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Digital Infrastructure Development within a Nonprofit Polymer Science Library: An Analysis of the Transition to Digital Serials at the Michigan Molecular Institute

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**Digital Infrastructure Development within
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An Analysis of the Transition to Digital Serials
at the Michigan Molecular Institute**

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Abstract

The authors analyze the issues that the Michigan Molecular Institute Library (MMI) will face in making the transition to digital serials. Supporting a specialized research institute, the library has a limited number of serial subscriptions (68) from a large number of publishers (42). Furthermore, its specialized nature limits the number of potential consortia partners. Strengths include a user community of skilled researchers in a well-defined research area. In making the transition, MMI will encounter both similar and different issues than those found in larger academic and research libraries. Topics covered include current access, planning, licensing, archival concerns, interlibrary loan, interoperability, and emerging trends. The authors recommend that the MMI librarian periodically evaluate the collection strategy in keeping with changing trends.

Introduction

“The growth of e-journals in science and technology indicates that most science libraries now need to make a short-term or long-term plan to convert their print journal collection in such disciplines to an electronic format. The question shifts from that of ‘why’ to ‘when’ and ‘how.’”¹

This statement captures the reality that faces scientific libraries as they plan for digital collections. Like Gandhi, Judith Eastland, Director of Information Resources (MLIS) at Michigan Molecular Institute (MMI), seeks to build a quality electronic journal collection that will enhance research opportunities for the professionals who work there. It is a challenge for her to begin such an undertaking in this specialized scientific library because most literature about digital conversion focuses on public or academic libraries with larger collections. Eastland’s strategic plan for the library, written when she was hired for the position in 1995, included all the electronic resources now in use. The periodic revision of that plan currently underway provides an excellent opportunity to reevaluate the role of electronic resources. This article identifies steps that can help assure a successful transition for MMI to a digital environment and includes a description of the current information infrastructure, research norms at the institute, and elements pertinent to the creation of a conversion plan. Finally, the authors discuss several outside factors that will likely affect decision-making and will impact the planning process at MMI.

Literature Review

A review of the literature revealed no publications about digital serial transitions specific to small, specialized, nonprofit science libraries. Publications with some relevance either reported transitions specific to chemistry collections in large universities or offered general transition guidelines for all information centers.

Subash Gandhi’s study² states that most science and technology libraries ought to create plans for digital conversion. The objective of his feasibility study was to create a scientific electronic journal collection for use at the City University of New York (CUNY), a large research institution. The nature of the collections and the planning process at CUNY are not readily applicable because the patron population and serial collection differ greatly from MMI’s resource center.

Similarly, Tina E. Chrzastowski's 2002 Los Angeles SLA presentation³ described the rationale and research behind electronic serial conversion within the chemistry library at University of Illinois at Urbana-Champaign. Although informative, this presentation did not address the unique concerns of a specialized library that primarily serves professional researchers.

In addition to such academic research, authors such as Carol Tenopir have reviewed the electronic serial environment to chart a course toward optimum patron-centered electronic collection development.⁴ Groups such as the International Coalition of Library Consortia (ICOLC) have been formed for the purpose of creating a collective library strategy for the responsible acquisition of electronic serials.

Several authors echo the need for an objective-centered collection strategy. Health science librarians, Jonathan Lord and Bart Ragon, emphasize collection policy building that is uniquely tailored to meet the needs of this specific patron population though they also take into account the challenges brought about by the current library market.⁵

Finally, several monographs assist librarians with electronic collection development. One such source, *Building Electronic Library Collections: The Essential Guide to Selection Criteria and Core Subject Collecting*, by Diane Kovacs,⁶ was reviewed for the purpose of determining whether or not the content would be useful for specialized chemistry libraries. While the advice given, such as preparation for workflow changes, is helpful guidance for any general library, the scientific resources listed are more appropriate for secondary and undergraduate academic settings. To date, no one has studied the special challenges that a small, specialized, nonprofit science library will face in constructing an enduring collection development strategy for electronic resources that will meet the needs of its host institution.

