding practice by contemporary practitioners. Miller's book helps librarians and historians decode the material nature of the bound volume. Lindsay's *Fine Bookbinding* is sure to become a well-thumbed resource for the book conservator seeking detailed instructions for basic and complex fine binding techniques using leather.

#### Reformatting Print Materials

Libraries create surrogates of print materials, also known as use or access copies, for various reasons: to protect originals from further damage, to replace originals if deterioration threatens to make originals unusable, or to enhance access by taking advantage of new technologies that permit analysis and manipulation of originals through, for example, optical character recognition of text to allow searching and magnification of the image.

A number of studies and projects discuss the use of microfilm to provide long-term access to physical content. Articles on this topic range from case studies, guidelines for decision-making, criteria for selecting digital repositories, and discussions of access methods and metadata.<sup>20</sup> Although microfilm was once the gold standard for reformatting print material and ensuring long-term access to its intellectual content, the survival of microfilming as a preservation tool is now in question. One is more likely to read discussions of how to convert microfilm to digital images than descriptions of new microfilming projects.<sup>21</sup> Yet microfilming is still used in many newspaper reformatting projects, both to ensure longevity of this information for centuries to come and to reduce the costs of digitization.

Conway has cautiously defined digitization for preservation as "an investment in the creation of lasting digital products," rather than as a method of preserving objects in the traditional sense of stabilizing deteriorating or at-risk materials.<sup>22</sup> As digitization activities have matured into programs within institutions and among members of consortia, key players in digital libraries and digital preservation have generated numerous best practice documents. Hurst-Wahl suggests that the field may wish to consider developing a universal set of guidelines governing selection, metadata schemas, scanning and quality control, and long-term preservation of resulting digital resources.<sup>23</sup> This standard could be very beneficial for normalizing practices in digitization and encouraging interoperability. Until the field prioritizes formal standardization of digitization activities, however, new resources such as Bülow and Ahmon's *Preparing Collections for Digitization* will offer useful compendia of

best practices for practitioners and administrators.<sup>24</sup>

#### Other Media Formats

While the brittle books crisis dominated the discourse of preservation in the 1980s and 1990s, the fragility of photographic and audiovisual material has become a significant worry for the preservation community during the last decade. Few libraries have media preservation specialists on staff, making assessment of rapidly deteriorating and obsolescing collections difficult. While interest in the content of the material may be strong, lack of expertise and dauntingly high reformatting costs present insurmountable hurdles for many institutions to overcome, particularly as librarians contemplate the needs of audiovisual material.<sup>25</sup>

Libraries and archives face many technical challenges in preserving photographic audiovisual materials. The physical and chemical composition of these materials often leads to their rapid decay, particularly in poor storage conditions, and makes them easily susceptible to damage because of careless handling. Collections of such material are often poorly documented or contextualized, though many contain significant and rare content.<sup>26</sup> The literature examined for this review reflects the continued interest in providing new information about the nature of deterioration of photographic and audiovisual material, and care on the physical artifact.<sup>27</sup>

The Getty Conservation Institute's recent edited volume on photographic conservation, which covers 150 years of technical information and research about the photographic medium, provides a welcome addition to the reference literature that gathers fundamental research and critical historical documents in one place.<sup>28</sup> The Getty also published an English-language edition of Lavédrine's helpful catalog of analog photographic processes, from daguerreotypes and heliographs to chromogenic prints and negatives.<sup>29</sup> This volume also includes information of care of these materials.

Similar comprehensive publications in the area of sound recordings and moving images would be greatly welcomed by preservation specialists; the field suffers from having few authoritative reference sources in this area. The few that have been published are often difficult to procure in North America and many are dated. Instead, the literature of audiovisual preservation often favors case studies of preservation and restoration, which combine historical context of the material being preserved with description of techniques used to play back and make a preservation copy of materials. As part of preservation projects, archivists often must investigate original methods of capturing sound and images, and contend with problems associated with conversion of analog signals to digital formats.<sup>30</sup> Reports on restoration work and contemplations of the ethics of restoration

and access often dominate the literature on moving image preservation, revealing an ongoing pattern of self-reflection about the nature of restoration work and how the boundaries between ethical and unethical actions should be drawn.<sup>31</sup>

As Clarke notes, preservation of mixed-format archival collections often requires “compromises between ideal physical conservation treatment, patron usage requirements, and staff resources,” given the varying needs of different formats that make up these collections.<sup>32</sup> Van Ness and Cox report that in the wake of Greene and Meissner’s “More Product, Less Process” (MPLP) revolution in archival processing, archivists often find themselves reducing or eliminating routine preservation tasks such as rote removal of rusting staples, separation of photographs from other materials, or flattening folded materials. These day-to-day activities are overshadowed when considering the costs of more expensive conservation treatments.<sup>33</sup>

### Preservation Inside and Outside the Library

As more and more libraries renovate and innovate to take best advantage of the square footage of the physical facility, library administrators are reconsidering the amount of space allotted to collections, service areas, and users. More collaborative working spaces and the ability to accommodate more users in the library rank high on most librarians’ wish lists. This reallocation of space often means that fewer physical collections are stored onsite and preservation workspaces may be moved out of the library building.

The shifts in collections and preservation work from onsite to offsite storage can have significant impact on collections and preservation activities. Collaborative efforts between consortiums for collection development have reduced the overall number of copies of many resources, as collections are increasingly shared across many institutions rather than being seen as belonging to only one library.<sup>34</sup> The Research Libraries Group (RLG) Partnership Shared Print Collections Working Group studied how a shared print policy for intra-collaborative cooperation might be devised.<sup>35</sup> Off-site storage also affects processing of materials. Morris reminds preservation professionals that when fragile materials are newly cataloged before off-site storage, they may require additional protection because of increased use given that patrons are now able to discover those items via the catalog.<sup>36</sup>

At the same time collections are being moved to remote storage, preservation and conservation operations (along with technical services) are being moved out of libraries and archives and into their own buildings. Martyniak surveys academic institutions to understand how they protect collections from the elements, from loss, and from additional damage during these shifts.<sup>37</sup> She identifies critical issues including devising methods of moving materials from the

main libraries to the conservation facility that minimize damage, and tracking rare and special collections as they move from vaults and controlled access reading rooms to labs often miles away. Guill voices concern that archives needing sufficient space for processing and storing collections are now competing with demands to use more of the building for users.<sup>38</sup> Less square footage devoted to these essential archival activities may have a negative impact in two ways: on archival security, because archival storage may be shifted to less desirable locations like basements and thus exposed to potential disasters such as floods, and on access to collections, because they cannot be processed as quickly with limited work space.

## Mass Digitization and Its Impact on Preservation Activities

### The Google Decision

Google’s book search partnership with some of the largest academic and public libraries in the world to digitize a significant corpus of their collections significantly affected the direction and scope of digitization projects and programs in libraries. While institutions once contemplated how they would be able to digitize more than a small percentage of their collections because of prohibitive cost and copyright restrictions, universal access to much of the world’s knowledge seems within everyone’s grasp within the next decade, thanks to the efforts by Google and other consortia such as the Open Content Alliance.<sup>39</sup> While intellectual property concerns continue to provide roadblocks to material still under copyright (see below), the technical and economic challenges seem to have been mostly resolved. Even the naysayers who worried about the fate of digitized materials, should Google no longer be a player in the years to come, may be at least partially reassured by the founding of HathiTrust ([www.hathitrust.org](http://www.hathitrust.org)) in October 2008, a non-profit organization devoted to the long-term preservation of products of Google Books and the Internet Archive digitization initiatives.<sup>40</sup>

### Mass Digitization, Preservation, and Libraries

Ignoring the projected impact that Google Books and other large-scale digitization activities will have on preservation activities in libraries is difficult. Conway, summarizing the findings of Rieger’s report on mass digitization, foresees that

most library books will reside in remote storage facilities, traditional preservation functions will reorient to support digitization quality control, and the artifactual value of books will pale in compari-

son to their digital surrogates—readily available for print-on-demand services but stripped of their tangible connection to their origins and history.<sup>41</sup>

He argues that the enthusiasm for online access to an ever-increasing number of books and other materials should be tempered by the sobering realization that librarians and users may be sacrificing certain types of information about objects themselves and the circumstances of their creation in a ravenous desire for quick and easy access to the content they contain.

Large-scale digitization shifts priorities and requires difficult decisions about resource expenditures. Conway notes a series of dilemmas that mass digitization efforts have engendered.<sup>42</sup> In a time of flat or declining budgets where most preservation dollars are spent on controlling environmental conditions in storage facility, administrators will have to choose between funding digitization activities and funding conservation treatments with the few resources left over in the preservation budget. Preservation-quality digitization, with its high standards for creation of acceptable surrogates that emphasizes full information capture, may be swept aside to increase productivity for digitization projects. Analog audiovisual material, which libraries are eager to have in more accessible formats, may become the victim of poor digitization decisions, which are made in absence of standards for audiovisual analog-to-digital conversion. The library and archival communities face a serious skills gap in the labor force in the areas of digitization and digital preservation, which is forcing institutions to use outside talent (i.e., vendors) until the profession has developed a critical mass of new information professionals equipped to manage this work, which may lead to declines in quality of work performed.

#### **Renewed Focus on Special Collections Materials: Revealing “Hidden” Treasures**

Because Google has taken the lead in converting print material to digital form, libraries have now turned their concerns to those materials that are not so easily scanned, indexed, or served to the masses. Providing digital access to special collections material in libraries and archives has become the new challenge for institutions in recent years. As Lynch states, “special collections are a nexus where technology and content are meeting to advance scholarship in extraordinary new ways.”<sup>43</sup> Digitization of historically and culturally significant manuscripts and visual materials allows researchers to use tools of analysis, such as text mining, visualization, and image enhancement, creating new avenues of inquiry that were previously inconceivable.<sup>44</sup>

In placing their attention on digitizing special collections and archival material, institutions hope to bring to light

materials that were previously “hidden”—i.e., inaccessible for reasons of lack of documentation, obsolete formats, poor physical condition, or other barriers.<sup>45</sup> Libraries and archives also have the opportunity to work collaboratively in bringing together materials of the same provenance that are physically held by various institutions; this endeavor has been described as virtual unification.<sup>46</sup> Collaboration with users of digitized material can result in increased contextualization of digitized material through added metadata and annotation.<sup>47</sup> Despite the benefits and opportunities that digitization of these hidden collections brings, libraries also must be wary of hidden costs, among them the expenses incurred to ensure long-term retention of the digital master files and the potential for damage to digitized originals as users increasingly seek the original after viewing the digital surrogate.

The fragility of special collections material can make digitization of these materials difficult. Deterioration and damage found in the original objects can introduce errors into digitized images of documents, which must be corrected using image processing technologies.<sup>48</sup> Special collections material requires significant item-level assessment to identify potential problems before scanning and also may need conservation treatment before digitization as well as significant postproduction descriptive work. All of these concerns make such material less amenable to systemization and streamlining.<sup>49</sup>

Rieger identifies a number of “principles of engagement” that must be considered before launching large-scale digitization initiatives for special collections and archival material, among which she lists the importance of developing a business plan to establish institutional principles, setting digitization specifications that “accommodate the versatile nature of special collections,” and weighing the consequences of quality control decisions.<sup>50</sup> The wisdom of her directives should provide guidance to institutions contemplating collaboration with commercial partners on special collections digitization initiatives.

#### **Legal Roadblocks to Large-Scale Digitization Initiatives (Copyright)**

Copyright restrictions often present a significant barrier to digitization projects. While digitization of public domain materials is relatively straightforward and unproblematic from the perspective of being able to copy and distribute a work online freely, other materials require permission of the copyright holder or holders.<sup>51</sup> For institutions wishing to digitize material, determining the copyright status of a published work can be time-consuming. If the publication date cannot be verified, or if the copyright owner cannot be found for a publication that should still be under copyright according to current laws, the library may decide not to move forward with digitization and digital distribution plans.

