Serials Literature Review 2008–9

Embracing a Culture of Openness

Maria Collins

The serials literature from 2008 and 2009 reveals the new identity of the serials professional—one who embraces openness. Many forces have pushed the serials profession into a state of flux; among these are the recent economic recession, the evolution of scholarly publishing, and the concept of open systems and data. Chaotic change for serialists has evolved into opportunities to revise collection strategies, approach Big Deal purchasing in new ways, devise creative user-access solutions, and become stakeholders in the debates over scholarly communication. The literature also reveals serials professionals developing a Web 2.0 sensibility. These themes are presented in the review through a discussion of six major topics: sustainability of serials pricing, the future of the Big Deal, management of electronic resources, access, blurring and decline of formats, and Web 2.0.

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The financial crisis that began in late 2007, sometimes called the "Great Recession," sets the stage for the serials literature of 2008 and 2009. Wikipedia explains that this recession "is noted by many economists to be the worst financial crisis since the Great Depression of the 1930s."[1] With endowment funding at private universities dwindling and state universities receiving cuts and reversions, few library budgets have remained unaffected by the economic downturn. Using Wikipedia as the source for this quick explanatory blurb of the financial crisis is no coincidence—Web 2.0 functionality was another central theme pushed out to serials readers in 2008 and 2009. As serials professionals face reduced budgets, cancellations, and evolving publication models, Web 2.0 concepts of openness, interoperable systems, interactive communities, and networking are reshaping the manner in which people communicate, access scholarly content, and develop tools to support library collections. The Internet became the great equalizer—freeing content from traditional containers such as journal issues or books by providing a platform for distributing discrete units like articles and chapters. With growing support for the open access (OA) movement, evidenced by government- and university-supported mandates issued in 2008 and 2009, the scholarly communication process was officially transformed. Consequently, all participants of the scholarly journal information chain, including publishers, researchers, and librarians, are reinventing their roles in supporting scholarly communication. The serials literature reveals many ways in which the work of serials professionals and concepts of openness intersect: through experiments with acquisition models, development of standards to support open systems, automation and simplification of metadata to support patron access to electronic material, negotiation of rights to remove barriers to access, and an evolved focus on managing content instead of formats. Viewed holistically, these separate advancements coalesce to reveal a new global model for serials librarianship that prioritizes access, connectivity, and community.

This literature review provides readers with a snapshot of these themes through a sampling of periodical literature, occasional reports, and a small selection of books published in 2008 and 2009. The review covers six major sections: sustainability of serials pricing, the future of the Big Deal, managing electronic resources, access, blurring and decline of formats, and Web 2.0. topics included represent both the usual suspects within serials literature, such as serials pricing and access, and nontraditional topics pushed out to serialists from the serials literature, such as e-books and Web 2.0. OA and institutional repositories (IR) were also important topics during this period and appeared frequently in the serials literature. Because they are such large and important areas, they merit separate attention and will be the focus of a future literature review. To maintain a manageable scope for this paper, the author excluded many relevant topics, such as preservation, collection evaluation, open source, discovery, patron use of materials, the integrated library system (ILS) marketplace, and broader discussions of scholarly communication.

The author identified sources for the review through multiple means. The author initially selected for review journals used for past serials literature reviews as well as core serial titles that directly target serials professionals. Once these titles were identified, the author conducted a systematic table-of-contents analysis to identify quality articles and dominant themes in the literature for 2008 and 2009. Additional sources, including a select number of monographs and non–peer reviewed articles focusing on the article's key themes, were gathered organically through citations within the articles reviewed and additional literature searches of core themes in Library and Information Science Abstracts (LISA). In total, the author considered more than 350 articles, reports, white papers, and books. Each source selected was reviewed, abstracted, and assigned keywords and a quality ranking to assist with final selection and grouping for inclusion in the literature review.

Sustainability of Serials Pricing

The Economic Crisis and Sustainable Collections

Given the context of the economic recession, issues related to the serials pricing crisis were magnified in 2008 and 2009. The squeeze caused by increased serials prices and shrinking library budgets has forced many practitioners to reconceptualize sustainability of serials acquisitions through unbundling Big Deals and envisioning new models of access. Orsdel and Born capture this landscape well in their annual "Periodicals Price Survey" for 2008 and 2009 where they outline strong influences on the journal market, such as OA, the economic crisis, renegotiations of the Big Deal, and commercial pricing of journal content.[2]

To better understand the dominant pricing concerns for 2008 and 2009, summarizing a few of these key influences from Van Orsdel and Born's surveys is helpful. With the issuance of national and university mandates requiring research to be made freely available to the public (as directed by the National Institutes of Health (NIH), European Research Council, and many European and American universities, including Harvard), the OA movement transitioned from theory to practice.[3] Unfortunately, even with the increased push to comply with these policies, OA still had minimal affect on serials price increases. Van Orsdel and Born reported consistent increases of approximately 7–9 percent with the expectation of the same for 2010.[4] Even with strong pockets of opposition to these mandates as demonstrated by the Partnership for Research Integrity in Science and Medicine (PRISM), a lobbying organization pushing for the repeal of the NIH mandate, Van Orsdel and Born noted that publishers were not adverse to OA as a concept, but as a business model. Many publishers were simply scrambling to adjust their strategies for maintaining revenue streams while experimenting with OA models.[5]

Likewise, librarians were in the process of reevaluating their ability to meet increasing demands for online content from patrons while simultaneously dealing with decreasing budgets. This balancing act was precarious at best and was of such concern that several statements on the economic crisis were issued in 2009 in an attempt to emphasize to publishers the strained economic environments of consortia and academic libraries. Two statements to note include the International Coalition of Library Consortia's (ICOLC) "Statement on the Global Economic Crisis and Its Impact on Consortial Licenses" and the Association of Research Libraries' (ARL) "Statement to Scholarly Publishers on the Global Economic Crisis."[6] The ICOLC statement argued for the value of consortia in assisting libraries that are navigating economic strains on their budgets, saying that "library consortia are uniquely positioned to be the most effective and efficient means to preserve the customer base for publishers and create solutions that provide the greatest good for the greatest number."[7] The ARL statement provided additional feedback to publishers specific to academic research libraries. Both statements recommended that publishers allow flexible pricing and adjustments to negotiated deals for consortia licenses to stay in place whenever possible. The ARL statement further recommended that libraries be allowed to negotiate their contracts mid-term if necessary. Van Orsdel and Born noted "libraries and consortia have already begun invoking financial hardship clauses and asking to renegotiate licenses for bundled content midterm."[8]

Additional concerns in the ARL statement include the effect of the recession on a research library's ability to purchase "long tail" materials, such as foreign or small-press publications necessary to create a robust collection but

that often have a small circulation.[9] Often, these unique or niche collections are easily neglected in times of economic strain, yet these collections are becoming increasingly recognized as critical to a research library's value and mission. In a library environment where the Google Books program is sometimes perceived as homogenizing libraries' monographic collections, and commercial Big Deals that offer "everything we've got portfolios" appear to normalize journal collections across academic libraries, the argument can be made that long tail materials are the rarest and most valued of collections.[10] The question remains, though, whether libraries can build sustainable collections that include these types of materials in difficult economic times.

The topic of sustainable collections is a primary focus in Walter's article "Journal Prices, Book Acquisitions, and Sustainable College Library Collections."[11] Walters defined a sustainable collection as "one that can be maintained without significant degradation over time—one with a budget that provides for continued access to serial resources . . . as well as the timely acquisition of important monographic materials."[12] He discussed a radical suggestion for achieving a sustainable collection—abandon the serial (in bulk) for the monograph to support certain collections, such as an undergraduate collection. Walters argued that undergraduates often simply need exposure to topics that monographic resources can easily provide. Furthermore, a minimal number of serial resources are required to meet undergraduate research needs. To illustrate this point, Walters cited several studies that demonstrate "the most important research tends to be concentrated in a relatively small number of key journals."[13]

The serials literature contains many more examples of professionals using the crisis in scholarly communication as impetus to change directions and reconceptualize how to meet research needs in our current environment. The ARL statement invited publishers to take this same journey by modifying their business models and applying OA strategies as a possible transition from the traditional subscription model. Too often, business models for consortia deals penalize large ARL libraries that are forced to "absorb significant price increases to compensate for discounting other customers."[14] The concept of creating opportunity and change from hardship was also a prominent theme in Grogg and Ashmore's article, "The Art of the Deal: Negotiating in Times of Economic Stress."[15] These authors stated "times of economic stress can actually provide increased opportunities for negotiation."[16] For instance, if funding is short, libraries may decide to abandon ineffective tools that fail to support local workflows, or if a library is unable to sustain a consortia deal, perhaps a middle ground can be negotiated with a vendor that allows the library to reduce content to realize savings rather than abandon the deal altogether. Grogg and Ashmore wrote "the wisest among us will look upon the constricting economy as an opportunity to re-evaluate, renegotiate and revision."[17]

Understanding Journal Price Increases

To negotiate effectively, librarians must have a clear understanding of the factors that influence journal pricing. As information professionals consider the merits of an OA model, this understanding, especially of the commercial publishing market, becomes even more imperative. Ortelbach, Schulz, and Hagenhoff used a regression analysis to study several factors known from previous studies to influence journal pricing, including size of the journal, circulation, profit status of the publisher, country of origin, and academic discipline.[18] They found that profit status of the publisher and journal size were both positive factors influencing price. For-profit publishers produce more expensive journals than not-for-profit publishers, and journals with a more content are more expensive than journals with less content. However, the data were not significant enough to implicate these factors as causes of the serials crisis.