The Michigan Molecular Institute and Its Library

MMI is an independent organization that performs nonprofit research in polymer sciences and technology. Over the past thirty years, institute researchers have published several hundred articles in professional journals and have obtained numerous patents. MMI also offers courses to professionals as well as to students from many different colleges. Students come from various

universities and corporations including Saginaw Valley State, Central Michigan, and Michigan State Universities, Dow Chemical, and Dow Corning. There are typically five to ten students per semester. Two courses are taught yearly. Although MMI does not award degrees, students receive credit from their colleges. These students use a special collection of reference books that have been provided by the faculty member who is teaching the course, and no electronic resources are specifically provided for these classes.

Cherie Hutter, vice president of Human Resources and CFO of the institute, describes MMI's work as "contractual," in that it cooperates with a "business, university, or government agency to produce the scientific work that they request."⁷ The institute is, therefore, organized into professional groups that are assigned to specific scientific research projects that change over time. As of February 2003, the groups include:

- a BAE Army grant to design, develop, integrate, manufacture, and support a wide range of advanced aerospace and intelligent electronic systems for government and commercial use;
- a Life Sciences Corridor project, funded by Michigan Economic Development Corporation, that is concerned with food quality sensors and serves as an incubator for new life science companies;
- a dendrimer study that artificially manufactures or synthesizes molecules built from monomers;
- a soy bean research project to develop coatings and lubricants;
- various recycling projects; and
- an in-house analytical recovery group that is ISO 9000 certified.

MMI's library, the Raymond Boyer Resource Center, is a special collection that emphasizes polymer and material science. The architect, Alden B. Dow, placed the circular library at the core of the building so that it could be immediately accessed from offices and research labs. The main level

holds all the books, reference materials, and polymer journals. It also includes a large reading area. The lower level houses two offices, computers, and additional chemistry journals. Currently, the library serves thirty-seven full time and three part time employees, seventeen independent contractors, and four high school or undergraduate student cooperative interns. Thus, compared with the average college or university library, MMI has a small, specialized user community.

The library has over 3,600 books and monographs. It makes its library holdings available via the Online Computer Library Center (OCLC) and is also a member of the Michigan Library Consortium (MLC). The MMI cost center obtains new resources for research projects and charges back the expenditures to the proper project's account. The center also allocates a certain lump sum to each group for laboratory supplies. Library resources are allocated as laboratory expenses. MMI has spent about a quarter of a million dollars on research information and materials during the last five years.

Employee projects require the availability of certain in-house journals, as well as access to online sources. In addition to the more obvious research needs of chemistry professionals, a small number of periodicals reflect the needs of employees, like the CEO, who are concerned with matters such as accounting, personnel, and other management issues.

MMI Resources

As of 2003, the total budget for periodicals was \$50,000. The center currently subscribes to thirty print titles through EBSCO at a cost of \$39,000 per year. The additional \$11,000 is used to purchase standing orders and serial titles not available from EBSCO, to pay for unexpected subscription price increases, and to order a few key journals requested by researchers. MMI holds approximately sixty-eight titles from about forty-two different publishers. The number of periodicals obtained from any one publisher is surprisingly small with less than a dozen providing between two and six journal subscriptions; the remaining publishers each provide only a single periodical title.

In addition to the print journals, MMI subscribes to SciFinder and STN Easy from Chemical Abstracts. As described below, the two services meet different needs and have varying usage limitations and pricing structures.

MMI has a SciFinder package of three hundred and ten searches per year at a prepaid cost of \$7,300 or \$23.59 per search. This package enables access by an unlimited number of patrons. Eight researchers currently access this online database. That number is based upon both individual need and prior training in its use. One feature that adds to SciFinder's usability is that it provides truncated lists when spelling or detailed source information is incorrect or incomplete. Another advantage is that it is a cost-effective way to begin a broad search, leave the computer for a period of time, and then come back to refine it. MMI researchers are pleased with SciFinder's expanded archival coverage that now includes sources from 1900 to the present.

STN Easy, another online database source, is most often used by the resource center director to verify author and citation information for researchers. Each hit costs between two and five dollars; abstracts cost an additional four dollars. Monthly charges arrive in a format similar to a telephone bill. Employees typically do not use this source because SciFinder is more cost-effective and easier to use.