For those institutions that have been working with Google to gain access to digital copies of large parts of their collections, the recent overturning of the Google Book Search Settlement Agreement means that Google may be less likely to digitize orphan works whose copyright status cannot easily be determined. Lavoie and Dempsey, in their study estimating the number of books potentially still under copyright in library collections, could not determine how many orphan works may be lurking in the more than 12 million post-1923 books found in U.S. academic libraries, but suggest that if even 10 percent of that figure were orphans, the costs to research their copyright status would be significant and potentially be a deterrent to digitization of these materials.<sup>52</sup>

While the copyright issues surrounding book scanning and digital distribution have received the lion's share of attention in recent years, the problems are equally acute for unpublished works that archives and libraries wish to digitize. For special collections materials, the amount of time required to contact rights holders to request permission to display digitized material online also can be very time-consuming and potentially very expensive. Akmon reports that the biggest obstacle to getting permission is nonresponse to requests.<sup>53</sup> Archives have traditionally considered nonresponse the same as refusal to grant permission, and Akmon suggests that archives may want to reconsider this extremely risk-averse stance, as it means that significant percentage of documents in archival collections (sometimes as much as 30–40 percent of collections) cannot be made available to users online. Dickson reports similar difficulties with copyright clearance for archival materials and also recommends that a new definition of due diligence for manuscript and archival collections be developed that will define reasonable effort in copyright search and make it easier and less expensive to make such material available online.<sup>54</sup>

## Risk Management

### Environmental Conditions and Collections Care

Several articles reviewed for this project report on the effects of environment on collections, including the importance of establishing stable environmental conditions within cultural institutions, monitoring fluctuations, and selecting the appropriate monitoring devices or heating, ventilation, and air conditioning (HVAC) systems. Chang and Falk studied the stability of environments in mid twentieth-century buildings.<sup>55</sup> Their survey and subsequent analysis emphasizes the need for collaborative efforts “to design more environmentally sound archive spaces.”<sup>56</sup> Researchers also have examined the effects of air pollution and airborne fungi on deterioration of collections.<sup>57</sup>

Readers attempting to reduce vandalism of collections may find guidance in research conducted by Pérez, Cuadrado, and Cervera to determine user attitudes toward book vandalism, with the ultimate goal of developing intervention measures.<sup>58</sup> They found punishment (e.g., fines and charging replacement costs), surveillance, and exhibits featuring mutilated materials to be potential deterrents.

### Disaster Response

Response to and preparation for disasters continues to be an integral part of conservation and preservation management. The field of disaster response includes risk management, insurance, security of collections and buildings, and protecting materials from damage because of fire, flood, and other natural or manmade disasters.<sup>59</sup> Lunde and Smith, and Fleischer and Heppner note that risk management, disaster response and continuous operations planning, and security are all essential for protecting collections and institutions from theft, damage, and loss.<sup>60</sup> These disaster plans include preventing loss of digital resources, access to computers and databases, and minimal or no loss of revenue stream. Preparing for loss, preventing damage, and responding appropriately in the face of all types of disasters is essential for the economic and intellectual well-being of cultural institutions.

While resources written for cultural institutions tend to focus on recovery of collections, the new emphasis of disaster response efforts is the financial viability of the institution or the enterprise as a whole.<sup>61</sup> Plans for disaster response and prevention need to include decreasing risks during renovation projects and creating security in safe zones. Harris and DiMarco provide guidelines and basic policies for protecting patrons and staff during a crisis such as a bomb scare or a shooter.<sup>62</sup> Harris and DiMarco define lockdown as “an emergency protocol to prevent people or information escaping.”<sup>63</sup> How does one control the panic and protect individuals? Planning for these situations is the key to a safe outcome. At the same time, institutions must consider the safety of buildings and collections during renovation. Again this requires planning, vigilance, and constant communication to prevent theft, fire, and water damage by inattentive construction workers, while minimizing the potential for injury and fluctuations in the environment in renovated areas.<sup>64</sup> Oehlerts points out the critical need for better inventorying practices for collections.<sup>65</sup> As she notes, “A major component of library risk management is being able to precisely identify what you own.”<sup>66</sup>

### Preservation Planning and Programs

Preservation planning must include a thorough assessment of risk to collections; these activities are particularly important

for assessing the value of collection to provide appropriate insurance coverage. Galbraith and Seago report on the development of a survey instrument by insurer AXA Art that may be used to determine risk in the areas such as security, fire detection and suppression, inventory control, and emergency planning.<sup>67</sup> Bülow reports on a risk assessment to determine priorities in the area of preservation and reduce risk where financially feasible conducted by the National Archives of the United Kingdom.<sup>68</sup> The survey determined high risk to collections because of uncontrolled storage conditions, poor storage and retrieval practices, and careless handling during digitization and microfilming projects; actions were taken immediately to resolve these problems.

### Security

Using the word security in the broadest sense, failure to secure collections risks the loss of documentary heritage, collective memory, and intellectual property. In a special issue of *Library and Archival Security* devoted to security concerns in the archival environment, Cox and colleagues set the stage for discussing issues of security for collections, particularly archival materials.<sup>69</sup> They note that security must be considered from two perspectives; physical security of collections to prevent theft and mutilation; and accountability and ethics. Accountability is defined as making certain all materials are present, arranged to be findable, and accessible to the public.

Neff expands on the study by Cox and colleagues by highlighting forgeries of materials in cultural institutions.<sup>70</sup> In this case, forgeries include altered documents and dates, and falsified provenance. These types of forgery call into question the authenticity of the materials and the reputation of the curators. Griffiths and Krol focus on preventing insider theft.<sup>71</sup> They observe that thinking that staff members are more honest than researchers is naive and stress that one must be ever vigilant to prevent loss and publicize thefts when they happen.

### From Preservation to Curation: The Lifecycle of Digital Materials

In the last decade, many new sources on digital preservation and curation research have been established and others have expanded their coverage of digital preservation issues. Journals that have become essential reading for preservation professionals interested in these areas include *Ariadne*, *D-Lib Magazine*, *Information Standards Quarterly*, *The International Journal of Digital Curation*, and the *Journal of Digital Information*. Furthermore, many established journals have published special issues on digital preservation, such as *Library Hi Tech*, *Library Quarterly*, and *Library Trends*.

In addition to literature found in journals, research reports from the following organizations are often the first sources for information on groundbreaking projects in digitization, digital preservation, and digital curation.

In the United States:

- Association of Research Libraries (ARL)
- Council on Library and Information Resources (CLIR)
- Educopia Institute
- OCLC Research

In the United Kingdom:

- Digital Curation Centre (DCC)
- Joint Information Systems Committee (JISC)
- Digital Preservation Coalition (DPC)

### Definitions of Digital Preservation and Digital Curation

In the last decade, the areas of digital preservation and digital curation have emerged as new specialties for information professionals, as librarians, archivists, and curators have increased responsibilities to care for the products of digitization activities and born-digital materials. In 2007, the Preservation and Reformatting Section of the Association for Library Collections and Technical Services (ALCTS) drafted short, medium, and long definitions of digital preservation; the medium-length definition states, “Digital preservation combines policies, strategies and actions to ensure access to reformatted and born digital content regardless of the challenges of media failure and technological change. The goal of digital preservation is the accurate rendering of authenticated content over time.”<sup>72</sup> This definition reflects the changing understanding of what the phrase “digital preservation” connotes. Whereas it was once synonymous with digitization, the term now reflects a much larger set of responsibilities beyond reformatting activities.

Digital curation has an even greater scope than digital preservation. While it includes many activities that can be characterized as preservation-related, it encompasses all aspects of the lifecycle of digital objects. The DCC has defined digital curation as “maintaining, preserving, and adding value to digital research data throughout its lifecycle.”<sup>73</sup> Curation has a particular focus on the importance of data reuse by communities of practice, a function that is particularly important for the scientific disciplines but which also has significance for many other fields.

### Digital Curation and the Lifecycle Model

Digital curation encompasses tasks such as creation, appraisal, ingest, various preservation actions, storage, transformation of data and objects into new objects, disposal,

reappraisal, and migration. To represent this concept of curation, the DCC developed a model to illustrate the relationships between the different processes and activities.<sup>74</sup>

The DCC Lifecycle Model may be seen as complementary to the Open Archival Information System (OAIS) model, which was first developed by the Consultative Committee for Space Data Systems of the National Aeronautics and Space Administration (NASA) and later adopted as an international standard for archiving information (ISO 14721:2003). The OAIS model aims to establish the requirements for an archive “to provide permanent, or indefinite long-term, preservation of digital information.”<sup>75</sup> Dryden notes that the OAIS model is “a conceptual framework for systems design, not a blueprint,” and that “different implementation strategies are possible within the framework.”<sup>76</sup>

Both the OAIS and the DCC models are applicable to all types of information, not just scientific data, and have been widely adopted by institutions in the cultural heritage community. Similarly, curation is not a concept that is specific to the work accomplished by a particular discipline or industry, but may be applied to information management as it is practiced in any organizational environment. As Harvey points out, the DCC Curation Lifecycle Model “was not designed for any specific digital curation operation or for application to any particular discipline. It can be applied in a wide range of digital curation contexts, including institutional repositories, digital archives, and electronic records management.”<sup>77</sup> He notes that it is particularly valuable because it conveys the critical knowledge that successful preservation and reuse of archived data rely on good data design and capture of essential information about data from the point of creation. Constantopoulos and colleagues, and Dubin and colleagues have suggested refinements to the DCC Model that would incorporate additional information about usage and semantic knowledge about curated objects.<sup>78</sup>

### Creation and Use Patterns of Digital Material

The DCC Lifecycle model also is a helpful starting point in considering the progress that has been made in developing infrastructure for digital curation and designing tools to help achieve preservation and access goals. In the last few years, practitioners and researchers have focused significant attention on studying communities of practice and meeting technical challenges to support curation functions. In particular, the field has concentrated on the earlier part of the lifecycle by developing methods to study how users create, use, and reuse data. In a series of case studies, researchers from the JISC in the United Kingdom have examined a number of key communities in the hard sciences, social sciences, and engineering to identify patterns of data creation, use, reuse, and archiving through the Disciplinary Approaches to Sharing, Curation, Re-use and Preservation (SCARP) project.<sup>79</sup> The

purpose of the studies was to achieve “a better understanding of the diversity of researchers’ data practices, and of their needs and expectations of support for data management and preservation.”<sup>80</sup> Similar studies in the arts and humanities areas have been undertaken or suggested, one example being the work accomplished by Benardou and colleagues for the Digital Research Infrastructure for the Arts and Humanities project, which aims to provide “the foundations (strategic, financial, legal, technological and conceptual) for the timely design and construction of the digital infrastructure requisite for scholarly research in the arts, humanities and cultural heritage in Europe.”<sup>81</sup> Witt and colleagues offer guidance about how one might create data curation profiles, instruments that could be used to identify particular data forms that might be curated by an institution to support the work of particular domains or communities of practice.<sup>82</sup>

### Technical Challenges of Digital Preservation

The technical challenges of preserving digital materials are numerous and daunting. At every point in the curation lifecycle, preservation managers must perform certain actions on digital objects and maintain information about those actions. Each phase in a digital object’s lifecycle involves a sequence of events. Harvey notes that the seemingly simple act of ingesting an object into a repository involves many steps, including, but not limited to, identifying file formats, generating fixity values (such as a hash digest or checksum), checking for viruses, generating metadata records for objects, converting files to a preservation-ready format (often referred to as normalization), and assigning persistent identifiers to files.<sup>83</sup>