Another study by Kraus and Hansen found that journals from commercial publishers in chemistry were more expensive than those from noncommercial publishers.[19] They noted that "there is still a great discrepancy in cost between the commercial and non-commercial presses on a cost per journal, cost per downloaded article and cost per impact factor basis."[20] These are interesting findings in the context of the OA movement, which has the potential to revolutionize scholarly communication costs. Kraus and Hansen advocated submitting "articles to non-commercial and open access sources first, and publish in commercial journals as a last resort."[21]

In a presentation report for the 2007 North American Serials Interest Group (NASIG) Conference, Schonfeld described another concept that could be used to understand journal pricing: the two-sided market.[22] This theory has been applied to marketplace platforms with two or more sets of customers. The credit card market serving both merchants and the general public is an example. Schonfeld stated that "a scholarly journal also balances the interests of two sets of 'customers.' It must attract both sufficient articles to motivate scholars to read it as well as sufficient scholarly readers to motivate authors to submit articles to it."[23] This kind of analysis is especially useful with the advent of OA models causing a potential shift from the subscription model to the author-pays model.

Value and Role of Consortia in Journal Pricing

The value of buying through consortia during times of economic recession was another recurring topic in the literature

of 2008 and 2009. According to the *Survey of Academic and Research Library Journal Purchasing Practices* published by the Primary Research Group, 46 percent of the sampled libraries acquired subscriptions in bundles of fifty titles or more.[24] These bundled titles or packages were often procured through consortia negotiations. Perry surveyed ICOLC members to investigate current and future priorities for consortia.[25] Survey responses indicated that consortia continue to play a significant role in library acquisitions, especially in the context of the current economic downturn. Perry pointed out that the two current priorities, licensing and renegotiation, and the two future priorities, budget management and license negotiation, all relate to the economic downturn.

In their interviews with library professionals, Grogg and Ashmore also discussed a greater need to promote consortia value, especially state-level consortia. The authors pointed out the strong dependency many state-supported libraries have on consortia-provided collections that supplement their local collections.[26] Reduction of state funding for these consortia could have devastating effects on library budgets; librarians may find themselves in the position of renegotiating independently and allocating scarce funds for these unanticipated acquisitions. Several articles pointed forebodingly at South Carolina's dire situation.[27] Van Orsdel and Born noted "state funding for library consortia . . . tumbled in a number of states—South Carolina's PASCAL lost 90 percent of its funding."[28]

The ARL statement also advocated for the role of consortia negotiations but tempered its response with caution about unsustainable models.[29] Large research libraries are becoming unable to subsidize consortia agreements by taking on an inordinate amount of consortia costs for the Big Deal. Alternative pricing models that provide a more equitable distribution of financial costs for consortia arrangements are needed for the future viability of these deals.

Another article in Grogg and Ashmore's "The Art of the Deal" series focused on advantages and disadvantages of consortia negotiations.[30] The authors noted the obvious benefits of bulk purchasing and obtaining more content for the money; they also listed the lowered costs and redistributed savings, negotiation support of individual librarians, and consortia influence to include more "progressive licensing terms."[31] Regarding disadvantages, they discussed the often slow pace of consortia negotiations, losing the ability to make flexible collection decisions, complexity of negotiations with a large number of members, and potential consequences of loss of access when consortia members opt out of consortia agreements.

Sanville added to this discussion of the role of consortia with a frank assessment of the economic value of these deals.[32] Consortia deals have proven their worth by increasing access and reducing costs, but Sanville also noted that consortial buying has been a treatment of the symptoms created by the crisis in scholarly communication, but is not the cure. In this practical context, Sanville listed several issues not addressed through consortia deals, such as increased production of scholarly content, the continued prevalence of traditional publishing models, smaller publishers being forced to increase prices to keep up or merge with larger publishers, and increased patron demand for online content. As scholarly communication evolves, the process of consortial buying also may change as these concerns are addressed.

The Future of the Big Deal

Parallel to these discussions of consortia value was concern about the sustainability of the Big Deal or all-inclusive publisher packages often negotiated by consortia for a minimal fee on top of a library's historic expenditures with that publisher. Numerous articles touched on a variety of issues related to the Big Deal, including a special section in the 2009 volume of *Serials Librarian* edited by David Fowler. Discussions of advantages and disadvantages of the Big Deal were the most common threads.[33] A summary of the most commonly mentioned advantages includes special pricing with lower unit prices; increased access, especially for smaller institutions; controlled price increases; immediate access to content; and streamlined workflows. With Big Deals often consuming a large portion of libraries' materials budgets, libraries also experienced disadvantages noted in the literature, including an inability to manage local collections and reduced flexibility to support alternative access models.

The volume of articles on this topic is indicative of the tension concerning the sustainability of the Big Deal. Grogg and Ashmore even speculated "time will tell if the world economic crisis of 2008, 2009 and beyond will finally be the straw that breaks the big deal's back."[34] Torbert asserted that satisfaction with the Big Deal is decreasing, but librarians surveyed from academic libraries still believe that Big Deal "benefits outweigh the difficulties."[35]

Taylor-Roe's discussion of her frustrations with the Big Deal also illustrates concerns about sustainability.[36] She detailed results from a survey of United Kingdom libraries concerning their satisfaction with the Big Deal. Specific discussion points included a dislike of Big Deal business models that limit cancellations, base pricing off a library's historic expenditures, and inhibit a library's ability to purchase journal content from other publishers. Rolnik, a small publisher, expounded on this last point by stating the Big Deal "locks my content out of the budget. There is often little budget remaining after the library pays all of its Big Deal invoices, even for high value content."[37]

Other frustrations mentioned by Taylor-Roe, such as difficulties in tracking transfer titles and an inability to deliver to

libraries an accurate title list, related to a publisher's ability to provide quality customer service.[38] Given these frustrations in combination with the economic downturn, the 14 percent of respondents to Taylor-Roe's survey planning to cut back on their Big Deals is not surprising; 38 percent thought they would maintain the Big Deals they already had, but a striking 28 percent indicated they would only take out new deals if they could cancel old ones, and 24 percent said they would actively seek to reduce Big Deal expenditures. Based on these comments, a breaking point is coming. Flexible pricing and choice of content to reduce costs are essential elements needed for a sustainable Big Deal model.

Usage Studies of the Big Deal

One method to evaluate whether a library is ready to break their journal packages is to study use of the collection. One criticism directed at the Big Deal is the prevalence of non-used titles within the package. Several studies examined use of their titles to determine whether this concern pertained to them. Botero, Carrico, and Tennant conducted an evaluation of Big Deal packages for the University of Florida libraries using Counting Online Usage of Networked Electronic Resources (COUNTER) compliant, publisher provided usage statistics.[39] For this library, the low cost per article and increased access to content indicated a deal too good to refuse despite concerns about the collections budget. Another study by Termens noted that journal package use across institutions within a consortium is not equivalent.[40] Termens' research indicates that the level of use may not always be high or even predictable. One final study of note is Murphy's analysis of nonused titles accessed through the OhioLink consortium.[41] Murphy conducted a citation analysis to understand the use of titles within select departments and discovered that fewer than 50 percent of the titles cited by faculty were purchased as part of Big Deal packages, and 75.4 percent of the titles maintained through OhioLink were cited minimally by faculty during a three-year period. Murphy argued that the premium paid to provide access to these unused titles should be funneled elsewhere to fund quality content requested by faculty. She aptly stated that "rather than contributing to the normalizing of library collections by supporting the strategic positioning of commercial publishers, large research libraries may respond better to the needs of all faculty, especially those conducting research in smaller fields, by returning to a la carte purchasing."[42]

Reinventing the Big Deal

Numerous articles explored alternatives to the Big Deal that might better serve as a sustainable option. Van Orsdel and Born commented that in reaction to the increasingly resource-intensive nature of the negotiations required to set up Big Deals, "some commercial publishers are talking about getting out of the negotiating business and are considering selling their journals as a single database with fixed prices."[43] Best described the concept of an orderly retreat from the Big Deal whereby libraries negotiate "the right to cancel superfluous or unaffordable titles."[44] Cleary supported this option noting that this would allow members to stay in the deal, provide access to the highest used titles, and reduce costs to a manageable level.[45] Another reconceptualization of the Big Deal incorporated aspects of both of these concepts. Boissy called his new version of the Big Deal the "comprehensive consortial model."[46] In this model, publishers grant archival rights, "streamline the consortial model, find a sustainable pricing point, and grant full rights to the complete publisher journal portfolio in electronic form."[47] One more option is to unbundle the Big Deal, not wholesale, but deal by deal depending on an understanding of return on investment. Cleary described a useful example of the unbundling process undertaken by the Queensland University of Technology (QUL) for their Taylor and Francis packages.[48] For the three Taylor and Francis collections purchased by QUL, Cleary conducted a cost per full-text-download analysis, revealing QUL's return on investment for these collections. Librarians for QUL established a benchmark of acceptable full-text downloads as an indicator of sufficient use to assist in their assessment. Ultimately, the decision was made to unbundle one of the three collections and return to a la carte purchasing for those titles. Cleary argued that consortia should negotiate to remove low use and low value titles to reduce costs or face cancellation of the Big Deal.