Other online sources allow MMI to pay for individual searches as needed. These include Chemweb and Science Direct. For a fee, researchers can also obtain updates about specific subjects through Chemical Abstracts. In addition, the library is a limited member of OCLC. This membership category allows MMI to borrow and lend materials and to use certain additional services.

MMI uses an Intranet to post inventory information and commonly used forms. The Intranet also provides access to an in-house database, Electronic Online Systems International (EOSI), that serves as the library's catalog. MMI purchased EOSI in 1996 at an approximate cost of \$10,000. MMI would like to include this catalog on its Web page. While EOSI includes traditional library materials such as books, monographs, and serials, it is important to emphasize that, while it is a useful tool for checking the availability of a serial, it does not provide direct links to articles. In summer 2004, MMI plans to migrate to a Horizon integrated library system, a more cost-effective alternative, that will be implemented by the Valley Library Consortium.

The majority of the information needs of MMI professionals evolve around the research projects that are carried out there and vary as projects change. The most requested information includes access to papers, patents, databases, standards, and general background information about chemical products. Most of the projects at MMI take place over the course of three to five years.

There are some differences in journal needs as projects change, but many core titles remain the same.

Assessment of Needs

At a library advisory meeting held on July 29, 2002, three representative scientists said that the current nature of their work has mandated quick-paced information gathering that leaves little or no time for browsing. Although they prefer to have a paper copy to read when it is available, they also understand that digital collections are now becoming the norm and realize that it may not be possible to continue subscribing to journals in both formats.

One of the challenges of the resource center is to find out how better to assist some professionals when they do not obtain information through the resource center. In 2000, the resource center director conducted 56 searches; in 2001, 212. The resource center director knows that one reason for lack of library use is the fact that some MMI scientists are skilled at gathering their own information and build upon their prior research; therefore, they tend to know the key players within their subject area and can perform successful independent searches.

The scientists agreed that maintaining archival access is a necessity. They are pleased with their current archival access, but they want online collections in order to create more room. Shelf space available in the primary research area is very limited and will require making decisions about journal retention within the next few years. The advisory council set a goal of providing alternative housing for older materials without discarding core periodicals. This decision was based in part on a discussion with Anita Dey, Head, Reference Services, at Saginaw Valley State University's (SVSU) Melvin J. Zahnow Library whose library had discarded important print journals that subsequently became unavailable in digital format.⁸

MMI professionals want a quality information infrastructure that will enrich the needs of all who use it. Researchers are weary of changing consumer trends and want to spend as little time and resources as possible in learning radically different search strategies and in purchasing new packages that do not offer significant improvements. Although they know that updating equipment is sometimes necessary, they do not want to contend with the unanticipated obsolescence of their investment. MMI researchers, on the other hand, are largely adept at digital information gathering,

know how to use the Internet effectively, want to keep up with important technological advancements, and are not intimidated by small variations in online search tools.

The purchase of some e-journal packages could negatively affect existing norms that work well for MMI and its patrons. For example, interlibrary loan (ILL) rules may be affected. The institute benefits greatly from ILL and anticipates receiving approximately 1,000 interlibrary loans in 2004. Although agreeing to not provide ILL for e-journals is beginning to be accepted at larger institutions, this change does not make sense for MMI because it depends upon reciprocal ILL agreements. The Michigan Library Consortium currently bills MMI for an ILL service called LVIS (Libraries Very Interested in Sharing) where MMI pays \$25 annually for a reciprocal agreement in which all paying members agree to interloan for free any request that can be fulfilled. How will online journal packages that have restrictive ILL license provisions affect the budget when such factors are taken into account? In addition, many quality resources, such as the ISI *Web of Science*, that are commonly used in large academic and corporate settings, are not financially practical for the Institute.