At the point when the information package, containing the object and associated metadata, is submitted to the archive, throughout its life in long-term storage, and when that object is retrieved from the archive for delivery to data requestors, events and changes must be documented to maintain the provenance of the material. To accomplish these objectives, digital curators require technical solutions integrated into all stages of the data lifecycle. According to Harvey, “The ideal is to collect metadata by automated processes close to the point of data creation so that the need for costly human input is minimized.”<sup>84</sup>

### Development and Evaluation of Digital Preservation Tools

The digital preservation communities in North America, Europe, Australia, and New Zealand have invested significant effort in the development of digital preservation tools and repository infrastructures. The complexity of managing objects in every phase of their lifecycle means that the possibility of any one institution or even consortia of institutions



building a repository environment that satisfies archiving requirements for every community of users is unlikely. Thus, given the enormity of challenge, this process of development has been highly collaborative. Many tools have been developed using open source development processes and have been distributed widely, available to anyone who wishes to download the source code. Examples of tools that have been made available to the public include the Library of Congress' Transfer Tools, the JSTOR/Harvard Object Validation Environment (JHOVE/JHOVE2), the National Library of New Zealand's Metadata Extraction Tool, and the National Archives of Australia's Digital Preservation Software Platform.<sup>85</sup> The literature contains several helpful articles published by developers or early implementers that explain the functionality of tools or report on tests of tools in experimental or production environments. Ashenfelder and colleagues explain how the Library of Congress Transfer Tools facilitate network transfer of digital files from data creators to the repository.<sup>86</sup> The toolset uses the BagIt specification, which consists of a virtual container accompanied by a manifest that helps to maintain the original organization of the files and also acts as a seal of authenticity that the files have not been altered in any way during the transfer process. Abrams and colleagues report on the development of JHOVE2, a format characterization tool that allows repositories to identify and validate file formats, and also extract key file characteristics (also known as significant properties).<sup>87</sup> These capabilities help repositories gather critical information necessary in preservation planning and developing action plans. While the development of individual tools to assist in particular activities such as format validation and integrity checks has been very helpful, Hswe and colleagues stress that digital preservation environments require the integration of tools into larger repository structures and workflows.<sup>88</sup>

#### Types of Preservation Repositories

Caplan categorizes digital preservation repository implementation into three models: distributed replication, repository and toolkit, and formal OAIS.<sup>89</sup> The first model, distributed replication, is typified by the Lots of Copies Keep Stuff Safe (LOCKSS) repository. In the LOCKSS system, a group of institutions creates a private network running interconnected LOCKSS boxes. These boxes maintain the integrity of digital materials stored on each computer through continuous polling among its members, which ensures that copies remain unchanged and that corrupted files are replaced with new copies when necessary. Caplan points out that this is essentially for a "dark archive"—LOCKSS-style repositories were not designed to serve users materials, but to be an archive of last resort.

The second model, repository and toolkit, is common in

Europe and Australia. In this scenario, institutions often run an institutional repository system such as DSpace or ePrints into which digital preservation tools can be integrated. It adds preservation functionality to systems that may not have initially been designed primarily to support preservation and curation activities. The European Preservation and Long-Term Access to Our Cultural and Scientific Heritage (PLANETS) project is an example of this model.

The last model, formal OAIS repository, is more common in North America. It is designed specifically to support preservation functions, from ingest to long-term storage to dissemination (e.g., the OAIS model). While tools are integrated into these systems at the time of initial distribution, implementers cannot add new tools as they are developed or swap out old tools for new ones (as can be done in the repository and toolkit model). The State of Florida's Dark Archive in the Sunshine State (DAITSS) system, Portico (the digital preservation service offered by ITHAKA), and various institutional repositories of national libraries, such as Koninklijke Bibliotheek, the national library of the Netherlands, follow this model of development.

As repository design becomes more sophisticated, the micro-services model, where functionality is no longer interdependent with repository architecture, has appeared. Abrams and colleagues describe the approach, pioneered by the California Digital Library, as

devolving function into a set of granular, independent, but interoperable micro-services. Since each of these services is small and self-contained, they are more easily deployed, maintained, and enhanced; at the same time, complex curation function can emerge from the strategic combination of atomistic services.<sup>90</sup>

#### Collaboration: Registry Services and Preservation Workflows

Developing tools, services, and repositories to support digital preservation and curation work is a highly collaborative process. Two areas benefitting from these joint efforts are data and registry services, and preservation workflows.

Data and registry services gather information from a variety of sources and make it freely available to the preservation and curation communities. Examples of registry services include format information registries such as PRONOM and the Global Digital Formats Registry (to be merged into the Unified Digital Formats Registry and the e-Journals Preservation Registry Service).<sup>91</sup>

Institutions work together, often within consortial arrangements, to develop effective preservation workflows that will benefit the field as a whole. Many are proof-of-concept exemplars that eventually may be incorporated into

production environments. The PLANETS project has created a series of tools and services that can be used together in a test bed environment to analyze the effectiveness of various preservation strategies.<sup>92</sup> The Personal Digital Archives and Library System (PeDALS) Project, which works within the LOCKSS model, seeks to “articulate a curatorial rationale that describes an automated workflow for processing collections of digital archives and publications.”<sup>93</sup> Developers have created a workflow for the Controlled LOCKSS (CLOCKSS) system, to make material openly available after “trigger events.”<sup>94</sup> Other institutions reported on the development of workflow procedures and processes in the literature, including University of Oregon, in the area of electronic records management, and digital imaging at the University of Maryland.<sup>95</sup> These reports should be seen as illustrative of the types of workflows under development.

### Metadata Standards for Preservation

The last decade has seen significant progress in the development of metadata for digital preservation. PREservation Metadata: Implementation Strategies (PREMIS), first released in 2005 (version 1) and revised in 2008 (version 2), provides librarians and archivists with the means for documenting information about the digital object, its required technical environment, and its provenance, while also empowering professionals with the ability to record details of future preservation activities.<sup>96</sup> PREMIS has become a key metadata standard for the digital preservation community and, according to Vermaaten, is often integrated with other standards such as METS (the Metadata Encoding Transmission Standard).<sup>97</sup>

Other notable developments in preservation-related metadata standards include the Repository eXchange (RXP) protocol, domain and format-specific metadata standards, and standards for embedding metadata in word processing documents. According to Caplan, Kehoe, and Pawletko, the Repository eXchange Package (RXP) protocol—a joint development by the Florida Center for Library Automation, Cornell University, and New York University—will facilitate transfer of materials between institutional repositories, solving problems of incompatibility between Archival Information Packages (AIPs) generated by different repository systems.<sup>98</sup>

Metadata standards for particular domains, formats, and applications also are under development. Otto reports on the current status of AES-X098B, the Audio Engineering Society’s audio object technical metadata standard for audio objects.<sup>99</sup> Otto identifies the critical need for a robust technical metadata standard for audiovisual material and explores the potential application of AES-X098B for other types of complex multimedia, particularly moving images.

Naumann, Keitel, and Lang describe the development

of a metadata schema for the Landesarchiv (State Archive) of Baden-Württemberg to handle information about heterogeneous digital archives.<sup>100</sup> This standard aims to manage metadata from a number of different formats and genres of information, including statistical primary data; data from records management systems (RMS) and geographical information systems (GIS); office files; digitized papers, parchment, maps and photographs; system manuals; and data descriptions. Some older databases also include paper documentation, which can result in hybrid objects (i.e., a database with paper documentation). The metadata schema includes descriptive, technical, structural, and fixity elements.

In the area of scientific metadata, Matthews and colleagues introduce the Core Scientific Metadata Model (CSMD), which was developed by the Science and Technology Facilities Council of the United Kingdom.<sup>101</sup> The CSMD model aims to “capture high level information about scientific studies and the data that they produce,” including information about the studies themselves and the people involved with them; annotations and indexing terms; publications associated with the studies; datasets, data files, and associated technical metadata; parameters of the studies, such as measurements used in samples and environments where data was collected; and authorization, indicating who may access and use study data.<sup>102</sup>

To assist curators in documenting files gathered through web harvesting activities, the International Internet Preservation Consortium (IIPC) has issued guidelines for implementing the Web ARChive (WARC) file format, which is becoming the accepted metadata standard for web archive files.<sup>103</sup> This document gives direction on best practices in file naming, record identification, recording of information about harvesting and processing actions, and converting ARC files to the WARC format.

Last, Sefton and colleagues report on techniques being used to embed metadata and inline semantics in word processing documents to support access as well as preservation activities.<sup>104</sup> These approaches are format-agnostic; the aim is for the technology to be usable in proprietary and open source environments (e.g., in Microsoft Word as well as in OpenOffice, with the Open Document Format (ODF) being the primary file format used). Semantic objects considered as candidates for embedding in documents include semantic terms, such as indexing terms or provenance information, block elements such as sidebars in technical manuals, and data visualizations.

### Preserving Authenticity of Digital Objects

One of the thorniest problems that digital preservationists face in creating and maintaining trusted digital repositories is how to guarantee the authenticity of digital materials over time. Archivists employ a number of methods to ensure

the authenticity of digital objects, including following best practices in data security and backups, metadata generation to track all activities in all phases of the objects' lifecycle, and the use of digital signatures and digital certificates for transfer of materials in and out of the digital archive.<sup>105</sup> Because digital objects and records can be subjected to many transformations over their lifecycle as archivists work to keep them accessible to users, preservation activities and information about provenance must be well-documented.

Another concept closely related to authenticity is the idea that a digital object possesses features particular to its format, document genre, and presentation that must be retained when the object is transformed for purposes of preservation (i.e., reformatted or migrated).<sup>106</sup> As Harvey notes,

To keep digital objects, make them accessible, and be able to process and use them over time, we need to know precisely what it is we want to keep. More specifically, we need to know which of the properties or characteristics of the digital object we must maintain over time. These properties or characteristics are known as significant properties.<sup>107</sup>

While the concept of significant properties is valuable for preservation professionals who study the nature of digital objects and try to build systems to maintain authentic objects over time, significant properties cannot be defined absolutely and universally. What makes an acceptable copy is often in the eye of the beholder—different communities will have varying requirements for what constitutes the critical features of a document.<sup>108</sup>

### **Risk Management and Preservation Planning for Digital Preservation**

Risk management for digital collections constitutes a key part of the planning process for digital preservation programs.<sup>109</sup> Several risk management frameworks and tools have recently become available that will be valuable aids in preservation and curation work.