Mitchell and Lorbeer provided a well-written case study of a library transforming its collection after cancelling a Big Deal.[49] For them, the issue of nonused titles made continuing their Big Deals untenable. Purchasing larger numbers of nonused titles simply did not equate to their idea of an economically sustainable collection. Luckily for the University of Alabama at Birmingham (UAB), the library has a successful liaison program and, armed with COUNTER stats, librarians were able to transform the collection by selecting high-use titles, greater use of interlibrary loan, and increased support for pay-per-view. Most notably, they have been able to accomplish these changes with minimal disruption to patron service.

Pay-Per-View as an Alternative Model to Subscriptions and Big Deals

Outside of discussions about OA in the serials literature, pay-per-view (PPV) appeared to be the alternative model of choice to the Big Deal. Two works—by Carr and by Harwood and Prior—provided thorough examinations of PPV, including discussions of models, advantages and

limitations of the service, and the future of PPV.[50] As defined by Carr, PPV in simplest terms is a purchasing alternative for journal content in which the "library acquires individual articles that users request."[51] PPV models can take numerous shapes and forms. Harwood and Prior's descriptions of usage-based e-journal purchasing discussed two models trialed by the Journals Working Group (JWG) of the United Kingdom's Joint Information Systems Committee (JISC): (1) a "pay-per-view converting to subscription model" whereby patrons purchase articles up to a set threshold, at which point the journal title converts to a library subscription with unlimited access to articles, and (2) the "core plus peripheral" model whereby a publisher offers a subscription to core titles and PPV access to nonsubscribed titles.[52] Carr also outlined varying implementations of PPV from six different academic libraries in which the library established an account with a content provider, users initiated the purchase, and the library subsidized the costs.

The driving force behind most of the implementations was the realization of cost savings while maintaining a similar level of access as previously experienced with the Big Deal.[53] In a workshop report by Wolverton, additional advantages of PPV were outlined by Tim Bucknall, who implemented the service at the University of North Carolina at Greensboro in 2002.[54] These advantages include increased availability of journals and backfiles, immediate access to articles, a more cost-effective model to support access for low-use journals, and benefits as a collection development tool.

These works also discussed the limitations of PPV. The trials implemented by the JWG revealed numerous findings that could prove challenging as PPV models evolve.[55] One technical concern involved excluding freely available content to calculate chargeable downloads. To make these calculations, content providers need to devise ways to filter out freely available content, such as OA articles and promotional content. Usage statistics from multiple models of access (PPV, subscriptions, and packages) also would need to be consolidated for a complete understanding of use. Budgeting for PPV is another source of concern; dependable projections are needed to stabilize or account for PPV expenditures. These findings reveal that administrative support could be substantial, especially for monitoring usage statistics. Harwood and Prior also noted that archival rights often are not provided for PPV-provided titles unless they are converted to a subscription model. Collection managers would need to consider PPV options carefully if ownership of content is a strong priority for their organization.

Carr responded to and expanded on many of these concerns.[56] Regarding administrative support, respondents to his survey noted the level of support to be similar to managing subscriptions and packages. In addition, survey respondents noted that they did not experience a "high degree of uncertainty or risk" in respect to managing their budgets; instead

they realized cost savings by using this model.[57] In a short essay for *Against the Grain*, Carr also expanded on the issue of archival and perpetual access rights to PPV purchased content.[58] Essentially, a library's decision and commitment to a PPV service comes down to their readiness to reconceptualize the role of a library as a keeper of the keys to owned library content. In the current environment, with an increasing critical mass of materials available that the library cannot afford and an increasing emphasis on the openness of content, the library's role as purchasing agent for scholarly materials is slipping away to be replaced by a browser and the Internet. . . . Carr suggested that perhaps now is the time for libraries to commit to a "just in time" philosophy to meet the needs of users. He stated "many libraries today are in fail-fail situations. Librarians might reason that it is better to face the possibility of failing anticipated patrons in the future than the certainty of failing real patrons in the present."[59]

What is the future of PPV? Will it replace the Big Deal? Most of the libraries surveyed by Carr supported PPV.[60] Carr did note publisher acceptance of PPV as an ongoing issue. Two case studies—one presented by Chamberlain and MacAlpine, the other by Wolverton and Bucknall—also showed positive PPV implementation results.[61] These studies implied that PPV has a future in a mixed-model purchasing environment. The investigations of the JWG resulted in a more cautious view of PPV. Harwood and Prior made the following assessment on the future of PPV: "It was felt that on the basis of findings from these trials, a 'traditional' Big Deal pricing model is likely to give much greater budgeting predictability, whilst still offering access to all titles from the participating publisher."[62]

Managing Electronic Resources

For many serials professionals, 2008 and 2009 were the beginnings of a second decade of managing serial resources online. Evolving management practices and technological solutions for effective electronic resources management (ERM) continued to be primary topics in the literature. However, more abstract and global themes, such as strategic planning, interactive systems that support the automatic exchange of data, and the erosion of the journal issue as the dominant format or unit supporting the distribution of research also were discussed. Given the context of an open scholarly communication system and the influences of the Internet, this evolution in the research describing ERM is not surprising. Many information professionals have experienced the challenges and frustrations of developing or implementing an ERM system. Through this process they have gained an evolved understanding of the need for standards to support and enhance ERM system functionality. The implementation of ERM tools by libraries and the often

painful experience of modifying and abandoning traditional workflows have taught many librarians the value of careful planning and establishing transparent communication strategies. Finally, with more sophisticated systems in place, serials professionals also are seeing the boundaries between public and technical services disappear as technical services staff provide frontline support to patrons to ensure seamless access for electronic resources. To capture these themes, this section will discuss the following ERM-related topics: planning and workflows, ERM tools, and evolving standards and best practices.

Planning and Workflow Analysis

Abstract concepts like planning and workflow need to be grounded in both theory and practice to gain the true understanding of the reader. Several articles that focused on planning and workflow analysis for ERM provided this conceptual range from abstract to practical. Two articles took a predominantly theoretical approach in their discussion of electronic resource planning. The first, by Hulseberg and Monson, provided an interesting case study outlining Gustavus Adolphus College's strategic planning for ERM.[63] After initial brainstorming and goal-setting, librarians at the college established several initiatives related to ERM, including analyzing workflows, creating a documentation system, and developing an ERM system (ERMS). To evaluate the successful achievement of these initiatives, they determined appropriate assessment tools for assistance. Examples include usage statistics, library faculty and staff surveys, an annual workflow analysis project, and an annual report on recent research. Planning for ERM in this strategic fashion was valuable in enhancing their management process.

An article by Collins discussed theoretical concepts of planning and workflows with an emphasis on the importance of effective communication.[64] The author noted that "e-resource management concerns have outgrown traditional department boundaries necessitating efficient communication strategies to stabilize and guide workflow practices across the library."[65] The article provided comments from eight librarians about workflows given up and maintained after the advent of electronic journals in their libraries. Many of the processes left behind were print-based, including claiming, check-in, and binding. Librarians also were decreasing serials cataloging and increasing reliance on MARC record services. Processes retained included maintaining relationships with agents, verifying online access, and creating access points for all e-resources in the catalog.

In terms of practical approaches for workflow analysis, Blake and Stalberg provided a well-written explanation of a method to observe e-resource workflows in which Blake shadowed each staff member in her department for an entire day.[66] The authors transcribed observations into a visual representation of the serials life cycle and gave technical services staff an opportunity to respond to these charts and provide feedback. In addition to gaining a better understanding of serials workflows both in and outside the department, this analysis resulted in enhanced communication between serials staff. This process assisted staff in understanding changes in practice because of an increased focus on ERM, helped staff in defining responsibilities, identified legacy practices that could be abandoned, and revealed miscommunications and inconsistencies in the workflow that needed attention.