Will it be reasonable to cite ILL availability information on OCLC if only a small part of the collection is available for interloan? This problem may be unique to libraries of MMI's size and status since large corporations tend to own most of their content and most academic environments are not as research-driven as specialized science institutes. In addition, OCLC's ILL interface apparently does not have the capacity to indicate limited ILL availability on account of restrictions on digital resources. A non-lender symbol indicates that an institution is not willing to loan any materials. If an institution categorized as a lender cannot loan a journal due to licensing restrictions, no notation is available to indicate this. In such a case, an ILL librarian could often place an ILL request only to be forced to notify the patron that the source could not be acquired. Whether such restrictions will greatly impact MMI's participation in interloan agreements and in time spent searching for unavailable materials is not yet known.

Another major factor in making any decisions within this environment is that the Raymond Boyer Resource Center is staffed by one part-time librarian. Therefore, the resource center director must constantly find ways to optimize her time. She balances her priorities between her primary goal of meeting the informational needs of her patrons with her need to know what the best and most enduring information investments are.

Initial Considerations for Creating a Digital Collection

Gandhi's study reviewed the research and digital collection building practices of other academic institutions in an effort to explore how best to move forward in the context of a specific scientific research environment.⁹ Similarly, the MMI administration needs to consider many factors before building an electronic collection and establishing practices that will meet the needs of MMI's researchers now and in the future. In order to create such an environment, the resource center director must stay abreast of such issues as legalities, new technologies, power struggles among competing products, and emerging trends within the market because these factors can undermine or ultimately destroy a structure built with little forethought. Therefore, to assist in the planning process, this section analyzes these realities in detail.

Initial Considerations for Creating a Digital Collection: Planning

Engaging in overall planning, anticipating licensing issues, and ensuring archival access are especially necessary during the initial phases of digital infrastructure foundation development. Jonathan Lord and Bart Ragon make this point and suggest that the very first step should be a "well written electronic collection policy" to serve as a "blueprint for building a digital library."¹⁰ The authors, both health science librarians, say that such a plan can also be a beneficial tool for negotiating with vendors. For that reason, the policy should clearly outline what is and is not acceptable within the context of a library's objectives and list viable alternatives in case a desired scenario is not currently possible. The article contains a checklist that may be used to evaluate a potential electronic resource, but that list is rooted in their own library's current strategic plan. The authors note that priorities will vary within specific environments in accordance with an entity's overall mission and objectives.

The International Coalition of Library Consortia (ICOLC)'s *Statement of Current Perspective and Preferred Practices for the Selection and Purchase of Electronic Information*¹¹ is a helpful overview of current professional thought about e-journal acquisition and can therefore be useful when building a foundation for a digital information structure. Arnold Hirshon, Tom Sanville, Ann Okerson, and David Kohl have gathered relevant information for librarians with the goal of creating a common vision to maintain fair use as e-journal environments continue to evolve. ICOLC outlines

specific problems that libraries are encountering and describes what needs to happen within publishing and research communities in order to foster a healthy research environment.

As authors such as Gandhi, Lord, and Ragon suggest, a well-written strategy describes how the library will fit into the larger context of its host institution and what it will do to empower its researchers.¹²⁻¹³ This agenda will become the driving force behind the plan. Once this process is complete, decision makers can evaluate potential packages with a list of criteria that have already been adopted. Quality packages that do not fit the existing plan perfectly may be acceptable with some revision, but the driving force will still be clear enough for the overall objectives to be met. This use of clear, predetermined criteria will help the library avoid making purchases that do not fit the institute's long-term needs. Package deals meant to entice the library into buying resources that it does not need will become less persuasive.

Such a collection-building plan should also include goals about the number of electronic resources to purchase and a timeline for their acquisition. Ann Okerson, a Yale collection development librarian, co-author of the ICOLC statement, and a major contributor to library and information science literature, suggests that librarians plan a complete conversion as quickly as possible because patrons prefer electronic access when it is available and because publishers will soon phase out print in favor of electronic resources.¹⁴

Okerson asserts that user preference for electronic resources should drive information specialists to “strengthen consortia as customers for scholarly and scientific information, strategically aggregating demand and supporting an active consumer agenda.”¹⁵ Consortium development favorable to MMI has been negligible, due in part to the minute number of such libraries. The size, nonprofit status, and specialized interests of such libraries make it difficult to find other libraries to collaborate with since possible partners are often corporate libraries that find it more difficult to enter into consortia agreements. Furthermore, potential partners with MMI's specialized collection focus must be international because no similar research institutions exist in the United States. Yet international cooperation is made more difficult because e-journals are “still in their infancy in the rest of the world” with the exception of the United States and United Kingdom.¹⁶