The concept of the trusted digital repository (TDR) has become a central trope of the digital preservation discourse, as the field strives to build reliable systems and structures for long-term storage of digital materials. In 2007, the Center for Research Libraries and OCLC published the *Trustworthy Repositories Audit & Certification: Criteria and Checklist*, known as TRAC, for TDRs.<sup>110</sup> Several institutions, such as Cornell University and Columbia University, have used these criteria to assess risks to materials stored in digital repositories.<sup>111</sup> TRAC is currently under review to become an International Standards Organization (ISO) standard.<sup>112</sup>

Two web-based toolkits that hold promise for assisting professionals in preservation planning are the Digital

Repository Audit Method Based on Risk Assessment (DRAMBORA), developed by the Digital Curation Centre and Digital Preservation Europe, and Plato, developed by the PLANETS project. DRAMBORA “presents a methodology for self-assessment, encouraging organisations to establish a comprehensive self-awareness of their objectives, activities and assets before identifying, assessing and managing the risks implicit within their organisation.”<sup>113</sup> The developers of DRAMBORA used the TRAC criteria in creating their assessment framework. Case studies looking at how DRAMBORA has been implemented in the field are beginning to appear in the literature, such as that written by Innocenti and Vullo of the University of Glasgow.<sup>114</sup> Barateiros and colleagues have suggested that the risk management approach, primarily used at this stage to develop assessment criteria for digital repositories (i.e., TRAC), also should be integrated into the design process.<sup>115</sup>

Preservation planning is an essential part of risk management. While preservation administrators have had access to tools to create preservation plans for physical materials for many years (e.g., needs assessment surveys such as CALIPR, and disaster planning tools such as dPlan), they often were inadequate to plan for digital preservation requirements.<sup>116</sup> The preservation community now has a planning tool that is designed specifically for digital materials. Plato is described as a “decision support tool that implements a solid preservation planning process and integrates services for content characterisation, preservation action and automatic object comparison in a service-oriented architecture to provide maximum support for preservation planning endeavours.”<sup>117</sup> While Plato was not designed to accomplish collection-wide needs assessment, it does allow institutions to compare the effectiveness of different preservation strategies to make informed choices about how best to preserve digital materials, given the constraints of a particular institution's resources and the needs of its designated community of users.<sup>118</sup>

### **Economic Sustainability**

As part of an overall risk management policy, institutions also must consider the economic sustainability of digital preservation and curation programs. While short-term digital projects often have been well-funded by granting agencies such as the National Science Foundation, the National Endowments, and the Institute for Museum and Library Services in the United States, and by governmental agencies in Canada, Europe, and Australia, long-term digital preservation programs have had significant difficulty in sustainability, which includes developing a business case, establishing a business model, and measuring costs.<sup>119</sup> The Blue Ribbon Task Force on Sustainable Digital Preservation and Access recently studied the sustainability challenge,

with a focus on analyzing the reasons for market failure in developing feasible digital preservation solutions.<sup>120</sup> The task force report issued in 2010 created action agendas for the key players in the digital preservation field, including data creators, owners, repositories, and users to begin to address sustainability concerns in the United States. ITHAKA and PLANETS also studied the problem of economic sustainability in the United Kingdom and Europe. ITHAKA gathered case studies of how U.K. and European organizations are generating revenue and minimizing costs for digital preservation programs, finding that most programs rely on a mix of revenue generated from subscription, licensing, and consulting activities as well as host institution financial support—few programs are completely self-sufficient at this stage.<sup>121</sup> The recent white paper from PLANETS on the emerging market for digital preservation tools and services summarizes data from interviews with eighteen suppliers and vendors in the digital preservation arena.<sup>122</sup> The study found that legal obligation to preserve material, either for business requirements or to fulfill an organization's mission, is the key driver for digital preservation needs and activities now. Uncertainty about costs and potential economic benefits make constructing a good business model for digital preservation difficult, however.

### **The New Preservationist**

The preservation field has seen several respected graduate programs experience cutbacks or even closure. The recent demise of conservation and preservation administration programs at the University of Texas and elsewhere suggest that the preservation and conservation professions are in a period of retrenchment and transition.<sup>123</sup>

In reflecting on these changes, one has a strong sense that further differentiation and stratification among practitioners and researchers in the preservation arena is likely, particularly as more and more material to be preserved originates in digital form rather than being the product of a reformatting action. As digital material becomes ever more central to collections and endeavors, concern grows about how best to preserve those digital materials and who will take on the responsibility of long-term care. The recognition that the next generation of librarians and archivists must be equipped to manage all types of collections—in various analog and digital formats—in all manner of institutions, has brought about numerous changes in how preservationists and conservators are being educated. In the last decade, several programs focusing on media preservation, digital preservation, and digital curation have been established to meet these critical challenges for safeguarding collections and providing increased access to this material. The recent literature suggests that the preservationists of tomorrow may

possess a very different skill set from the generations that came before them.<sup>124</sup>

Educational programs tend to emphasize the differences in the skills required of physical preservation and digital preservation professionals, rather than stressing a holistic approach, which would equip students to understand both traditions and knowledge bases. While arguing that a single educational program could equip students with collections conservation hand skills and the technical knowledge of information systems and programming required to build preservation-ready institutional repositories is difficult, any program that aims to educate either conservators or digital curators must emphasize the importance of developing managerial expertise and economic savvy. Additionally, the convergence of libraries, archives, and museums suggests that the field will need professionals who are boundary-crossers as well as specialists.<sup>125</sup>

In the conservation field, practitioners have raised concerns that training based in academic programs, rather than conservation laboratories and in practice, will lead to conservators without sufficient preparation to actually perform the work required. Von Imhoff worries that the conservator emerging from current academic conservation programs lacks the hand skills required for basic repair and restoration tasks, despite an increasing knowledge of historical context and the science of conservation.<sup>126</sup>

Meanwhile, programs in digital preservation and archiving have been focusing on developing laboratory environments that will allow students to experiment with new software tools and repository environments developed by practitioners in conjunction with programmers. The focus for these new laboratories is an increased emphasis on providing experiential learning opportunities beyond what has been available previously. Bastian and colleagues report that a curriculum laboratory in development at Simmons College provides students with learning modules offering scenarios they may encounter in practice and that give them tools and guidance to develop problem-solving skills.<sup>127</sup> The educational content is being developed and tested in collaboration with several practitioner institutions and educational programs.

### **Continuing Education**

While digital preservation and curation programs and initiatives—such as NEDCC's School for Scanning and Digital Directions conferences, LYRASIS programs, and the University of North Carolina's Digital Curation Curriculum (DigCCurr) II project—have been established at several information schools across the country, Molinaro expresses concern that the knowledge and skills in these areas have not fully penetrated to the local level of practice despite such programs.<sup>128</sup> Local institutions, which lack access to basic information about best practices of digitization and digital

preservation, may make poor decisions when converting materials to digital form or when planning for storage or migration, leading to collections that have a poor chance of long-term survival. Molinaro states,

If we have any hope to preserve the digital record of our lives and collections there must be a coordinated effort that takes advantage of the years of work that has been put into the development of the practices that will provide the best shot at sustainability. People at the local level must be encouraged and supported to represent their collections and communities in a digital form that has a very good chance to persist over time. We must leverage the expertise that exists and make it easy for people at the local level to know what to do.<sup>129</sup>

One project that targets the need for information and expertise at the local level is the Digital Preservation Outreach and Education program, which is a new initiative of the Library of Congress National Digital Information Infrastructure and Preservation Program (NDIIPP).<sup>130</sup>

## Conclusion

The literature reviewed for this paper reveals a preservation field grappling with tremendous change. The authors reviewed and discussed literature in five areas: the tensions and challenges for preservation administrators as libraries embrace digital resources, mass digitization and its effects on the longevity of collections, increased awareness of risk management and disaster response, the need for digital preservation and curation, and the changing focus on preservation education in the digital age. Libraries are in the process of reinventing themselves and preservation practice will inevitably follow suit. As libraries become collaborative workspaces, making more room for users and shifting print collections and preservation activities offsite, preservation professionals will engage less in custodial activities and more in the work of making long-lasting, accessible digital products through the processes of digitization and digital curation. The future of the preservation field lays in effective implementation of digital technologies for collection building, strong leadership in standards and best practices development, and careful management of resources to continue to care for print collections and give increased attention to those materials that most need our attention (audiovisual and born-digital materials). While preservation professionals' responsibilities to care for the record of human activities continues to grow apace with the development of information technologies, those same technologies offer them opportunities to increase access to materials in

ways unimaginable in decades past. As Conway writes, "It is the end of preservation as we know it," but the authors believe that the profession has many reasons to be optimistic about the future.<sup>131</sup>

## References and Notes

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# Notes on Operations

## Kindles and Kindle E-Books in an Academic Library

### Cataloging and Workflow Challenges

Richard E. Sapon-White

*Academic and public libraries have begun to purchase e-book readers and make them available for check-out to their users. The nature of the e-books on these devices necessitates new approaches to workflow for acquisitions and cataloging departments. In addition, the application of cataloging rules and conventions presents a number of difficulties for catalogers. At the Oregon State University Libraries, a pilot project to purchase Kindles, load them with e-books, and make them available for circulation offered an opportunity to explore and understand the various challenges that these electronic resources present for traditional technical services units. The experience resulted in several innovations. A novel workflow largely bypassed the acquisitions unit, shifting purchasing procedures to the circulation unit. Use of the Provider-Neutral E-Monograph MARC Record Guide made most cataloging straightforward, although the lack of adherence to print conventions for some titles made cataloging a time-consuming endeavor. LibraryThing provided an additional avenue of discovery of the Kindle titles for library users.*

Whenever new information delivery technologies appear on the market, librarians are drawn to investigate them for their potential interest to library users. One such new technology is the e-book reader. Although portable e-book readers have been available since the RocketBook appeared in 1998, only in the past few years have they been widely accepted by consumers.<sup>1</sup> Forecasted sales of such devices have skyrocketed recently, from 3 million devices in 2009 to 6 million in 2010.<sup>2</sup> Their portability and capacity for storing thousands of books are attractive to readers. As their popularity has grown, thousands of titles have become available for downloading.

The Kindle, a portable e-book reader developed by Amazon and launched in 2007, provided the company with a way of maximizing sales of trade and other publications by catering to the wants of the digital public.<sup>3</sup> Although not the only e-book reader, as of November 2010, 47 percent of e-book reader owners had a Kindle as compared to the iPad (32 percent) and Sony Reader (5 percent).<sup>4</sup> Amazon's Kindle continues to lead in sales, accounting for 59 percent of e-readers shipped in March, 2011.<sup>5</sup>

Libraries have started to purchase e-book readers for circulation to their patrons.<sup>6</sup> As with any new technology, libraries need to examine whether and

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Submitted June 2, 2011; tentatively accepted, pending modest revision August 16, 2011; revision submitted September 20, 2011 and accepted for publication.

how e-books designed for proprietary devices, such as the Kindle, can be accommodated within their current operations and services. The purchase of e-book readers has ramifications for collection development, acquisitions, cataloging, and circulation policies and practices.

In 2009, Oregon State University Libraries (OSUL) decided to conduct a six-month pilot project to see if library users would borrow Kindles preloaded with e-books. Kindles were chosen over other e-readers because of their popularity and the large number of titles available for them. This paper describes the challenges presented by the acquisition and cataloging of e-books for the Kindle, specifically examining the changes to technical services workflow and the difficulties encountered in the application of cataloging rules.

### Literature Review

A considerable body of library literature deals with many aspects of e-books, such as licensing issues, e-book implementation in academic libraries, and the use of e-books by students and faculty.<sup>7</sup> In much of this literature, the e-books discussed are aggregations of titles purchased from vendors in package deals and accessible over the Internet.

What few articles do discuss e-readers in academic libraries tend to focus on circulation issues and popularity among users. For example, a literature review by Tees looked at the use of e-book readers at universities, focusing on their use as replacements for textbooks as well as loan policies and the brands of e-book readers being purchased.<sup>8</sup> Similarly, Waterfield surveyed public and academic libraries to assess the degree to which they have purchased e-book readers and made them available to their users.<sup>9</sup> While he found widespread use, his survey focused primarily on circulation

periods, loan policies, and popularity instead of technical services issues.

An appendix to Waterfield's survey does provide the sequence of procedures followed at Suffolk University when an e-book is purchased for the Kindle.<sup>10</sup> Amazon e-mails a receipt to Suffolk University's head of technical services, who then catalogs the e-book for the local integrated library system. The location of each e-book appears in the catalog as "Kindle."

No literature describes the impact of e-book readers on workflow in technical services or specifically addresses the cataloging issues associated with e-books stored on e-book readers.

Cataloging e-books of any variety involves decision making in the application of cataloging rules. Bothmann described for each area of bibliographic description the application of such rules to e-books.<sup>11</sup> In contrast to the Program for Cooperative Cataloging (PCC) approved provider-neutral e-monograph guidelines (discussed below), he considered e-book readers to be direct access devices, much in the same class as CD-ROMs and floppy discs.<sup>12</sup> He made the case for cataloging e-books as unique manifestations rather than facsimiles of their print versions. Bothmann suggested that e-books be classified for purposes of virtual browsing as well as for collection assessment purposes. While detailing the specific cataloging rules well, he did not discuss the kinds of difficulties, many of which concern the challenges of locating basic cataloging data, encountered in the pilot study at OSUL.