Strader, Roth, and Boissy provided a practical application of workflow analysis in their discussion of roles and responsibilities of parties involved in the information supply chain.[67] They presented a checklist of tasks needed to provide access to an electronic journal, and they identified the responsible party (publisher, agent, or librarian) for each step. For each task, the chart notes the appropriate communication needed from each party and describes the processes each party must complete to establish and maintain e-journal access. This is an excellent example of a workflow document that can be used to organize and direct those who support electronic journal access.

Electronic Research Management Tools

Support for ERM workflows often comes in the form of an ERMS, including commercial and locally developed tools used to facilitate ERM. These options are abundant and of strong interest to serials professionals, as demonstrated by the prominence of this topic in the literature. Marketplace overviews are common and assist librarians in analyzing the best choice for meeting their ERM needs. The "Helping You Buy" series in *Computers in Libraries* always provides useful information for considering a technological purchase. Breeding provided the latest edition of this column focusing on ERMS, reviewing six commercial products.[68] Breeding defined these systems and presented areas of the ERM life cycle that an ERMS can support. He also provided a useful comparison of each system's knowledge base, or central data repository, detailing a library's collections. Other areas mentioned included local installation versus software as a service (SaaS), integration with the ILS, license management, statistics, and reports. Another article by Collins provided an exhaustive review of nine ERMSs, including one open source system.[69] Collins provided feedback from the librarian community about the challenges of ERM, including change management, prioritization of work, and inconsistent practices and metadata. Representatives from the companies interviewed also discussed challenges they have experienced in building an ERMS, including the lack of industry standards and interoperation with other systems.

The librarians' wish list for ERM functionality included automated and custom reporting, the ability to manipulate data within the system, continued need to minimize duplicate entry, and additional management features to support e-books, complex workflows, and troubleshooting.

Other discussions of ERMS in the literature focus on locally developed or open source options. Stranack discussed the CUFTS ERM in his presentation of the reSearcher software suite, which is an open source software option from Simon Fraser University to support link resolution, federated searching, personal citation management, and ERM.[70] Stranack promoted the benefits of collaboration within an open source community and invited readers to consider this alternative to the "high cost and closed nature of commercial software."[71] ERMes was another open source solution depicted by Doering and Chilton.[72] Disappointed by commercial offerings, librarians at the University of Wisconsin began locally developing their ERM using an access database. This allowed them to create a quick, simple, yet functional solution to meet their ERM needs.[73]

Many libraries are using simpler tools and solutions to facilitate ERM processes and are finding that these alternatives are quite effective in meeting their needs. A presentation report from the 2007 NASIG conference outlined alternatives including FileMaker Pro, Blackboard, and EBSCOhost's Electronic Journal Service.[74] Watson and Hawthorne used these alternatives in lieu of commercial systems at their respective institutions to support the storage of ERM metadata, management of invoices and license agreements, registration tracking, and follow up including ticklers, notifications, and alerts. Murray, dean of libraries at Murray State University, described Web 2.0 solutions as an alternative to commercial software.[75] Librarians at Murray State used blogs to assist with trials, Google Docs and spreadsheets to support subscription management (cancellations, title changes, and new orders), wikis for storage of administrative metadata, widgets for reporting, and mashups to bring these technologies together in a single interface. Murray commented that "commercial ERM systems may seem at times to have too much functionality to be practical, particularly for libraries that do not need all the bells and whistles."[76]

Many ERMS users have quickly discovered that their needs for technical support go far beyond the idea of a centralized container to store metadata and a system to support license management. Libraries need ERM solutions that actively support and manage ERM workflows and capture and interlink complex relationships between organizations, resources, collections, and local management data needed to categorize their electronic resources. A few locally developed alternatives discussed in the literature have created custom solutions to address some of these iterative or complex issues. Collins and Murray described the University of Georgia's (UGA) electronic journal verification system, which automates the scheduling, queuing, and problem-reporting pieces of an access verification workflow.[77] While recognizing the need to verify electronic subscriptions, many librarians have not been able to adopt a proactive approach to access verification because of the time-intensive nature of access checking. UGA's system makes this process more viable and serves as a potential solution for this particular ERM challenge.

Resnick and colleagues also described a creative method to assist with access problems.[78] Their paper recounted the evolution and development of a problem-reporting help desk database. The creation of this tool was the culmination of an experiment to include technical services librarians with ERM and licensing expertise as part of the help desk service. Including these librarians resulted in improved response time and problem resolution for access problems and eventually led the team to develop a helpdesk database to support the problem-resolution process.

Blake and Samples described a local solution used to resolve issues surrounding metadata relationships in ERM systems, specifically, organization name authority.[79] Their article described the implementation of a name authority tool as part of North Carolina State University Libraries' locally developed ERMS, E-Matrix. The authors provided context for the name authority problem through interviews with librarians across the country and discussed current practices of organizations such as OCLC, which also support name authority data.

The success of these locally derived solutions comes from a strategic focus on a given problem. These efforts contribute to a greater understanding of pieces of the ERM dilemma and, if considered more broadly, could lead to more effective ERM designs for commercial products. These local developments also reflect the good will of the librarian community as many of the institutions designing these solutions are willing to share the metadata or code behind these tools.

Going beyond descriptions of ERMSs, the serials literature also discussed their implementation. Case studies by White and Sanders as well as Beals provided a detailed description of the investigation, selection, and implementation of an ERMS.[80] Other articles provided tips for implementation success.[81] These include the importance of teamwork and communication; allocating the appropriate amount of time and staffing resources; documenting e-resource workflows; setting goals and priorities before beginning implementation; determining local programming resources; matching collection size and complexity to ERMS functionality; establishing target date and deadlines for implementation phases; and employing change management strategies, such as regular meetings, additional training, and inclusion of affected staff in the planning process.

Several of these tips were lessons learned from an unsuccessful or challenging implementation. Grogg described

the often slow pace of implementation in her column "Electronic Resource Management Systems in Practice," and this is demonstrated by Ekart's description of Kansas State University's struggles to implement Verde.[82] Numerous issues hampered the speed of implementation including defining workflows in Verde that would account for local practices. Ekart described their workflow implementation attempts as "trying to shoehorn our current processes into the available site-specific tasks."[83] Grogg echoed these concerns, stating that other librarians have reported frustrations with an ERMS's ability to handle complex workflows.

Another troubled implementation story from Pan described one without an initial defined purpose or goal.[84] Because of miscommunications with their vendor, the staff at Pan's library began with efforts to display their ERMS's resource records in the catalog. After spending a year designing a workflow and troubleshooting this process, library staff abandoned using their ERMS for public display and reevaluated their purpose for implementation. They masked the ERMS records in their system and adjusted their focus to support backend management data for acquisitions, licensing, and collection management. This library learned the difficult lesson of appropriately aligning processes with priorities to successfully meet the institution's implementation goals. Of course, implementation goals often vary across institutions. The most common ERM goals mentioned throughout these implementation case studies include centralizing ERM data, supporting the subscription life cycle (trials, renewals, new subscriptions, and cancellations), supporting collection analysis and storage of usage statistics, limiting multiple points of data entry, managing license information, and streamlining workflows to facilitate patron access.[85]

The serials literature reveals the complexities of ERM as well as the evolution of tools to address those complexities. The implementation experience has taught librarians the value of planning to help define the purpose of an ERMS and the importance of matching a system's functionality to this purpose. Given the extensive research in this area, change to "ERMS" appear to be a desirable component of ERM. One final article of note edited by Tijerina and King provided five essays exploring the future of ERMS.[86] The common thread through all these essays is the importance of standards in the continued development of ERMS. Riggio commented that vendors are currently moving in the right direction with the development of standards like the Standardized Usage Statistics Harvesting Initiative (SUSHI), Cost of Resource Exchange (CORE) and the ONline Information eXchange (ONIX) family. Systematic use of standards to normalize and support metadata transmission will ultimately lead to more open ERMS. In another essay from this article, Pesch reiterated this theme, commenting that ERMS cannot survive as standalone systems. He argued that "ERM systems must become a part of the e-resource supply chain."[87] This

is only possible if these systems use standards that allow for the automation of data exchange, including knowledge base holdings, cost data, and license data. Pesch commented further that standards are critical in reducing the effort currently required to maintain and populate an ERMS.