Gandhi reports that libraries, such as Drexel University, are making the decision to convert completely to e-journals, which might “become a typical scenario for most academic libraries.”¹⁷ He

concludes that each library ought to create short and long-term plans to make a complete conversion. Such academic trends will inevitably affect the market; Gandhi predicts that e-journal prices will ultimately go down.¹⁸

Opinions about the speed of digital conversion vary. Jeff Slagell, the head of serials and ILL at Delta State University's W.B. Roberts Library in Cleveland, Mississippi, urges some caution regarding the e-journal market:

“This new medium wears both white and black hats, and it's our responsibility to determine its most appropriate usage. Don't let your evaluation be influenced by hype and what everyone else seems to be doing. After the initial excitement, you may discover that shifting from print to electronic versions in some cases is not the best option for your institution.”¹⁹

Although some libraries are exercising caution about digital conversion, they appear, nonetheless, to be doing so based on a vision of complete digital access tailored to the needs of a specific user population.

To envision a coherent structure that will fit well with MMI's needs without investing a great deal of time to research the market is a challenge because the functions of businesses that cater to information centers often overlap and are not made clear up front. In addition, there is no defined norm for the services that providers perform because services change constantly as vendors vie for and respond to consumer preferences. An initial overview of the market allows one to create a running list of likely contenders for current or future use that is based upon whether or not those businesses are planning to grow in ways that will benefit the resource center.

How can an aggregator, publisher, or vendor assist a library or resource center? Some sources discuss the usefulness, scope, and reputation of these information providers. For example, in 2001, Carol Tenopir, Gayl S. Baker, and William Chandler wrote “Racing at Full Speed.”²⁰ This publication is the fifth in an annual series known as the “Database Marketplace.” It profiles companies that perform services for library and information science establishments and describes current partnership information, technological advancements, consortia updates, etc.. The publication

analyzes science-related journal delivery groups such as BioOne, SPARC, Ingenta, SciFinder, EBSCO, and Elsevier and lists contact information. If updated regularly, this source should be a useful tool.

The diversity of publishers in MMI's specialized collection, the lack of staff time available, and the absence of realistic consortium development have led the resource center director to the preliminary judgment that MMI should select an aggregator for its future digital conversion. Cataloging and interface are two components that need to be carefully considered when pursuing this option. The aggregator does not always supply cataloging; and future decisions to work with aggregators, vendors, or publishers may result in MMI employees having to use multiple interfaces.

EBSCO is currently under consideration as the most likely aggregator. This decision was made after researching other possibilities, none of which were found to be cost effective in relation to the percentage of MMI periodicals available within a given package. According to EBSCO invoices for the Institute, about 50 % of the journals ordered through them are available for an on-line plus print cost. Their overall reputable image and reliable history with MMI make them a solid candidate for the initial purchase of digital resources. EBSCO's history with MMI includes a commitment to improved services.

Recent articles report that EBSCO is headed in positive directions. In "EBSCO Releases EBSCOhost WEB 6.0," Paula Hane describes the product as "an enhanced version of its flagship EBSCOhost interface" that includes an improved graphical user interface with a spell checker and the ability to mark records.²¹ In addition, users can choose between basic and more advanced search methods that use Boolean logic. While many customers favor the system, it is not clear how well these advanced search capabilities would work in environments specific to polymer chemistry. Another growth area in the company includes increased archival coverage. EBSCO made an announcement in *Library Journal* that it currently plans to increase coverage to 1965 or date of first publication for many subject areas and that similar EBSCO projects are under construction for scientific disciplines.²² As with any company, it is equally essential that MMI's decision makers investigate EBSCO's stability and evaluate its balance sheet for financial soundness.