Martin and Mundle also addressed the issue of cataloging e-books.<sup>13</sup> Their focus was on the quality control of vendor-supplied bibliographic records for a vendor-specific packaged collection of e-books.

In 2009, the PCC approved the provider-neutral e-monograph guidelines.<sup>14</sup> These guidelines prescribe an approach to cataloging e-monographs when they have multiple distributors.

Usually, the application of standard cataloging rules would result in the creation of multiple bibliographic records with identical data with the exception of the data for the distributor. The provider neutral guidelines advise omitting specific distributor data and instead use the print edition's cataloging data supplemented by additional fields indicating the electronic nature of the work.

### Setting

Oregon State University is a land, sea, sun, and space grant institution with approximately 19,000 students and 1,800 faculty. The OSUL holdings include more than 1.4 million volumes, 14,000 serials, and more than 500,000 maps and government documents. A main library and veterinary medicine library on the Corvallis, Oregon, campus are complemented by two branch libraries serving remote facilities of the university.

The libraries acquire approximately 15,000 monographs annually in addition to receiving approximately 5,000 government documents. Approximately 95 percent of the firm-ordered and approval plan monographs have copy on WorldCat (either Library of Congress- or member-contributed) with full-level cataloging including call numbers and subject headings. Most cataloging copy is downloaded in a "fast-cat" process by a paraprofessional, although a shift to shelf-ready books with an accompanying file of bibliographic records is currently underway and will result in moving cataloging functions to the acquisitions unit. Serials are even more likely to have cataloging copy in WorldCat and only rarely require original cataloging. The head of cataloging is the only professional cataloger in the unit, with time split between administering the unit and providing original and complex copy cataloging. The cataloging unit participates in the

PCC's Name Authority Cooperative Program (NACO), Subject Authority Cooperative Program (SACO), and Cooperative Online Serials Program (CONSER). OSUL contributes catalog records to Summit, the union catalog of the Orbis Cascade Alliance (a consortium of academic libraries in the Pacific Northwest).

The OSUL Strategic Plan calls for the libraries to "change the information landscape at OSU by providing faculty and students with the information they require, whenever and wherever they require it."<sup>15</sup> Since 2008, OSUL has been actively acquiring packages of e-books from vendors, primarily in the areas of earth and environmental science, biomedical and health sciences, mathematics, and statistics. This e-book purchasing policy complements one of purchasing e-serials whenever possible as OSUL moves from a primarily print institution to an increasingly mixed print-and-electronic one.

### Pilot Project

For this pilot project, a task force was formed in late spring 2009, and charged by the library's administrative management team with developing a workflow and procedures for purchasing, downloading, and cataloging Kindle e-books. The task force also discussed circulation rules, staff training, and promotion of the Kindles on campus. The three task force members represented collection development, public services, and circulation. The task force consulted with cataloging, acquisitions, and circulation personnel to plan workflow for the Kindle titles through those areas.

In the summer of 2009, OSUL purchased six Kindles: five six-inch Kindles, and one larger Kindle DX. The purchase of Kindle e-books began soon afterward, with cataloging of these titles completed by the cataloging unit head. About midway through

the project, after the cataloging unit head had cataloged the first set of fifty-two titles, he trained a paraprofessional in the use of the Kindle and the cataloging of Kindle e-books, including application of the provider-neutral e-monograph guidelines from the PCC.<sup>16</sup> After training, the list of newly purchased titles was sent directly to the paraprofessional for both original and copy cataloging.

OSUL purchased the first set titles before the Kindles were made available for circulation. These included literary classics, popular titles, guides to cities and parks in the Pacific Northwest, study guides for students, style manuals, and introductory works on science. The head of collection development decided to purchase these titles because they would appeal to students and faculty, thus increasing the likelihood of the Kindles' circulation.

One resource initially purchased for the Kindles was a blog about Portland, Oregon, with daily updates. The issues surrounding the management of this integrating resource proved insurmountable. Updates required daily downloading, but because they could be downloaded by library users, tracking these daily downloads when the device was checked out would have been impossible. In addition, tracking daily updates on multiple devices was considered onerous. Consequently, the blog subscription was cancelled. Newspapers and other serials available on the Kindle presented similar problems with tracking check-in of issues and so subscriptions for these, although initially considered, were not purchased.

Five Kindles were placed in circulation in November 2009, with one of the six-inch Kindles reserved for use in the cataloging unit so that new titles could be viewed readily. Once the Kindles were advertised as available, they were quickly checked out. Users found and requested already-purchased Kindle titles through the

library's catalog or via a Kindle webpage on the OSUL website. All of the libraries' Kindle titles were available on each Kindle. All Kindles circulated for two weeks with no renewals. One staff member in circulation was designated as the lead for training, monitoring the program, and responding to questions.

During the pilot period, from June through December 2009, cataloging problems were noted as encountered by the cataloging unit head. Other information for this paper was gathered from e-mail correspondence, meeting minutes, and interviews with pilot project staff.

### Workflow Changes

In the usual workflow for print monographs (see figure 1), orders are sent to the acquisitions unit for encumbering funds, assigning a purchase order number, placing the order with the vendor or publisher, and creating an order record in the library's catalog. Physical pieces, whether books, DVDs, or CDs, arrive several days to several weeks later. After acquisitions personnel check pieces against invoices, the materials are sent to the cataloging unit. If cataloging copy is available in WorldCat, a library technician 2 downloads a record for the work and edits it. If cataloging copy does not exist, a librarian or library technician 3 creates an original record. After physical processing, the piece is sent to be shelved.

Once the collection development librarian selected Kindle e-books for purchase and passed their titles along to the circulation unit, the workflow developed by the task force differed significantly from that for print books (see figure 2). The basic steps were as follows.

1. Circulation staff purchased the titles from Amazon using a gift card and downloaded the new e-books to each of the Kindles.

2. Circulation staff added the new titles to a LibraryThing collection.
3. Circulation staff notified the cataloging unit as to which titles had been purchased.
4. The cataloging unit completed the cataloging of each title.

Each of these steps is described in greater detail below.

#### Circulation's Role in Purchasing E-books

Once the collection development librarian had selected e-books for purchase, she provided the titles to the circulation unit. A point person for the project in that unit would then place the order directly with Amazon either via the Kindle reader's wireless connection or using a desktop computer via Amazon's website. When preparing for this step, the task force consulted with other libraries that procure books from Amazon and decided to use gift cards in increments of \$250 for making these purchases. Because purchased e-books were immediately downloaded and available to library users, no order records were created in the integrated library system and no purchase orders were generated to request shipment of a selected title from the publisher. A history of purchases on the Amazon website provided a record of these purchases for auditing purposes. Circulation staff notify an office specialist in the library administration when the available amount on the gift card is low. The office specialist can provide a total of expenditures made for Kindle e-books, but does not track the amounts for each title purchased. The role of the circulation unit in this step to the exclusion of acquisitions staff was novel.

One consequence of not having purchase orders in the integrated library system was that library users were not aware of titles that had been ordered, as they would be for firm orders. On the other hand, the time

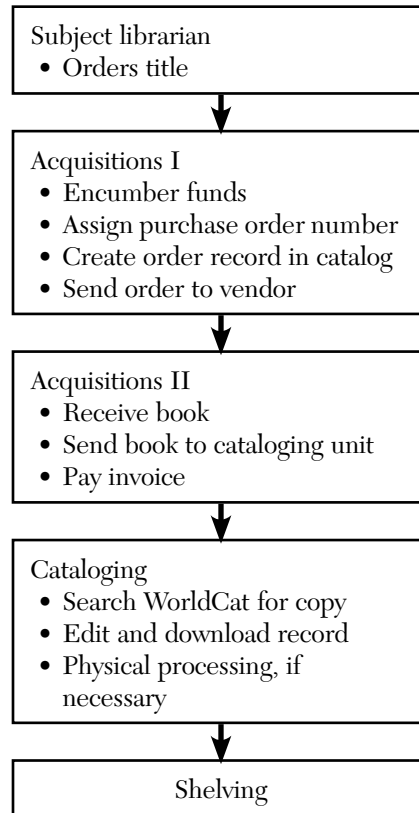


Figure 1. Conventional Workflow

between purchasing a title and the appearance of a bibliographic record for it in the catalog was much shorter than that for print monographs.

Kindle titles were (and continue to be) ordered in batches of three to seven titles at a time. Circulation staff downloaded all purchased titles onto each of the Kindles, providing users with the full complement of the libraries' Kindle e-books.

#### Circulation's Role in Resource Discovery

Early on, the task force discussed the discovery methods by which users could find Kindle titles. Although traditional cataloging in the library catalog and WorldCat provide good access, neither of these avenues features an obvious way to see all of the Kindle titles in one list. A user can do a call number search on "Kindle e-books" to

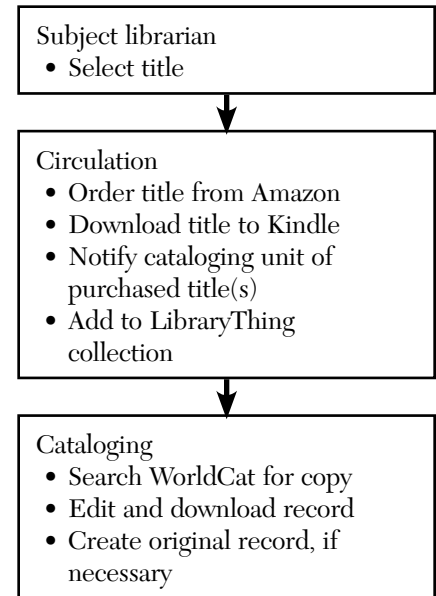


Figure 2. Kindle E-Book Workflow

retrieve all of the records for the Kindle titles, but most users are unlikely to think of this. Consequently, circulation staff created a LibraryThing collection listing all of the OSUL Kindle titles, initially featuring the collection in a box on the OSUL homepage. The box displayed book covers with links to LibraryThing's website for descriptions of the titles. Following the pilot, the circulation staff worked with the OSUL web team to create a page devoted to the Kindle program (<http://osulibrary.oregonstate.edu/kindle>) featuring an explanation about what Kindles are, OSUL circulation rules for Kindles, the LibraryThing box, and a link to an online reservation form for the Kindles.

#### Notifying the Cataloging Unit

To catalog Kindle titles in a timely manner, catalogers needed to be notified once the new titles were downloaded. In the print material workflow, acquisitions staff perform this function by delivering new pieces to the cataloging unit. For the Kindle titles, no such pieces are delivered. Instead, circulation staff send an e-mail message

to the head of cataloging to let him know that new titles had been purchased. However, not having been involved in acquisitions work previously, circulation staff did not realize the significance of this step and did not notify cataloging after every purchase. Early in the pilot project, the cataloger sometimes noticed titles on the Kindle that were not in the latest e-mail message from the circulation staff. The cataloger then would contact the circulation unit to determine whether the new titles actually had been purchased and were ready for cataloging. To improve communication between the units, circulation staff agreed to send lists of newly purchased titles to the appropriate catalogers as soon as purchases were made. This eliminated the need of the cataloging unit to check with circulation about new titles. Nevertheless, because titles were available immediately following purchase, occasionally catalogers noticed the appearance of a new title on a Kindle before notification had been received from the circulation unit.

### Cataloging

Before the cataloging unit began its work on the Kindle e-books, the task force made a number of decisions that affected their catalog records. Early on, the task force investigated how other libraries cataloged Kindles and Kindle e-books. The Eastern Shores Library System in Sheboygan, Michigan, chose to create records for each of the devices they had purchased, with fiction and nonfiction titles on separate Kindles. The catalog record for each device listed the titles stored on it, allowing for title access in the system's catalog. This method allowed for title access only in the local system and did not utilize WorldCat and its ability to provide widespread access to a library's holdings. Stanford University similarly cataloged the device, but no evidence could be found of how the titles

could be searched in their catalog. North Carolina State University created original records for each Kindle title, adding an edition statement of "Kindle ed." Titles were not classified; instead, a call number of "KINDLE E-BOOK READER #" was assigned (where "#" represented the number of the device). Because multiple titles are on each device, a single call number is used for several titles.