Standards and Best Practices

Given the previous statements about the prominent role standards will play in the future development of ERMS, the topic of standards takes on a new dimension. The serials literature for 2008 and 2009 provided updates and explanations of new and evolving standards, best practices, and projects in use or development that support ERM. Reasons for many of the standards and initiatives mentioned can be grouped into three areas. Initiatives like the ISSN-L and Knowledge Bases and Related Tools (KBART) facilitated journal linking and interoperability across systems. COUNTER, SUSHI, and CORE supported the structure and protocol for transferring usage and cost data to support cost-per-use. Finally, initiatives like Shared Electronic Resource Understanding (SERU) and Project Transfer (www.uksg.org/transfer) addressed librarian frustrations with aspects of ERM, such as licensing and the transfer of titles across publishers. Numerous articles provided basic updates to standards, and the few selected for the review provide useful overviews.

As part of his standards column, Pesch provided a succinct explanation of the ISSN-L introduced in August 2008, which serves as both a title-level and medium-level identifier.[88] Pesch included easy-to-understand graphics that illustrate the failings of the current ISSN and the successes of the new ISSN-L to support linking across systems. In addition, Pesch discussed how the ISSN-L standard can be implemented across the industry by using ISSN mapping tables for the already assigned ISSN-Ls. He explained that all participants in the journal information chain will need to implement this standard for it to be successful, but once in place, the ISSN-L "should result in significant improvements in the quality of linked access."[89] Vincent, from the ISSN International Centre, further defined the need for the ISSN-L standard as twofold: ISSN users want a way to identify a "product (or manifestation) level," and a standard is needed that will "collocate . . . medium-specific versions" of a title.[90] Vincent explained that the first ISSN assigned to a title, no matter the format, will be designated as the ISSN-L. She also provided an explanation of how MARC fields will accommodate this new data element with the addition of subfield "l" in the 022 ISSN field.

Another initiative, KBART, which is a joint National Information Standards Organization (NISO) and United Kingdom Serials Group (UKSG) project, also proposed to enhance linking through cleaner metadata. A presentation by McCracken and recorded by Arthur explained that the

goal of KBART is to improve "the functioning of OpenURL by providing standards for the quality and timeliness of data provided by publishers to knowledgebases."[91] If the metadata supplied to knowledge bases by content providers were improved, many OpenURL data and syntax errors would be resolved, allowing for more seamless linking to electronic resources. Currently, the project is focusing on best practices for publishers, but McCracken stated that this initiative could lead to future standards for publisher submission of metadata to industry knowledge bases.

Other standards address some aspect of the cost-per-use equation, a highly desired metric that many librarians would like to generate from their ERMS to facilitate collection management. The first element of cost is difficult to collect for cost-per-use given the myriad pricing models, billing bundles, and package deals that librarians manage in acquiring electronic resources. In addition, much of these cost data are locked within an ILS and not easily extracted. Rather than perform duplicate data entry to capture cost data in an ERMS, practitioners are investigating means to easily extract cost information from an ILS and transfer it to an ERMS. The *White Paper on Interoperability between Acquisitions Modules of Integrated Library Systems and Electronic Resources Management Systems*, written by a subgroup of the Digital Library Federation's Electronic Resources and Management Initiative, explored this issue.[92] Through an evaluation of four case studies, the authors were able to identify seven acquisition-specific data elements necessary to transfer between systems to support cost-per-use. These elements included "purchase order number, price, start and end dates for the subscription period, vendor name, vendor ID, fund code, and invoice number."[93] In addition, the paper discussed the various challenges of cost-per-use data, including the lack of itemized pricing for many journal packages and the difficulty in valuing unsubscribed titles that are often part of consortia Big Deals. Because of this white paper, the Cost of Resource Exchange (CORE) standard was initiated. Riding provided an explanation of the development of the CORE standard in "Cost of Resource Exchange (CORE): The Making of a Library Standard."[94] A NISO working group was formed, and an XML schema was written to test CORE as a draft standard from April 2009 through March 2010. Riding commented that the realized value of the standard will come when "librarians are able to use it to pull cost information from the ILS and other systems into the ERMS to make intelligent renewal and purchasing decisions."[95] This will be a highly anticipated moment for librarians desiring cost-per-use functionality in their ERMS.

Use of electronic resources, the other component of cost-per-use, has received dedicated treatment over the last few years through continued development of the COUNTER Code for Practice and SUSHI standard. Much of the focus in the literature concerning these standards centered on continued challenges of collecting use data. In Pesch's update on the COUNTER Code for Practice in release 3, he said the most important addition was the requirement that content providers support SUSHI to be COUNTER-compliant.[96] Pesch hoped this would be a huge step forward in establishing large-scale support for SUSHI.

Other additions to the COUNTER Code of Practice relate to a provider's responsibilities to separate specific use activities that skew usage statistics. These activities include federated search sessions, pre-fetch activity, robot activity, and the retrieval of full text for archiving. All these activities need to be excluded or identified for COUNTER compliance. Matthews further expanded on these challenges in her overview of the advances in usage statistics.[97] She commented that many vendors, especially smaller operations with limited development resources, may have trouble complying with some of the release 3 additions without a major overhaul of their systems. To address these kinds of limitations, many vendors are utilizing third party intermediaries to serve as a platform for content delivery and to capture usage data.

Gedye explored measuring the use of individual research articles through a detailed explanation of the Publisher and Institutional Repository Usage Statistics (PIRUS) project.[98] He noted increasing interest in gathering usage statistics at the article level, especially because government and university policies mandate self-archiving in institutional repositories. He commented that this kind of data can serve as an additional measure of article-level and journal-level quality. Furthermore, a standard is needed to consolidate article-level use from multiple sources, such as publisher-controlled platforms and locally maintained IRs. Participants in the PIRUS project hope to develop COUNTER-complaint usage reports at the article level, create guidelines to assist any host of online journal content to create these reports, and suggest a method for report consolidation.

Other areas of standards development are focusing on best practices to simplify ERM processes. NISO's adoption of SERU in 2008 as a best practice represented an attempt to simplify the time-consuming and complicated license negotiations that are often necessary to acquire electronic resources.[99] According to NISO, "SERU offers publishers and libraries the opportunity to save both the time and the costs associated with a negotiated and signed license agreement by agreeing to operate within a framework of shared understanding and good faith."[100] The SERU document provides an introduction to the concepts behind SERU, guidelines for implementation, and a statement of common understandings for subscribing to electronic resources. An article by Chamberlain and a NASIG conference report by Smith both provided background and context for SERU as well as suggestions for implementation.[101] Both parties involved in the purchase agree not to license the resource but abide by SERU and copyright law; they then sign the

registry on the SERU site and include any special terms concerning the arrangement in the purchase order.[102] Chamberlain commented further that SERU is not intended to replace all license negotiations, but when both parties are in agreement and comfortable with a simple understanding, this process can greatly streamline negotiations.

Another initiative—Project Transfer, sponsored by the UKSG—defines voluntary best practices for transferring a journal title between publishers. Pentz and Cole provided the most recent update of Project Transfer during 2008–9 in their paper "The UKSG TRANSFER Project."[103] They explained that Project Transfer will ensure that transferred content remains accessible and that users will experience minimal disruption. In addition, established best practices should create a framework to support more efficient processes for transfers and create expectations of the roles of each of the parties involved. Pentz and Cole also provided a detailed overview of the 2.0 version of the code of practice. They indicated that this latest version has received more publisher support than earlier versions, as twenty-five publishers had endorsed the code by May 2009.

Books and ERM:
Planning, Change Management, and Practice

The breadth of topics related to e-resources addressed in the serials periodical literature is indicative of the fundamental changes occurring in serials management and practice. Over the last decade, experimental practices in managing transitional collections as well as developing and integrating ERM tools within both the library and global information environment have resulted in the formation of ERM as a discipline of study and practice. Even though this review focuses primarily on periodical literature, a small but significant number of monographs focusing on a wide-range of ERM topics should be mentioned. What follows is a list and brief description of these monographic resources.

- Sheila S. Intner with Peggy Johnson, *Fundamentals of Technical Services Management*.[104] As technical services departments evolve to handle the changes in acquisition, cataloging, and preservation practices, due partly to the addition of electronic and digital resources in library collections, new managers to technical services need practice guidance and advice to strategically plan for and manage these changes. This book provides management theory, tips, and additional reading suggestions concerning the role of the technical services manager, staffing practices, evaluating a technical services department, understanding and managing the impact of digital resources in the department, and maintaining vendor relationships.

- Peter M. Webster, *Managing Electronic Resources: New and Changing Roles for Libraries*.[105] This book provides an extensive overview of ERM within the context of the larger, integrated information environment. Webster provides a useful and easy to understand presentation of technical ERM initiatives and tools such as link resolvers, citation managers, ERM tools, social networking applications, and ERM-related functions within the ILS such as link checking, package management, and authentication.