Gandhi cites Ingenta as a direct competitor with EBSCO in supplying online scientific literature.²³ While Ingenta is heading in useful directions, others note its current shortcomings. For example,

Mike O'Leary reports that the London-based business is both "at the forefront of the latest Web aggregation trend" and that it is "a confusing hodgepodge of content types, delivery formats, authentication methods, and pricing structures" O'Leary states that Ingenta's latest business ventures include the acquisition of UnCover and CatchWord and that its limitations include a lack of "subject indexing or special, topic-related indexing, such as chemical name or research population" and that full-text is not immediately accessible.²⁴ Tenopir describes Ingenta as "part e-subscription agent, part article vendor, part document delivery company, and part online service provider," and predicts that its growth is likely to continue.²⁵ She says that its "strength lies in providing indexing and full text from peer-reviewed research journals." Tenopir notes that it is geared toward both academic and corporate libraries and supplies full text access to about 5,400 journal titles.

Another possibility is that MMI could order some individual online titles directly from publishers, but this would greatly increase paperwork and could result in higher average journal costs. If no consortia or aggregation packages exist that would be favorable to MMI, this option could be strategically pursued at a future time.

Access can become increasingly complex with multiple search engines if e-journals are obtained from a variety of sources. In this case, increased computer support may be needed to simplify patron access. Software can, for example, condense searches by integrating data from various aggregation packages through standard cataloging conventions such as MARC records and PURL links. Although the capabilities and price ranges vary for such software, each has a similar goal of providing the services needed to provide integrated access. The *Directory of Library Automation Software, Systems, and Services* is published biannually to assist in such decision-making.²⁶ The 2002-2003 edition, edited by Pamela Cibbarelli, is currently in print. In addition, it would probably be beneficial to survey a sample of similar sized libraries to get an idea of what systems are in use, how effective they are, and what the maintenance costs are.

Initial Considerations for Creating a Digital Collection: Licensing

With each purchase of electronic journals, the resource center will have to negotiate license agreements. These contracts govern how electronic resources may be used and take precedence over copyright law. Several sources emphasize the need for a lawyer to review such contracts so that

principles of fair use remain intact. Gandhi²⁷ lists two reputable Web sites to assist librarians in becoming familiar with licensing norms: <http://www.licensingmodels.com> and Liblicense-L at <http://www.library.yale.edu/~llicense/index.shtml>.

In 1997, the Association of Research Libraries (ARL) published a source entitled, “Principles for Licensing Electronic Sources.”²⁸ ARL emphasized the need for librarians to become active players in the negotiation process and clarified some specific issues that information specialists should address. For example, the statement says that librarians ought to ask the licensor whether or not special needs specific to an institution will be taken into account within the contract. In addition, they should see that important terms have been defined so that they fit their specific user population. The contract should remove any ambiguity for terminology such as, for example, “archive,” “authorized use,” “concurrent use,” “local area network,” and “site.”

Library literature also offers examples of scenarios where libraries have agreed to unfavorable contract terms and provides suggestions for preventing such outcomes. MMI should insist that all litigation take place in state so that MMI will not have to send lawyers and witnesses elsewhere. Perhaps more importantly, the Institute would not have to litigate in Virginia or Maryland where the Uniform Computer Information Transaction Act (UCITA) has been enacted. This is significant because UCITA authorizes contractual practices that favor software publishers. As a result, consumers may not have legal remedies for defective software that they would have in other states.

Aside from such usage details, what will happen if an aggregator or publisher merges or goes bankrupt? How will such a change affect archival access? Other issues, such as responsibility for technological problems and downtime, should also be addressed. It should be made clear whether or not a refund will occur if the contract is breached without correction.

For ILL concerns, the resource center director will want to note areas within the contract that address this topic. According to Ruth Dukelow, associate director, Michigan Library Consortium, the contracts for some electronic journal packages permit interlibrary lending; but there may be restrictions.²⁹ For example, an article might have to be printed and then mailed or faxed as opposed to being delivered electronically.