The task force decided, on the advice of the head of the cataloging unit, to provide full cataloging for each title purchased to allow access by title, authors or editors, and subject headings, if any, via the local catalog, WorldCat, and Summit. Because titles were stored on the e-readers, with the Kindles kept at the circulation desk, these e-books did not need a Library of Congress Classification call number for location purposes. Instead, all of the Kindle works were assigned a local free-text call number (MARC field 099) of "Kindle eBook." Library staff could then quickly find all Kindle e-book titles by doing a call number search for "Kindle eBook" in the library's catalog. Library users were directed to the circulation desk of the Valley Library (the OSUL main library and the only facility with Kindles) for all of the Kindle titles by a location display of "Valley Circulation."

As titles were received from circulation staff, the head of cataloging searched each one in WorldCat to determine whether a bibliographic record for the e-book was available. If no usable record was found, the unit head would create an original one. This was the case for approximately a third of the titles in the pilot study. If a usable record existed, the unit head would pass along the titles and e-reader to a paraprofessional for copy cataloging. (As mentioned previously, the paraprofessional took over all cataloging midway through the pilot.) Once OSUL's holdings symbol was added to the WorldCat record, the Kindle titles could conceivably be requested

for interlibrary loan (ILL) either via WorldCat or through Summit, the Orbis Cascade Alliance union catalog. OSUL chose not to allow interlibrary lending of the Kindles. Although the pilot study task force and head of cataloging initially sought a way of suppressing the Kindle records from Summit and WorldCat to avoid ILL requests, they decided it was simpler to reject the few incoming loan requests when they were made.

### Using PCC Vendor Neutral E-Monograph Guidelines

Just as OSUL began purchasing Kindles, the PCC released its provider-neutral e-book cataloging guidelines.<sup>17</sup> Adopting the PCC guidelines meant that original records could be readily derived from those for print editions with only a few MARC fields added to reflect the electronic nature of the manifestation. These fields included the physical description for electronic resources (MARC field 007), additional material characteristics (MARC field 006), the general material designation "electronic resource" (MARC field 245, subfield h), and a source of description note (MARC field 588). This greatly increased the speed at which such records could be created if the original paper edition could be identified. Only three out of the forty-six titles (7 percent) published since 2001 lacked sufficient information to identify the print edition on which the Kindle version was based. For older titles, such as nineteenth century classics, identifying the original print edition was difficult and often impossible. This problem is discussed in greater detail later.

A second issue that arose in applying the provider-neutral e-monograph guidelines was deciding if they applied to e-monographs housed in a physical device. The guidelines were originally written to apply to remotely accessible e-monographs, not e-monographs that were encoded on physical media

such as CD-ROMs. The Kindle titles fell into a middle ground, where the e-monographs are downloaded from a remote site but are used on a physical device. Despite this ambiguity, OSUL decided to apply the guidelines to the Kindle titles. Midway through the pilot project, in September 2010, an FAQ on the PCC site explicitly stated that the provider neutral e-monograph guidelines could be applied to e-reader monographs.<sup>18</sup>

### Copy Cataloging

While the PCC guidelines simplified cataloging at OSUL, records compliant with those guidelines were not necessarily available for all of the Kindle e-books that OSUL was purchasing. For almost 75 percent of the e-books, multiple records were retrieved in WorldCat. In choosing a record, preference was given to one that was provider-neutral. If none existed, as was often the case, a record with an edition statement of "Kindle ed." was usually found. Although such records did not conform to the provider-neutral guidelines, as a practical matter, they were used with little editing to speed the process of cataloging. These "Kindle ed." records may be merged with guideline-compliant records at some point in the future. If such merges happen, the local bibliographic record in OSUL's database should be replaced, although currently OSUL does not subscribe to any bibliographic updating service. If cataloging copy was retrieved for an e-book that was neither vendor-neutral nor had the "Kindle ed." edition statement, the most complete record was used and adapted using the PCC guidelines.

### Original Cataloging

For a quarter of the Kindle e-books, no copy was found and an original record needed to be created. The process of cataloging the Kindle titles raised several difficult issues. The absence of

traditional printed book conventions, such as title pages and page numbers, and the lack of publication and edition information for many Kindle e-books made creating quality bibliographic records challenging.

One of the first steps in cataloging is to select a chief source of information so that the cataloger can transcribe the bibliographic data found there. For electronic resources, the *Anglo-American Cataloguing Rules, 2nd ed.* (AACR2) rule 9.0B1 states that the resource itself is the chief source, taking formally presented evidence from a title screen or other parts of the resource.<sup>19</sup> Similarly, *Resource Description and Access (RDA) 2.2.2.2* states that if the resource consists of images of pages, the preferred source of information is the image of the title page.<sup>20</sup> Because Kindle e-books are, in most cases, electronic versions of print books, one might reasonably expect to find a title page with title, author, and publication data. Although many Kindle e-books have a "cover" and a title page that may show the title and the name of the author, other bibliographic data, such as the edition, name of the publisher, place and date of publication, or ISBN may be missing. For example, the Kindle version of *The Complete Charles Dickens Collection* has no title page. It opens with a table of contents listing each title in the collection. No publishing data are provided anywhere in the e-book itself.

When such information is not available from the resource itself, AACR2 9.0B1 allows the cataloger to take it from online documentation about the resource.<sup>21</sup> (RDA rule 2.2.2.2 states the preferred source can be another source.)<sup>22</sup> For Kindle e-books, users can connect to Amazon's website via a wireless connection to find more information about the e-book. The website often will contain data such as the publisher's name or ISBN. While these data are useful when present, the website does not consistently

provide all of the necessary cataloging data. For example, Amazon's website records that the Kindle version of *The Complete Charles Dickens Collection* was published March 31, 2009, but no publisher is listed nor is an ISBN given. The editions of the individual titles that make up this collection are not listed on either the website or in the e-book itself.

The nature of Kindle e-books presents additional challenges for fully cataloging these works because they differ from both conventional print resources as well as other electronic resources. For example, in coding the MARC field 007 (Physical Description Fixed Field (Electronic Resource)), the cataloger must determine how to code subfield \$b (specific material designation). The Kindle titles are not in a physical format, although they exist on a physical device in electronic format. They are not exactly remotely accessible either because OSUL was working only with those Kindle works that have already been downloaded to the device. Only code "z" (Other) is therefore appropriate.

Ascertaining the "extent of item" (i.e., MARC 300 (Physical Description Area), subfield \$a, which gives the number and specific material designation of the units of the item being described) for the Kindle e-books is impossible. The PCC provider-neutral e-monograph guidelines state that, if available, the pagination of the resource should be included in parentheses following "1 online resource."<sup>23</sup> Because Kindles present e-books on pages, with device buttons for navigating to the next or previous page, one might think that the extent of item could be easily determined. All Kindle e-books, however, are without traditional pagination; in its place, the Kindle provides a location code at the bottom of each page for navigation. These location codes are not static; they change if the user adjusts the font size. Because of this, no pagination is available for recording and the



generic “1 online resource” is recorded unqualified. When copy cataloging such a title using the provider-neutral e-monograph guidelines, the pagination is deleted from the MARC 300 field, if it is present.

Because publication information may be missing from the Kindle version of a printed work, identifying the original edition of a title can be difficult. This is especially true for public domain titles, such as the many literary classics that Amazon makes available for the Kindle. For example, the Kindle version of *Jane Eyre*, illustrated by F. H. Townsend, has no edition statement on the “cover” or on the table of contents page, which is the title page substitute in this case. The table of contents provides the title, author, illustrator, and the company that converted the text to electronic form. No date of publication is recorded for either the electronic version or the original print edition. Paging ahead, however, one finds that the prefatory matter includes a “note to the third edition” dated April 13, 1848. This date is not sufficient to identify the edition. A search of WorldCat for *Jane Eyre* published in 1848 retrieved editions published by at least ten different publishers in the United States and England. The edition illustrated by F. H. Townsend, however, was published in 1897. This fact can be determined by searching WorldCat for the illustrator’s name. If checking the webpage on Amazon for the Kindle edition of *Jane Eyre*, a cataloger would discover the number of pages in the print edition and the date of publication of the Kindle version, but no indication as to which print edition had been digitized. In sum, the process of determining the original print edition can be time-consuming for titles that have appeared in many editions. The lack of publication information and print conventions may not trouble many users, but they do present difficulties for catalogers and scholars who require more detailed information.

### Brief Records

Six of the Kindle e-books purchased for the pilot project provided no authors, edition statements, or publishers and no print equivalents could be found on searching WorldCat. For these, short catalog records were created that appear only in the local catalog and were not contributed to WorldCat. The short records consist of the title, at least one subject heading, and the generic “Kindle eBook” call number. With such little data to identify the works, the cataloging unit head decided that the resulting bibliographic record was of dubious value.

### End of Pilot and Future Research

The pilot project concluded two months after the Kindles were made available for circulation. The response by OSU students, faculty, and staff was immediate; all of the Kindles were checked out within the first day. By January 9, 2010, the Kindles had circulated ten times with 110 user requests waiting in the queue. At that point, the library administration decided to purchase an additional twelve Kindles to handle the great interest in these devices and reduce the backlog of holds being placed by users, primarily students. Throughout the pilot and continuing to the present, OSUL allows users to purchase Kindle e-books for the library’s devices, up to a \$20 limit. This fact may contribute to the popularity of the Kindles at OSU.

If e-readers become a more prevalent service offered by academic libraries, further investigations into the changes and challenges that they bring to technical services units, including both acquisitions and cataloging, would be informative. These might include studies that quantify the time saved by the application of the PCC vendor neutral e-monograph guidelines or the application of *RDA* to the cataloging of works for e-readers.

### Conclusion

OSUL’s experience with acquiring and cataloging e-books on the Kindle has highlighted how these information resources differ from conventional print resources as well as other electronic works. Staff have had to make changes to the traditional workflow to accommodate these titles. Catalogers have grappled with scant or elusive bibliographic information as well as coping with applying cataloging rules to these e-resources.

Traditional library workflows needed to be adjusted significantly. While OSUL has become accustomed to the blurred line between acquisitions and cataloging, the incorporation of the circulation department into technical processing produced a radical departure from past workflows. Good communication between the departments helped to resolve some initial confusion and improve this workflow.

Another radical change to workflow occurred within the acquisitions unit. Acquisitions staff have traditionally handled the issuing of purchase orders, for both print and electronic formats, transmitting these to the book vendor and, if necessary, sending claims for unfilled orders. None of these steps occurs in the workflow for the Kindle e-books, resulting in a great savings of time and effort. The acquisitions unit is now excluded from the acquisition of these particular library resources and does not maintain any kind of accounting trail for them. Order documentation on the Amazon website via the gift card account will make the auditing of these purchases much different from a traditional audit.

The greatest challenge in cataloging Kindle e-books was not so much the application of cataloging rules, but locating the necessary bibliographic data. The need to search for this data in the work itself or on the Amazon website made cataloging less-efficient

and very time-consuming because the cataloger must search in several places before concluding that the data do not exist. The Kindle e-books' lack of print book conventions, including title pages and publication information, presented an additional obstacle to quality cataloging. In more traditional media, scarce bibliographic data would allow the swift creation of a relatively skeletal bibliographic record.

On the other hand, accelerating the cataloging process is possible using the guidelines for provider-neutral e-monograph records, allowing for the derivation of records from those for print versions. Once a cataloger selects a print record, the number of edits required is small and provider-specific information is avoided. Most of the works purchased by OSUL for its Kindles were recent popular works with readily identifiable publication data; the speed at which they could be cataloged helped offset the extensive time consumed by cataloging the works for which such data were difficult to ascertain. A time study could help determine how much time it takes to catalog a Kindle work as compared to other versions in print or on another electronic platform.