- Maria D. D. Collins and Patrick L. Carr, eds., *Managing the Transition from Print to Electronic Journals and Resources: A Guide for Library and Information Professionals*.[106] Electronic resources have transformed library collections, workflows, staffing practices, patron interactions, and management tools. This monograph includes a wide range of topics focused on these transitions, including budgeting and acquisitions, criteria for selection, collaborative library-wide partnerships, institutional repositories, ERMS, data standards, workflow management, and e-resource licensing.

- Rebecca S. Albitz, *Licensing and Managing Electronic Resources*.[107] Albitz provides a discussion of electronic resources licensing and library rights within the context of copyright law. This book also discusses the terms and conditions within a license, model agreements, licensing alternatives, and best practices for license negotiations.

- Holly Yu and Scott Breivold, eds., *Electronic Resource Management in Libraries: Research and Practice*.[108] Planning and workflow management are a central focus of this reference source with an emphasis on the electronic resource lifecycle. Management practices are provided for electronic resource selection, acquisitions, cataloging, public display, and usage evaluation.

Access

Simplifying the Rules

The acquisition of thousands of electronic journals and e-books by many academic libraries in a short period combined with increasing patron demand for electronic content has resulted in a renewed focus on quick, efficient access to materials. Initiatives described in the literature reflected this emphasis on access through discussions of metadata simplification and process automation. Several articles focused on the revisions of cataloging rules or standard records to simplify the level of metadata required. A study by Terrill discussed the new CONSER Standard Record, which "represents a change in cataloging philosophy, with its emphasis on

access and meeting user needs over detailed description with its focus on access rather than bibliographic description."[109] Terrill hoped to assess the initial acceptance of the CONSER Standard Record by catalogers and determined that library staff in the study had accepted most of the changes with minimal modifications to the records during copy cataloging. When individual MARC fields were considered, cataloging staff, especially those from CONSER libraries, were unlikely to edit individual fields in 68–99 percent of the instances. With a minimalist approach to description, Terrill indicated that the new CONSER Standard Record should lead to "more efficient and less expansive cataloging."[110]

Kemp examined numerous recent developments in cataloging, many of which will simplify cataloging practice, including the CONSER Standard Serial Record and the Resource Description and Access (RDA) cataloging rules.[111] Regarding the CONSER Standard Serial Record, Kemp stated that this record should consist "of common elements that could apply to any serials title, print or online, with just one level of detail, rather than allowing several different levels. The new standard record would provide all the basic information necessary to allow users to differentiate between, collocate, or find desired titles."[112] She commented further that the cataloging rule revisions behind RDA also should allow for more flexible cataloging of electronic resources. For instance, the Functional Requirements for Bibliographic Records (FRBR) throughout RDA will support separate descriptions of the content and the container delivering the content. Concerning RDA and the CONSER Standard Serial Record, Kemp stated that "not only will the rules of how to input information into MARC tags become simpler and easier to find, but the most detailed level of cataloging for serials will become less complicated."[113] Another source for information about the treatment of serials using RDA is Curran's column "Serials in RDA: A Starter's Tour and Kit," in which she identified the major sections of RDA that apply to serials.[114] She outlined changes in the cataloging rules from the *Anglo-American Cataloging Rules*, 2nd ed., as they relate to serials cataloging, and discussed specific rules related to serials from the November 2008 RDA draft. Serial issues requiring attention after the first release and RDA and FRBR mappings also are included. For serials catalogers interested in learning how RDA will affect their work, this RDA primer will serve as a useful cheat sheet to serials-related rule changes.

Value of Automation

In today's library environment, management of access is no longer just the domain of the bibliographic record; this process also occurs through title activation and management in a library's knowledge base. The catalog and the knowledge base also have become increasingly intertwined because of the use of a knowledge base to manage MARC record services to automate the process of cataloging. In an information world where hundreds of serial titles can be acquired through a single purchase, use of MARC records services and vendor-created MARC data has become critical to a library's ability to provide quick access to these collections. Kemp commented that outsourcing of cataloging through MARC records sets and services has allowed libraries to reduce the labor involved in serials cataloging and refocus staffing resources on original cataloging.[115]

In a similar vein, Chen and Wynn stated that "it is not possible to provide access in the library's catalog to all of these e-journals through manual cataloging alone."[116] Results from their survey of academic librarians across the United States concerning e-journal cataloging practices indicated that manual cataloging still occurs, but less frequently, as libraries work to automate serials cataloging through purchased MARC record sets. Chen and Wynn also stated that several libraries regarded "e-journal cataloging to be an 'unnecessary luxury' or even a waste of both time and resources."[117] This kind of statement represents a philosophical shift not only concerning how serials cataloging should be performed but also for the role of the catalog in providing access to journals. Chen and Wynn continued by reporting that "a growing number of libraries no longer consider the library catalog to be the primary means of access to e-journals. Instead, they direct users to tools other than the catalog for finding them."[118] An article by Lowe provided an excellent example of the shift away from the catalog as the primary discovery tool for electronic journals.[119] The library in Lowe's article added all of their print holdings to their knowledge base, which already tracked their electronic holdings, to create a comprehensive serials holdings display. They abandoned the use of their catalog for serials and removed all electronic journal records. The logic for this decision focused on the smaller effort required to manage print holdings in the knowledge base as opposed to the extreme effort required to catalog electronic journals for display in the online public access catalog. This solution also resolved the problem of having a different set of journals available from the catalog than the set available through the A–Z list by consolidating all serials holdings to a single point of access. Librarians at Lowe's library have received fewer holdings-related questions and have observed less confusion about where to go for serial discovery.

For many libraries, however, the adoption of a MARC record service has allowed the catalog to remain a viable option for serials access. Kemp's study investigating librarian satisfaction with MARC record services revealed that most librarians were satisfied with their implementation

of these services.[120] Librarians did complain about the number of brief records included with the service and expressed a desire for greater accuracy, but they felt that some access was better than none. Mugridge and Edmunds also discussed the benefits of batchloading MARC records sets.[121] These sets often prove valuable in revealing hidden collections and increasing collection use. After MARC record loads, librarians at Penn State would often observe an increase in collection use within days. Mugridge and Edmunds also provided a useful description of the typical workflow at Penn State for batchloading records. Similar to Kemp's observations, the authors noted record quality as a concern with these record sets. However, the desire to increase access to these collections trumps concerns about quality for Penn State. The authors stated that "batchloading allows for greater granularity—providing title-level access for collections for which only collection-level access was available previously and providing analytical access to items for which only title-level access was available."[122]

Such dramatic departures in workflows often result in unanticipated consequences, and implementation of a MARC record service is no exception. Mugridge and Edmunds as well as Kemp observed that use of a MARC record service is often incompatible with the single-record approach in serials cataloging, where multiple versions of a serial title are described using one record.[123] Libraries implementing these services have often reversed their policy from a single-record approach to a separate-record approach. Mugridge and Edwards discussed difficulties in de-duplicating records to maintain a single-record approach with a batchloading process. Considering these implementation challenges, and given the large number of electronic resources to catalog, Mugridge and Edwards argued that a single-record policy is "increasingly difficult to justify or maintain."[124] Carter discussed the dilemma of determining appropriate cataloging treatment for serials she identifies as quasi-serials; these are serials with both monographic and serial characteristics, such as standing orders and analytical series.[125] For example, batchloading MARC records for e-books often results in inconsistent cataloging treatment for these quasi-serials. Carter explained that these records are often loaded into the catalog with no check to determine whether any of the e-book titles loaded had historically received serial treatment. Given the efficiencies gained by loading MARC records sets, many libraries may need to reconsider the advantages and disadvantages of providing serial treatment for quasi-serials. To assist with this assessment, Carter provided a useful summary of these pros and cons. She commented that inconsistent bibliographic treatment of quasi-serials is just a small example of the "growing ambiguity between serials and monographs."[126]

The Influence of the Knowledge Base on Cataloging Practices

Management of a MARC record service often occurs through the same knowledge base a library uses to generate its A–Z serial list and to resolve to the appropriate copy. Curran wrote of another benefit that can be gained through a library's link resolver: using the OpenURL in the MARC record instead of using direct links.[127] Curran cited several reasons for this change: URL and coverage information are more efficiently maintained in one location, such as the knowledge base; and the OpenURL is more stable than a static URL. This practice also has allowed Curran's library to maintain a single-record approach. However, Curran admitted that occasional data errors in the knowledge base have led to bad links. She hoped the KBART initiative would lead to improved quality control within knowledge bases. Cole echoed these concerns about quality control in his review of the historical evolution of cataloging rules for minor and major title changes in comparison to publisher and aggregator treatment of title changes.[128] With publishers and aggregators often including titles with different ISSNs under the latest title, Cole observed this often can lead to access problems, especially when incorrect data are fed to a knowledge base provider. He was realistic about the vagaries of cataloging practice and does not expect publishers and aggregators to follow cataloging rules by the book. Cole did note the value of providing some level of access to both previous and current titles in knowledge base environments that result in A–Z serial lists. Page and Kuehn provided another user-focused perspective on knowledge base quality through their analysis of ILL requests.[129] In their analysis of ILL requests that were cancelled because materials were discovered locally, the authors discovered that "these requests were also associated with problematic OpenURL links to publisher or content provider Web pages."[130] All three articles indicated a need for cleaner metadata and sustained knowledge base maintenance.