Initial Considerations for Creating a Digital Collection: Archival Access

The literature about digital archiving proves the topic's complexity as a contentious area that is being discussed worldwide and that is rapidly changing. Electronic access is different from print because one may not own the journal but instead pay for the right to use it. Problems with this model from an archival perspective emerge as vendors lose their right to carry a specific journal that is in electronic format and stop offering it to their customers. If the library does not also own a print copy of the journal, then the information it had previously accessed will no longer be available to its user community. To ensure patron access in case such an event should occur, MMI now plans to archive its own journal collection; but this decision will cost space, money, and time. Tony Stankus says that, in addition to the cost and environmental upkeep of a designated archival space, an institution should count on having about three feet of shelf space per journal available yearly.³⁰ He says that hidden costs of archived journals also include binding and all of the preparation time connected with that task. Stankus notes that this alone accounts for 5-10% of a "typical university budget" and that the amount increases if missing issues need to be replaced. While such maintenance costs would not exist in a perfect e-journal environment, Stankus believes that most libraries must maintain print archives because they are currently more stable and reliable than electronic access.

Because of variables such as the research, project-based nature of the institute, its specialized subject matter, budgetary constraints, and future developments in the vendor market, it is difficult to predict when MMI ought to abandon print archives. As its electronic structure develops, perhaps another study regarding the consumer environment of online archives may become necessary.

Tasini vs. The New York Times (2001)

In addition to consumer demand in the market, future developments in electronic journal collections might depend on the outcome of current legal cases, emerging trends, and digital projects. Some librarians fear that the Supreme Court decision (2001) in the case of *Tasini vs. the New York Times* will have the result that certain online journals will be incomplete. This case occurred when a newspaper that owned copyright for the print version then made the text available in electronic format without obtaining permission from the contributing authors. *Tasini* won a court decision that publishers need explicit permission from authors for electronic publication. Libraries

worry that e-journals could have missing sections if authors, such as those who created specific scientific diagrams, choose not to have their works published online.

Such concern is warranted. Tenopir says that the “Tasini Supreme Court decision in the United States is already having an effect as general news and magazine databases are removing articles written by freelance authors. These articles are disappearing into a black hole, likely never to be seen again.”³¹ In addition, Kent Mulliner writes that the case “has yet to run its course,” and will likely impact such things as digitization projects and will increase overall maintenance costs that vendors will likely pass on to consumers.³²

Emerging Trends with Potential Impact

Lee Van Orsdel and Kathleen Born suggest that “flip pricing” will soon become the norm for journal collections. In this model, consumers would not pay for print with the option of obtaining free online access to a journal; instead, they would purchase online sources with the option of obtaining print for free or at a reduced cost. Library’s increased preference for electronic over print access, say the authors, shows why librarians prefer this model even if archival problems have not been resolved. The “ramifications for the market are huge” as e-journals become the principal product.³³

Another variable that could affect the market is the initiative to change the scholarly communication model with the goal of curtailing the inflation rate of serial subscriptions. Jeff Belle summarizes three projects:³⁴

The first, the Scholarly Publishing and Academic Resources Coalition (SPARC), was created by a worldwide coalition of librarians. SPARC offers an alternative publication option to researchers that competes with high-cost prestigious journals. There are arguments both for and against SPARC’s probable success. Some, for example, believe that large numbers of researchers are not likely to use this alternative. Despite promises to the contrary, others say that SPARC could become another expensive bureaucracy.

The second, the Open Archives Initiative (OAI), founded at Cornell University, is creating an extensive archival collection that will be made available to scientists at no cost. This collection will

“promote common metadata standards” in order to make it easier for scientific researchers to maneuver a vast network of publications. Publishers are already creating competition through Crossref, a source that uses hypertext technology to allow researchers to link directly to articles that are cited in their research.

Finally, the National Electronic Site License Initiative (NESLI) is a United Kingdom centered consortium that is “committed to unbundling print journals from ejournals.”³⁵ Just as the aforementioned rationale for flip pricing, NESLI wants to see pricing models change so that electronic-only access becomes a reality.