E-book readers are still a relatively new phenomenon and, as with many new technologies, come with a variety of proprietary platforms and standards. OSUL's experience with Kindles offers one approach to integrating these new devices into libraries. Despite obstacles, OSUL staff succeeded in creating a new workflow for these resources and ensuring quality cataloging.

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# Book Reviews

Norm Medeiros

***Describing Electronic, Digital, and Other Media Using AACR2 and RDA: A How-To-Do-It Manual and CD-ROM for Librarians.*** Mary Beth Weber and Fay Angela Austin. New York: Neal-Schuman, 2011. 301 p. +1 CD-ROM. \$80 paperback (ISBN 978-1-5557-0668-5).

During this period of evolving and emerging standards and best practices for the description of resources collected in libraries, there will inevitably be a number of publications and tools aimed at providing a practical and constructive method to ease the transition from cataloging publications in single databases to resource description across disparate systems. One of these publications is *Describing Electronic, Digital, and Other Media Using AACR2 and RDA*. In its introduction, the authors—Mary Beth Weber and Fay Angela Austin—clearly state that their purpose in writing this how-to-do-it manual is “to provide a source of useful information and ideas for catalogers who are charged with creating descriptive records in the rapidly changing environment of resource description for digital and nontangible formats” (xiii). In doing so, the authors offer a solid introduction to the concepts behind the Functional Requirements for Bibliographic Description (FRBR) in an attempt to explain how FRBR informs the new content standard, Resource Description and Access (RDA). Ideally, a cataloger conversant in resource description using the *Anglo-American Cataloguing Rules, 2nd ed.* (AACR2), with little knowledge of FRBR and RDA, would be able to read this manual and use the examples as the basis for creating resource descriptions for publications in multiple formats in three different metadata schemas.<sup>1</sup>

For those familiar with Weber’s previous how-to-do-it manuals on special formats cataloging published by Neal-Schuman, *Describing Electronic, Digital and Other Media Using AACR2 and RDA* continues Weber’s well-organized and easy-to-read style by providing general information on resource description, and then devoting entire chapters to each specific format mirroring the structure of AACR2. In her previous manuals, Weber includes examples in AACR2-compliant MARC format. The current manual expands the example types, including not just AACR2-compliant MARC format, but also RDA-compliant MARC format, Metadata Object Description Schema (MODS), and Qualified Dublin Core (DC).

There is much to applaud about this latest manual. It provides an excellent overview on the rapidly changing information environment; contains plenty of examples, charts, check lists, sources for further reading; and is not wedded to any particular schema. For those desiring more in-depth self-study, there is an accompanying website that contains many useful hyperlinks, documents, presentations, and blogs related to the manual’s main topics, as well as a means of contacting the authors with questions or comments. A CD-ROM provides an additional 130 pages of content summarizing each chapter and contains three workforms (one for AACR2-compliant MARC, MODS, and Qualified DC) for each of the formats covered.

Although catalogers versed in resource description according to AACR2 will find the manual a helpful introduction to FRBR and RDA, the authors do not adequately address the question why such a time-consuming

transition to RDA is justified. It would have been helpful had the authors described FRBR’s role in making RDA an improvement over current cataloging practice based on the flat structure of the International Standard of Bibliographic Description (ISBD). Weber and Austin do not explicitly state that FRBR is a grouping of three interrelated, hierarchically arranged entities that create links to data by following the relationships of a single entity (work, expression, manifestation or item) through the description of different resources. To support its entity-relationship model, RDA relies more heavily on the provision of access points and preferred titles than is the case with AACR2. The authors omit this important distinction and instead include a list of core elements that are closer in proximity to ISBD areas of description to maintain a consistency with current practice according to AACR2.

The authors’ decision to keep the manual consistent with AACR2’s flat structure further becomes a problem when the authors mash together work and manifestation core elements. This confusion over elements of the work and elements of the manifestation is particularly codified in the consistent explanation that title proper is equivalent to preferred title in RDA when, in fact, preferred title is the equivalent to uniform title in AACR2. The preferred title may be identical to the title transcribed from the manifestation or it may be the title of the work in another language if the title on the manifestation is translated from the original.

Another area in the narrative that could have been more broadly emphasized is RDA’s increased reliance on catalogers’ judgment. Unlike AACR2,

RDA is less a cataloging code than it is a set of guidelines predicated on the concept that catalogers will be required to make informed decisions. The cataloger therefore must be flexible, document decisions, and refer to specialist manuals in situations where RDA is not sufficient. With nontangible formats in particular, a cataloger must often evaluate a wide range of resources to create appropriate links that will lead users to a spectrum of related resources particular to their needs. In other words, RDA provides the building blocks to formulate descriptions that are hierarchically structured based on the FRBR conceptual model of work, expression, manifestation, and item, and through the provision of access points that act as pathways to persons, corporate bodies, families, events, concepts, objects, and places.

Catalogers require solutions and ideas to help them make sense of the rapidly changing landscape and other related issues that arise during the course of their work. *Describing Electronic, Digital and Other Media Using AACR2 and RDA* may not provide all the solutions and cover all the relevant issues, but it does fill an important gap. The manual stands on its own as a useful and informative tool for those generalist catalogers who are already skilled AACR2 practitioners, but who may not be as familiar or as comfortable with FRBR and RDA. Within this context, Weber and Austin's pragmatic approach to resource description during a period of transition is essential reading.—*Andrea Leigh (alei@loc.gov), Library of Congress, Washington, D.C.*

#### Reference

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***Subject Access to Films and Videos.*** 2nd ed. By Sheila S. Intner, David P. Miller, Andrea Leigh, and Bobby Ferguson. Santa Barbara, Calif.: Libraries Unlimited, 2011. 246 p. \$50 paperback (ISBN 978-1-5915-8937-2).

Subject analysis of pictorial materials has challenged catalogers for decades; subject access to moving images is particularly problematic. A full understanding of film or video content can require viewing in real time. Content is often multilayered, and moving image materials are often shelved by format rather than classed by discipline. Thus depth of indexing is a perennial problem. OCLC video cataloging records demonstrate that fundamental principles of specificity and coextensivity have been difficult to apply, perhaps more so because the Library of Congress Subject Headings (LCSH) were originally developed for textual materials and are based on literary warrant. “Ofness” and “aboutness,” issues for pictorial material, apply to moving images as well. Genre and form headings, critical points of access for films and video, are currently ill-defined and can introduce redundancies or even conflicts with standard form subdivisions assigned in accordance with LCSH. Additional access points, truly neither genre nor form, can be of equal importance, such as mode of distribution (local access cable programs, theatrical shorts), country of publication, original language, fictitious characters, time slot (prime time television programs), or audience (children's programming). The line between topical subject headings and genre/form terms is often blurred, and practices have changed significantly over time.

*Subject Access to Films and Videos* addresses some of these issues. Like the first edition of the same name (Soldier Creek, 1992), the main body of the work is a compilation of LCSH “pertaining directly to materials in the media group that catalogers call moving image materials” (x). Genre-form

headings are integrated into the list. As before, the headings list is preceded by chapters on general principles, genre/form headings, and collection development; this second edition adds a chapter on metadata for subject access as well. While the current edition lacks the separate bibliographies for collection development and subject access to films and video, the individual chapters are generously footnoted.

Intner's opening chapter on principles and practice covers numerous topics, including “Basic Terminology” (synonymous terms by which these materials are known: movies, moving pictures, talkies, etc.) and “Underlying Assumptions.” The intended audience for this book is unstated, but the underlying assumptions are at the most basic level: libraries will purchase moving image materials; LCSH can be assigned to moving image materials; bibliographic records for moving images and books can be merged in an online public access catalog; tools and methods are equally applicable to films and videos, and so forth. The section “How LC does it” is essentially a distillation of instruction sheet H2230 in the Library of Congress *Subject Headings Manual*.<sup>1</sup> This chapter would benefit from a more cohesive organization, a clear outline of the many thorny issues specific to film and video, and fewer references to past practices.

The second chapter, Miller's “Genre/Form Headings: From the Margins to the Center,” expertly summarizes the development of genre/form vocabularies, as well as current and emerging best practices, focusing on instruction sheet H1913 in the Library of Congress *Subject Headings Manual* and referencing new proposals to handle geographical, ethnicity, and language aspects of moving image materials. Although policies in this area are in flux, Miller deftly tackles this moving target, outlining emerging discussions and controversies, helping readers distinguish between substance

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and ephemeral details, and pointing them to online documentation for updates.

Leigh's chapter on "Metadata for Subject Access" covers a wide range of topics, from individual schemas (Dublin Core, PBCore) to folksonomies and social networking sites. It also fills some gaps left by the first chapter on principles and practice. Particularly useful are discussions of precoordinated LCSH headings and browse displays, as well as issues of subjectivity and authorial intent. While these principles are broadly applicable to all library resources, and not particularly "metadata-specific," they lay valuable groundwork and provide context. Leigh also addresses subject analysis issues that are unique to moving image materials, such as the "ofness" versus "aboutness" question and resultant double-indexing.

The heart of the book, compiled by Ferguson, is its last 200 hundred pages, a subset of LCSH "descriptors representing topics pertinent to the worlds of film and video alone" (x). An underlying assumption stated early in the book is that LCSH can, and by inference should, be assigned to moving image resources. Therefore subject analysis of film and video demands familiarity with all of LCSH, and not just a subset. Moreover, the list is puzzling in its inclusion of many terms that would seldom if ever be assigned to film and video, such as Kodak instant camera; video compression; headings for video games (a form otherwise omitted from the book), names of individual theaters; and phrase headings of the type "[topic] in motion pictures." The list also includes genre/form terms and broad terms that happen to include media concepts in their reference structure (library shelving, minorities; oceanography). This list might serve a subject-specific library housing print materials relating to film and video, but it does not help readers provide subject access to the films and videos themselves.

In summary, the book would have benefited from greater organization. More examples illuminating some of the trickier subject analysis scenarios would have been useful. Miller's thoughtful discussion of genre and form headings and the rich content of Leigh's metadata chapter are the strengths of the book. Readers seeking a thorough and well-organized treatment of subject cataloging principles might wish to consult Martha Yee's *Moving Image Cataloging: How to Create and How to Use a Moving Image Catalog*.<sup>2</sup>—Jane Johnson Otto (jyotto@rul.rutgers.edu), Rutgers, The State University of New Jersey, Piscataway, New Jersey.

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***Collection Development and Management for 21st Century Library Collections: An Introduction.*** By Vicki L. Gregory. New York: Neal-Schuman, 2011. 261 p. +1 CD-ROM. \$75.00 softcover (ISBN 978-1-5557-0651-7).

A new textbook on collection development and management comes from Vicki L. Gregory, a respected author and professor (School of Information at the University of South Florida, Tampa) in the field of library science. Several recent textbooks on collection development and management are already available. The author's personal, informal tone and her choices for topics to include and emphasize differentiate this book from the rest.

A survey of the table of contents reveals that the basics of collection development and management are included: the impact of new

technologies on collection development and management; assessing user needs and marketing the collection to those users; collection development policies; selection sources and processes; acquisitions; budgeting and fiscal management; assessment and evaluation of the collection, including deselection (weeding); cooperative collection development and resource sharing; legal issues in collection development; professional ethics and intellectual freedom; preservation; and the future of collection development and management. Gregory's treatment of these topics is uneven. Some of these chapters include thorough discussions, while others include only brief overviews.

This difference in coverage becomes apparent at the outset when Gregory opens her book with a short overview of the process of collection development, but quickly shifts the focus of the chapter to an analysis of the current context for the discipline, including a growing reliance on electronic resources; the concept of the "long tail"; social networking; responses to copyright (e.g., information commons, open access serials, open-source software); and the effect of globalization on collection building. The presentation of these issues at the beginning of the book may be confusing for students and librarians new to collection development; will they understand the comparisons made to traditional practices to demonstrate the newness of these concepts?