Singer provided an interesting opinion piece about another possible solution to data quality concerns: the idea of a centralized knowledge base discussed in the UKSG's 2007 report "Link Resolvers and the Serials Supply Chain."[131] Singer criticized the UKSG's ideas to govern a centralized knowledge base through one organization. Instead, he believed that a community-based knowledge base would be a better option. He commented that "a centralized, standardized approach, maintained by librarians, publishers and vendors could not only reduce total cost of ownership, but also improve the quality of the data."[132] Singer pointed out numerous benefits of a community-maintained knowledge base: librarians would gain the flexibility to contribute to the knowledge base when vendors are unable or unwilling to make requested changes, it would create a single standard

framework for holdings, and it would eliminate maintenance of multiple knowledge bases in the vendor community. Ultimately, Singer emphasized that the "world does not need another closed-access, subscription based library data silo."[133]

Ensuring Perpetual Access to Electronic Content

The serials literature also focused on negotiating for and ensuring perpetual access rights to electronic resources. Articles on this topic examined the current state of perpetual access rights within license agreements, creating awareness of existing perpetual access provisions and initiatives in development to support this awareness. Rogers examined long-term access provisions in electronic journal license agreements in place for university and polytechnic libraries in New Zealand and determined that even though libraries value perpetual access and archival guarantees, these rights are often missing from negotiated license agreements.[134] Rogers found that licenses failed to address perpetual access or archival rights in 70 percent of the agreements reviewed. Zambare and colleagues also found that the provisions for these rights in license agreements were unacceptable.[135] These authors examined their license agreements for these terms after receiving content for a cancelled title in an unusable archival format. Before further attempts to go electronic-only, the library negotiated with vendors for "low or no-cost access to subscribed back files in a contemporary format."[136]

Perpetual access and archival provisions are often a source of confusion for many librarians. Keller, McAslan, and Duddy from the Oxford University Library attempted to remedy this confusion by creating a long-term access policy for their library's e-journals.[137] This document provided an overview of long-term access options for publisher-licensed content, JSTOR, OA journals, aggregators, Portico, Lots of Copies Keep Stuff Safe (LOCKSS), Controlled Lots of Copies Keep Stuff Safe (CLOCKSS), and back issues. The policy is straightforward, easy to understand, and, best of all, available to other librarians to either adopt or use as a model for a similar policy of their own. Another initiative described by Burnhill and colleagues, the Piloting an E-journal Preservation Registry Service (PEPRS), also focused on creating awareness of archival provisions for titles.[138] Sponsored by JISC, the PEPRS project is a pilot of an e-journals preservation registry through the United Kingdom academic data center and the international standards body for serials. Archiving organizations working with PEPRS include CLOCKSS, Portico, and e-Depot. This pilot is based on a study by Oppenheim and Rowland submitted to JISC in 2009.[139] Through research and interviews, this study revealed the need for a reliable information source on archiving options for journals and that librarians would most likely consult the registry while making serials management

decisions to renew subscriptions, change formats, or store or withdraw print volumes. This registry would hopefully reveal "gaps in archive provision."[140] Burnhill and colleagues acknowledged concerns about funding and maintenance of the PEPRS project but, if successful, this tool could prove to be useful for the international serials community.

The Blurring and Decline of Formats

E-Books or Serials?

Serials professionals are in the business of providing metadata and acquisitions support for materials funded and issued on a continuing basis. E-books increasingly fit this description, with some purchasing models requiring subscription and annual access fees. Management of an e-book collection is not so different from managing an e-journal package; often a license agreement defines terms of use, a purchasing model must be negotiated, and a title list requires management. Thus e-book management was a common theme in the serials literature. The journal *Serials* published a special supplement on e-books in 2009 and both of the NASIG and UKSG annual conferences included sessions on e-book management.

The NASIG session "When Did (E)-Books Become Serials?" presented by Armstrong and colleagues explored how e-books are both similar and dissimilar to serials.[141] Speakers commented on the erosion of the book as a container, observing that metadata describing book content (abstracts, MARC records, and digital object identifiers) could be found at the chapter level. This is parallel to the breakdown of the journal and issue with a metadata focus on the article level. Presenters also discussed similarities of e-books to Big Deal journal packages because e-book packages can be leased, have annual fees, and allow swapping of titles in and out of the package. One speaker noted that "subscriptions are probably the most successful business model for e-books."[142] The presenters also observed that unlike serials, e-books do not yet have the infrastructure to support their sometimes continuing nature. For instance, unlike the subscription management systems offered by agents, many book vendors do not have systems in place to "control packages of books."[143] The size of e-book packages was noted as another difference between the two formats, with journals often sold in groups of hundreds and e-book packages including thousands of titles. Consequently, knowledge base management can quickly become problematic and time-consuming given the number of e-books in a package. To assist with this problem, McCracken observed that the industry "need[s] a better way of transferring content from the content providers to the electronic resources and access management services (ERAMS) vendors. Vendors

need to transmit information to knowledge base providers on behalf of libraries."[144]

The UKSG report by Thompson and Sharp also discussed the blurring lines between e-journals and e-books. They emphasized the importance of integrating e-books along with e-journals into the library's ERM tools, such as the link resolver and catalog, to increase discovery and use of these resources.[145] They also explained "students are interested in content, not format; if they have to know whether something is a journal article or a book chapter in order to search for it effectively, the potential discoverability of resources is adversely affected."[146] The blurring of content lines also was discussed by Soules in "E-Books and User Assumptions," in which she outlined several user studies to analyze user assumptions of electronic content.[147] She discussed the breakdown of terms like "e-journal" and "e-book," noting that publishers already presented mixed serial and monograph content on their platforms. Soule explained that "formats are blending; content is simply content. . . . In the growing world of information bites, let us focus on e-resource and e-content and drop terms like e-book and e-journal. It would enable us to view these individual pieces on their own merit."[148]

Print Retention and Storage

Another format that received attention in the literature is the print serial. However, unlike the articles focused on the increased use of e-books, the literature discussing print serials focused on the decline of print and issues related to retention and storage. The Ithaka report *What to Withdraw: Print Collections after Digitization* observed that print serials are no longer the format of choice for access, acknowledging that "large-scale digitization of print journal collections has led to most access needs being met via digital surrogates."[149] The role of print in today's information environment is therefore primarily one of preservation. With space at a premium at most libraries and budgets tight because of the economic recession, the Ithaka report aimed to address which print titles libraries could responsibly withdraw. Through their analysis process and interviews with librarians, the authors determined that few titles can currently be withdrawn from academic library collections. However, print versions held in two print repositories, such as those titles included in JSTOR, are candidates for withdrawal. The report discussed several reasons to retain print, including "the need to fix scanning errors; insufficient reliability of the digital provider, inadequate preservation of the digitized versions, the presence of significant quantities of important non-textual material that may be poorly represented in digital form; and campus political considerations."[150] Libraries can undertake numerous strategies to increase the number of titles they can withdraw by making the academic community aware of local preservation efforts, upgrading digitization efforts when quality is low, and participating in large-scale preservation and storage programs.

O'Connor and Jilovsky examined many of the preservation efforts that could help address concerns presented in the Ithaka report.[151] These solutions include national repositories, repository libraries, and last copy programs. One example is the Universal Repository Library (URL) vision, which grew from the International Conference on Repository Libraries and proposes to link repositories on an international scale. Another initiative discussed is ASERL's "virtual storage collection to . . . assist with the identification of last copies and the wider availability of low-use materials."[152] The authors described common threads in the literature on print storage, including the value of institutional storage facilities versus collaborative efforts, the need to analyze the costs associated with print retention, and the issue of materials ownership.[153] O'Connor and Jilovsky argued "that a network of national . . . print repositories will provide the most reliable and cost-effective solution" to print storage.[154]

The "Key Issue" column in the journal *Serials* reviewed the UK Research Reserve (UKRR) pilot project, a promising national repository initiative identified in the Ithaka Report.[155] Crawford's overview of the UKRR pilot provided a brief description of the collaboration between the British Library and higher education institutions in the United Kingdom to create a shared collection repository. Access to materials held in the print repository is provided through document delivery, and at least two additional print copies of the included titles are held by participating libraries. This project has freed more than eleven thousand meters of shelf space, allowing universities to repurpose this space for study areas, workspaces, and new collections.