Yet, publisher revenue continues to be maintained by factors such as “prestigious research institutions” that will pay higher subscription rates to maintain their stature and by those who value the reward of being published in high profile journals.³⁶

Finally, the authors of this article see the possibility of radical change if vendors were to offer the opportunity for specialized libraries to purchase individual articles in their narrow, subject fields. MMI, for example, would place an order to purchase an electronic copy of all articles on polymer chemistry, no matter in which serial title the article appeared. Journals might eventually disappear as a “container” to be replaced by a more article-based system. Such a system would bring revolutionary changes to the current scholarly communication model and have a profound effect upon journal publishing and marketing.

Interoperability

Interoperable technology can play a vital role in research access at MMI. Arms describes interoperability as the “task of building coherent services for users from components that are technically different and independently managed.”³⁷ This involves the use of standards such as Z39.50, MARC, and the HTTP protocol that are used in the creation of metadata so that libraries may network and retrieve digital objects from one another with a common and stable computer language. Such objects can include items such as pictures, experimental diagrams, and articles. For example, if MMI's recent study of the Shroud of Turin had taken place in a time in which interoperable systems were widely used, the resource center could have digitally retrieved relevant experimental data collections upon request. Some authors argue that there are many problems with

interoperability. For example, William Moen concludes that it is a very complicated endeavor and that more research is needed before it becomes truly useful.³⁸

Yet, the ICOLC statement supports and encourages such development to the extent that “licensed content should be portable to all major computing platforms and networked environments” and should use accepted standardization conventions. Licensing should also allow for information to be integrated “into local system infrastructures.”³⁹

Some exciting advances relevant to the physical sciences have occurred in interoperable systems. In “A Spectrum of Interoperability: the Site for Science Prototype for the NSDL,” the writers describe the National SMETE Digital Library (NSDL) as a “broad program to build a digital library for education in science, mathematics, engineering, and technology” (hence, the acronym SMETE). The project’s goal is to create a coherent scientific digital library that will endure over time.⁴⁰ The authors note, however, that challenges include reaching optimal system functionality and finding the financial resources needed to create vast amounts of metadata.

A goal inherent to the creation and maintenance of such a system is that it be useful at different levels in accordance with the diverse financial priorities of a variety of scientific libraries. Therefore, interoperable systems are being planned such that they can accommodate three different incremental levels. The goal is to maintain smooth transition options for those who want to ascend to a higher level at a later time.⁴¹ Thus, MMI’s level of participation, if any, in an interoperable system will require an evaluation of the costs and benefits of such a step.

Conclusion

Gandhi concludes that librarians need to create policies that include a vision of complete electronic conversion within the next few years, but his study is specific to larger academic settings.⁴² The reality for MMI is that it will have to incorporate electronic journals at a rate that makes sense in a context that includes time and budgetary restraints. MMI also needs to make such a conversion in keeping with its overall strategic planning while maintaining an overall awareness of relevant developments that support or hinder a transition and that make sense for institutions such as MMI.

The rate at which a complete conversion to electronic resources can happen will depend on such factors as individual publisher cost for available online sources, the evolution of stable electronic archives, and whether or not opportunities are found for meaningful consortium-building. Although this will be a challenge, MMI scientists are adept at research, work within a focused subject area, are content with the current information system, and do not rely upon obtaining the latest technology as quickly as possible in order to complete their projects. Any future quantitative or qualitative research specific to small, specialized scientific libraries would assist MMI in its strategic planning.

As larger libraries continue to make complete conversions, aggregate via consortium building, and create grant-driven agendas, the market will evolve such that MMI will need periodically to reevaluate its collection strategy. Economic trends change quickly depending on current events, and businesses now appear to be tightening their belts in order to survive. Although the current economic climate could include cutbacks in library budgets, it is obvious that most libraries are developing strategic plans on the assumption that complete digital access to journals will eventually become the norm.

Carol Tenopir says that the process of electronic journal transition is like “looking at the heavens through the limited range of a telescope—we can begin to see where we want to go, but we can’t quite travel there yet.”⁴³ Sooner or later, market forces, changes in the scholarly communication process, and user preferences will force MMI to make the “trip” and convert to e-journals. The speed of this conversion will depend upon several factors including the ability of vendors and publishers to provide cost-effective services to small-specialized research institutes such as MMI, the availability of financial and human resources, and the level of demand by MMI researchers for digital access.

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