The author continues her work with chapters on the assessment of library user needs and on the creation of collection development policies. Gregory details the many types of data that librarians collect to ascertain community needs in a variety of environments (e.g., colleges, cities and towns, schools). As she notes, the successful collection development policy translates the assessment into a plan for fulfilling user needs. These two chapters are among the textbook's

acquiring items to provide a collection of materials for library users. While libraries still acquire physical items and will continue to do so, Holden argues that the shift from information scarcity to information abundance mandates rethinking acquisitions practice as a less linear and more flexible system. The library collection today may include access that is leased, content that is owned but hosted on systems to which access is leased, and items that are owned. Holden states it is time for acquisitions practitioners to acknowledge that developing procedures based on current needs is more likely to be successful than continuing to add new formats to old workflows.

In the second chapter, Holden challenges acquisitions practitioners to think strategically about acquisitions as a way of broadening the “spheres of access” libraries provide to users. He notes that vendors have long been partners in developing spheres of access; vendor services like approval plans and shelf ready processing help libraries make new titles available quickly and efficiently. Holden employs sidebars to define terms like “shelf ready” and to explore concepts such as the interplay between selection and acquisitions. This technique allows experienced acquisitions practitioners to skip familiar basics while helping novices understand these terms and concepts. A strength of this chapter is Holden’s deft introduction of the Statement on Principles and Standards of Acquisitions Practice;<sup>1</sup> it is reproduced in a sidebar, then referred to frequently in the text. For example, he points out six standards that apply to working with vendors, such as giving first consideration to the library’s needs, and securing permission before using ideas obtained from a vendor’s bid responses. As Holden emphasizes, these ethical standards remain important even as the traditional acquisitions work associated with procuring books expands to include purchased digital content, licensed content, open access

content, content shared through consortia, and pay per view content. While the proliferating avenues for acquiring content allow libraries to expand their spheres of access, they also require acquisitions practitioners to work proactively with others, both inside and outside the library.

The remaining three chapters expand on the role of acquisitions in broadening the library’s spheres of access. Chapter 3 focuses on some of the paths by which content is acquired. Holden uses the numerous ways of providing access to e-books as an example of why organizing acquisitions work by format needs to be reexamined; e-books may be purchased title-by-title, purchased in packages, subscribed to in packages, or subscribed to through services that allow for title substitution. These options make it impossible for acquisitions to establish a single workflow for the e-book format, supporting Holden’s argument for more flexible, goal-oriented acquisitions units. The fourth chapter focuses on how acquisitions units frequently remain involved with content beyond the procurement phase, with responsibilities such as maintaining an A-to-Z list to facilitate use, or monitoring usage to inform decisions about future content acquisition. In the final chapter, Holden suggests that the lines between acquisitions, document delivery, and interlibrary loan are blurring. Acquisitions practitioners today need to move beyond the rigid linear procedures common to the traditional information supply chain, to more proactive, flexible practices focused on providing access without regard to format.

Although Holden’s book is an important addition to the literature on acquisitions, it does not fully live up to the author’s stated goals. Because of its brief discussion of many core competencies, this book alone will not meet the needs of students and new professionals looking for a comprehensive guide to acquisitions.

Pairing it with *The Complete Guide to Acquisitions Management* by Frances C. Wilkinson and Linda K. Lewis will serve novices well.<sup>2</sup> The Wilkinson and Lewis book provides a comprehensive, if somewhat dated, introduction to core competencies. Holden’s book, meanwhile, offers an excellent conceptual approach to acquisitions, arguing a strong case for rethinking acquisitions practice to meet the challenges of a more diverse information universe. Three strengths of the book are readability, the integration of ethical practices into the text, and the use of sidebars to define terms and explain concepts. Recommended for academic libraries of all sizes and for larger public libraries.—*Ginger Williams (ginger.williams@wichita.edu), Wichita State University, Wichita, Kansas.*

#### References

1. ALCTS Acquisitions Section Ethics Task Force, “Statement on Principles and Standards of Acquisitions Practice,” approved by the ALCTS Acquisitions Section and adopted by the ALCTS board of directors, Feb. 1994, [www.ala.org/ala/issuesadvocacy/proethics/explanatory/acquisitions.cfm](http://www.ala.org/ala/issuesadvocacy/proethics/explanatory/acquisitions.cfm) (accessed Sept. 12, 2011).
2. Frances C. Wilkinson and Linda K. Lewis, *The Complete Guide to Acquisitions Management* (Westport, Conn.: Libraries Unlimited, 2003).

***The Frugal Librarian: Thriving in Tough Economic Times.*** Edited by Carol Smallwood. Chicago: ALA, 2011. 277 p. \$42 paperback (ISBN: 978-0-8389-1075-7). Also available as an e-book (\$34) and print/e-book bundle (\$49).

This ambitious collection of thirty-four essays speaks directly to the current economic times in which librarians work. After glancing through the essay titles, I questioned why some of the topics were addressed; was this book about how reference librarians can assist job searches, or was this a guide to help librarians run cost-effective

library operations? My question was answered in the foreword, written by Lorienne Roy. This book addresses both relevant programming and reference services to job searchers as well as how to get the most out of a library's operational resources. As a reader, I appreciated that this explanation was given so immediately in the text.

The book's scope is so broad that it is similar to attending a conference on relevant services and cost saving ideas. Like a conference, the contributions are uneven. There are contributions by public, academic, school, and multitype libraries from across the United States. The projects' scales are also mixed, with contributions ranging from that of a one-person library, to those by the largest public research universities. In an attempt to present all of these diverse library perspectives, some essays will be immediately relevant to some readers, while other essays will not be as interesting. The essays are organized into nine categories or parts. While it is clear that each part was meant to stand on its own, a few essays could have easily been placed in more than one category.

Part 1, "Helping Patrons Job Search," presents arguments that libraries are very relevant resources to job searchers. It also provides reference guidance that can help librarians be effective at helping job seekers. Germano's essay gives an overview of the most common business questions that job searchers have. Kuhl's essay emphasizes the role a librarian can play, and knowing when to make a referral. He also encourages librarians to work with outside experts, and to this end provides tips on locating and working with such specialists.

In part 2, "Librarian Survival," the focus moves inward, addressing professional survival tips for librarians. Lund's essay on infusing his public library with an entrepreneurial spirit is insightful, and may be of use to many library leaders. Mancuso's essay describes his personal journey of being laid-off from

his full-time library position, and his challenges and triumphs of managing to stay in the library field without moving. Harris's essay suggests free sources for ongoing education; it could have just as easily been placed in part 9, "Professional Development." Lincoln's piece provides a case study of a library media specialist's career, within the context of Michigan Public Schools, and addresses other career options.

Grants are discussed in part 3. I found this section of the book to be the most useful. Stickell and Nickel's essay did a nice job in describing the grant process from beginning to end, and included a short case study from the University of North Carolina at Charlotte. Packard's essay follows, with an overview of helpful tools and suggestions. Brown provides discussion on what a grant proposal should address, and encourages applicants to think strategically about the needs of their diverse communities.

Part 4, "Programming," includes an essay by Finley and Kluever on community-focused programs. Their essay supports Brown's in making the point that programming should be based on community needs. They argue that libraries can align these needs with staff strengths to provide "free" programming. I disagree with the suggestion that programming is without costs because the time of library employees is the most precious resource libraries have. Forrest's article looks at other ideas for inexpensive programming, but again does not cost out the time this work represents for librarians.

Part 5, "Sharing," begins with an interesting essay by Bergstrom and Dugan on a collaborative project between the library and campuswide career services. They describe how the library's relationship with the career services office developed during a process of identifying overlapping subscriptions. As librarians came to know the curriculum better, they were able to identify outreach possibilities that provided added value for students.

They describe the pros and cons of building and maintaining a shared cost model with affected campus stakeholders, and note that the model needs to be revisited every year. They also discuss the very real challenges of being flexible with stakeholders' changing budgets and priorities, while still trying to discourage free-riders. Dill looks at a joint-use library shared by Indiana University-Purdue University Columbus, Purdue University College of Technology in Columbus, and the Ivy Tech Community College. She credits the success of this project to shared planning, contributions and staff, and emphasis on mission and policy development. She talks about assessment by looking at common measurements that serve as proxies for shared use (circulation, computer logins, etc). Given the promise of large institutional savings by two institutions sharing a library, this model may grow in importance. While capturing the value of a joint-use library may be challenging, this is an area that would benefit from future study. Other articles in part 5 include the responses that were generated in Kansas from south central libraries in a meeting sponsored by the regional multitype library. Also included is an essay by Tuck and Fraser describing how King County Library System worked with a local museum to provide passes to its community members. They provide a very useful list of elements that should be addressed in a partnership agreement, and tips that help maintain the relationship. Helling contributes an essay about Indiana's public libraries moving to an open-source catalog, and the shared policy acceptance that allowed the budding consortium of Evergreen Indiana to exist. His argument for joining this consortium is strengthened by his discussion of the concrete savings for the Bloomfield-Eastern Green County library that resulted from this decision. Like the "Grants" section, I found "Sharing" to offer very useful and timely essays.



Part 6, "Management," begins with an essay by Vega and Becnel that features ideas for public libraries, including a summary of a revamped children's program whose cost went from \$16,000 a month down to \$750. Crane describes how she uses spreadsheets to capture and report the costs associated with digital projects. This tracking allows her to answer the question, "What do your digital projects cost?" and build credibility through transparency. Farison writes another article that includes helpful advice on spreadsheet development as it pertains to periodical usage statistics. The Crane and Farison articles provide useful tips for the beginning library administrator. I believe our profession could benefit from more work in this area. Passonneau provides a valuable essay on green information technology approaches, and includes a rich list of URLs for further information. The last two essays of this section focus on the most valuable resources in libraries: people. Harris and Chimato write about staff stress in times of budget crises. While this essay serves as a review for effective and seasoned managers, it is essential reading for new managers. Johnson and Hisle provide an essay on training student workers in an academic library setting.

In part 7, "On the Job Success," Cooper provides a very good overview of how he cut costs in his public library when he reviewed the library's service contracts and took them out to bid. Asch discusses the resources her library needed to build and maintain for its two strong digital collections. Soules and Nielsen provide tips for effective relationship building in advancement of the library's mission. In the following essay, Bailey describes the local politics of Providence, Rhode Island, and how a grassroots movement saved branch libraries in the city. I found the essay by Holley, a small Internet bookseller, to be very valuable. He offers a unique perspective on how to get the most out of gifts and discards. Driscoll ends this part of the book with ideas for increasing a small school library's resources.

Part 8, "Staffing," begins with an essay by Britto that reviews sources of temporary library staff in a university setting. Evans describes how her library has worked with undergraduate computer science students to provide needed staffing in the technology arena. Laskowski and Gao describe how they managed two large-scale collection projects at the University of Illinois. They claimed success by articulating each step in their procedures

and aligning tasks with appropriate expertise. Blackburn and Davis provide differing viewpoints on their creative staffing ideas.

The last section, "Professional Development," includes two essays. Britto, providing his second essay of the book, describes the technology training program at the Central Washington University Library. This program provides basic and advanced technology training through tutorials and workshops. Britto also shares advice on making workshops attractive to busy faculty. The last essay, by Koury, provides justification for attending library conferences, in addition to money-saving tips that allow her to attend several national conferences each year.

The lack of focus on any one library setting or issue is both a strength and weakness of the book. Even though I found the quality of the essays uneven, I recommend the book for providing good suggestions and generating ideas for different libraries in different settings. It also provides a very good overview of challenges in library work for newer professionals.—*Ruth A. Zietlow (razietlow@stcloudstate.edu), St. Cloud State University, St. Cloud, Minnesota*