Several articles in the literature discussed tools to assist deselection. Ward and Aagard described one library's process of evaluating the collection for titles to withdraw using the WorldCat Analysis tool.[156] In this example, librarians created a subject list of titles with information about duplicate holdings at peer institutions. This information was used to create criteria for deselection. Sorensen described the use of a database tool developed using Drupal, called the 5K Run Toolkit, to assist with managing a deselection project.[157] The library identified three categories of material for possible storage or withdrawal: print journals available through JSTOR were considered for disposal, print journals available online through the publisher were considered for storage, and print journals available through an aggregator also were considered for storage.

Lingle and Robinson provided a well-written, two-part case study describing a health sciences library's project to deselect print and replace high-use print journal titles

with online backfiles.[158] The demand for space to build a clinical simulation facility precipitated the transition from print to electronic-only. Part 1 of this series described how the library made their deselection decisions through usage data, an assessment of stable online content, and an overlap analysis with other university campuses. Librarians also considered the availability of online backfiles. Part 2 detailed the decision-making process using these factors, including ILL, and detailed the implementation process needed to ensure a seamless transition of the collection for patrons. The authors noted "people clearly prefer the convenience of full-text access to the journal literature from their office or remotely from anywhere with an Internet connection."[159] Users revealed, however, a continued desire for a current journal reading area and a need for more computer workstations to support access to the online collection.

Web 2.0

Influence of the Internet and Web 2.0 on Scholarly Communication

Ending this literature review as it began, with a definition from Wikipedia, seems fitting. Wikipedia defines "Web 2.0" as the "participatory Web," being associated with "web applications that facilitate interactive sharing, interoperability, user-centered design and collaboration of the World Wide Web."[160] Dodds expanded further on the fundamental concepts behind Web 2.0, such as community, collaboration, and participation, in his well-written article "The Threads of Web 2.0."[161] Dodds emphasized the value of networked services and the interweaving and integration of data across the web through the evolution of technology standards. Dodds described Web 2.0 as a "move away from the Internet as simply a platform for exchanging information, towards the Internet as a platform for creating and working with information; moving from a distribution system towards a collaborative environment."[162] He provided advice to publishers on how they can further embrace Web 2.0 technologies while providing content to users on the web. Publishers need to identify and create opportunities for connections across their user community and should allow for public sharing of information through mashup technologies to both integrate and participate within the web environment on a more global scale.

Abram also provided an overview of Web 2.0 technologies, outlining many of the applications that exemplify Web 2.0 concepts, such as RSS (really simple syndication) feeds, wikis, blogs, widgets, APIs (application programming interfaces), streamed media, and social bookmarking.[163] He included open source systems as well as the open access

model for publication as examples of Web 2.0. Abram directly related Web 2.0 to librarianship through a brief discussion of the characteristics that define "Librarian 2.0," namely, the willingness to learn new tools to facilitate work, adopt and integrate the Open URL across library services, and incorporate nontraditional cataloging such as user-driven tagging and folksonomies. Abram touched on the theme of content over format, noting that librarians with Web 2.0 sensibilities should be "container and format agnostic."[164] He explained that Web 2.0 "is primarily about a much higher level of interactivity and deeper user experiences, which are enabled by the recent advances in Web software combined with insights into the transformational aspects of the Internet."[165]

The transformative effect of the web also was discussed by Kaser, who provided an example of the potential influence of Web 2.0 on electronic journal collections.[166] Kaser acknowledged the importance of the collections themselves, but noted that Web 2.0 applications "layered on top of the collection" will "get at knowledge in new and exciting ways."[167] For example, Web 2.0 applications such as social bookmarking and tagging not only enhance the discoverability of electronic journal collections, they also can personalize these collections by allowing the user to associate their personal context through descriptors and comments. Users are able to engage scholarly content to support contextual learning, a process much more valuable than simple exposure to a closed scholarly communication process. These applications provide users with a greater opportunity to become part of that scholarly community.

Examples of Web 2.0 Support For Serials Management

Numerous innovative uses of Web 2.0 applications to support management of serials and electronic resources were discussed throughout the literature. Badman and Hartman as well as Sutherland and Clark discussed the use of Web 2.0 technologies, such as RSS feeds, to create virtual journal reading rooms for patrons.[168] Badman and Hartman provided useful explanations of RSS technologies that aggregate, deliver, and organize feeds and discussed the value of creating virtual reading rooms to increase awareness of the journal collection. Both sets of authors mentioned the JISC-funded ticTOCs (a journal table of contents service) project as a great resource for aggregating journal feeds from a variety of publishers and vendors for searching and browsing.

ERM also could use Web 2.0 tools, such as blogs, twitter feeds, and chat programs, to facilitate communication between librarians and their peers as well as vendors and publishers. Emery discussed communication benefits from social networking for electronic resource librarians, including quick consultations with colleagues to resolve problems, mining for ideas to improve local workflows, and attending

virtual conferences to stay current with the field.[169] Along these same lines, Wood commented that librarians can use tools like blogs and RSS feeds to stay up-to-date about happenings and trends in the profession.[170] Numerous blogs provide information "about issues involving the acquisition and utilization of electronic resources, from licensing issues to digital rights, from copyrights to open access."[171]

Managing access to electronic resources to enhance their discoverability is another common use of Web 2.0 technologies. Kapucu, Hoeppner, and Dunlop described how the University of Central Florida used social bookmarking through Delicious to provide additional, customized access to library databases.[172] The authors discussed the value of tagging social bookmarks for "users to personalize their links, impart ad hoc organization, improve findability, and lay the ground work for social networking."[173] Churchill and colleagues described the use of social bookmarking as a core component of the Repository of Interactive Social Assets for Learning (RISAL) Project, which serves as a repository of resources such as articles, websites, and presentations used for learning and instruction.[174] The resources and bookmarks (called assets) included in the system can be tagged, embedded, linked to, ranked, and categorized to allow for sharing and reuse. Instead of these class resources living on individual student spaces or hidden within course management software, this experiment aims to create a growing network of assets and build a collaborative Web 2.0 environment to better support classroom instruction.

Other Web 2.0 examples discussed in the literature showed enhanced accessibility of electronic resources through the library catalog. Kemp discussed the integration of Web 2.0 technologies with the catalog, including mashups, tagging, and recommender features, in her discussion of advancements supporting serials cataloging.[175] Kemp described future scenarios of how these Web 2.0 applications can enhance the search experience. In another article by Singer discussing linked data, the primary focus is not necessarily library catalog functionality but the metadata within it.[176] Singer opened the column with a description of problems with library data, such as the duplication of data and the self-contained, nonrelational nature of this kind of data. He then defined the linked data "movement whose intention is to make these data structured, reusable, machine-readable, and interrelated."[177] After outlining the mechanics of linked data, such as using Uniform Resource Identifiers (URI) for naming, Singer provided a useful example of linked data within a library context, describing the potential linking effects across vended and local library systems when URIs are assigned to journal titles, database names, and organizations. He argued that libraries need to abandon the closed nature and controlled vocabularies of their data, utilizing linked data instead as a means to integrate with the web and remain relevant to the future information environment.

Conclusion

Ogburn, in "Defining and Achieving Success in the Movement to Change Scholarly Communication," discussed five stages of transition libraries need to experience to achieve a cultural shift in scholarly communication.[178] These stages include awareness, understanding, ownership, activism, and transformation. The last of these stages, transformation, "equates to attainment of a profound alteration of assumptions, methods and culture."[179] Ogburn rightly noted that this last stage is difficult to achieve, but one could argue on the basis of the serials literature of 2008 and 2009 that the serials profession is well positioned to realize and support a fundamental change in scholarly communication. The literature of this period presented the economic crisis as a catalyst for change because many librarians were experimenting with pricing models and valuing access over ownership. The economic crisis also has elevated the tensions behind the serials crisis, which almost assures serials professionals' willingness to support alternative models of scholarly communication. Other themes in the literature such as the increasing value of consortia, building of collaborative storage and national repositories, and enhanced communications through Web 2.0 technologies revealed an enhanced sense of community across the profession. Examples of information professionals embracing openness through development of open systems, support for standards, and promotion of open access also abound in the literature. The role of the web as a platform to distribute information is forcing the library and publishing communities to connect and build services on the web to stay relevant. The web has served a critical role in stripping any residual sacred cows from the serials profession, including the definition of a serial, the value of content over the container, the prioritization of access over ownership, the future of local collections, and even the future of the ever-increasing serials budget given the possibilities of an author-pays pricing model. Like it or not, serials professionals have found themselves in the midst of a transition. By embracing the core tenets of openness, such as community, interoperability, and accessibility, serialists are in fact participating in the transformation of scholarly communication.

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