Systems Librarianship 101: Defining Systems Librarianship

> *The systems librarian is a unique breed. The position requires someone who not only understands libraries and computers but someone who can put both fields into context.*
> —Patricia Ingersoll and John Culshaw[1]

Coming up with a standard definition for systems librarianship is like lumping all technology together into the same category. Fitting the wide variety of tasks systems librarians engage in into one coherent schema is difficult. Depending on the size, type, funding, needs, and philosophy of their institutions, systems librarians may have duties as diverse as:

- Computer hardware selection, installation, purchasing, and troubleshooting

- Software selection, installation, purchasing, and support

- Local and/or wide area network administration and security responsibilities

- Internet support, including router, wireless, proxy server, and firewall configuration

- Security and stability of the public computing environment

- Webpage and/or intranet design and maintenance

- Managing the library's social network presence

- General help desk functions

- Database vendor liaison

- Overseeing the library's technology commons

- Electronic resource selection and implementation

- Original computer programming

- Digitizing, archiving, and cataloging document, audio, and video collections

- Staff and patron technology training

- Integrated library system (ILS) maintenance and automation migration, upgrades, and training

- Database development and programming

- Project management

- Creating technical documentation

- Acting as a liaison between library staff and computer services staff

- Writing/reviewing requests for proposals and required system specifications for vendors

Systems librarians may be responsible for any or all of these functions, for additional functions, or for an entirely different (or as yet unimagined) set of duties. In addition to the specific technological tasks in the previous list, they may also have budgetary and management accountability, as well as responsibility for more traditional library functions such as reference and cataloging.

To add to the confusion, systems librarians may or may not have earned a Master of Library Science (MLS).[2] Systems-related tasks may be a part of their jobs or comprise their full set of responsibilities. Librarians may work as part of an information technology

(IT) department, manage a systems department, serve as a liaison to such a department, assume half-time systems duties, or exist as a department of one (or solo librarian), their library's sole source of automation support. Their library may be part of larger systems or institutions that assume part of the burden of supporting technology in the library, or it may be a stand-alone library with no outside technical support (with the exception of some systems vendors). Each systems librarian position, therefore, comes with a unique blend of responsibilities.

Job titles of those who work with computer technology in libraries also vary tremendously from library to library. A random sampling of titles from the systems librarian survey results in labels as diverse as:

- Information systems librarian
- Library webmaster
- Digital services librarian
- Manager of library systems
- Lead library systems analyst
- Eservices librarian
- Head of information technology
- Instruction and liaison librarian
- Library systems and digital collections administrator
- Virtual branch and innovative tech manager
- Metadata librarian
- Assistant director of technical services for library systems
- Systems manager
- Informatics librarian
- Web services librarian

- Integrated digital systems librarian

- Head of application development and management

- Systems manager/reference librarian

- Library systems liaison officer

There are countless other variations on the theme. However, some librarians with automation responsibilities, especially solo librarians or those in smaller institutions, will have no terms in their title indicating they have taken on such responsibilities.

As librarians, we tend to feel a certain level of discomfort with that which we cannot easily categorize. However, this variety in background, title, and tasks is confusing only if we allow ourselves to be blinded by the technological aspect. More traditional library positions also vary tremendously in scope and duties by type of library. No one could possibly suggest that reference librarians in a largely electronic news library, in a small, largely nonautomated, rural library, or in a sizable research institution are not clearly serving as reference staff—even though the types of questions they receive, the specific tools they use, and their daily tasks may look quite different. What matters is that these librarians are using their reference background to assist library patrons in answering questions and researching topics of interest.

Note also that a number of the job titles in the previous list reflect systems librarians' dual roles in systems and reference or in systems and technical services. Another difficulty in defining systems librarianship occurs because librarians have historically taken on systems duties in addition to their existing responsibilities rather than stepping immediately into a full-fledged systems role. This assumption of technological duties often happens gradually so that systems work becomes identified in an institution as belonging under an existing department rather than as a specialty in its own right. Further, technology becomes so intertwined with

all aspects of library operations that it seems difficult to define systems librarianship as a specific subfield; systems librarians have a hand in running each department. As library technology becomes more complex and demanding, however, many librarians who previously held one of these dual roles find the balance of their duties shifting toward systems work. Given this inevitable shift, it may be useful again to think of systems responsibilities in the same way we think of reference or technical services responsibilities. Even in smaller institutions where one person tends to fill dual (or multiple) roles, departments and responsibilities are clearly identifiable as belonging to specific subfields of librarianship.

Another difficulty in definition stems from the tendency to define systems work even now as outside the purview of librarianship and as falling in the realm of the IT department or as the responsibility of computer technicians. This view is shortsighted, reflecting nostalgia for a precomputerized era, a false separation of computer and other technologies, and a lack of understanding that librarians have been involved with the development of technologies that met library needs from the very inception of such tools. (The development of the MARC standard is a preeminent example of such involvement.) We should also remember the libraries' involvement with and use of technologies from the typewriter to microfilm, each of which was used and supported in— and served to transform—our institutions long before the computer age.

We cannot abandon such an integral aspect of library operations to nonlibrarians, since the ways in which we implement and support technology in our libraries affect all of our departments and services. Supporting computer technology does not make you a technician; it makes you a librarian with systems responsibilities. Michael Porter sums it up best, saying, "Today, technology is a powerful driver of change in libraries, and it will stay that way for the rest of your career."[3] Librarianship and systems responsibilities

go hand-in-hand, and their skill sets are both complementary and required for any computer services librarian.

Eric Lease Morgan, librarian at University Libraries of Notre Dame, notes: "I consider myself to be a librarian first and a computer user second. My professional goal is to discover new ways to use computers to improve library and knowledge services. Therein lies the essence of systems librarianship. *Systems librarianship is the art and science of combining the principles of librarianship with the abilities of computing technology* [emphasis in original]."[4] Because of this, non-MLS systems personnel can discover that they have as much learning to do on the library side as librarians who assume systems duties have to do on the technology side. The successful systems librarian blends both outlooks and skill sets in finding the appropriate balance for her institution.

Library Skills and Communication

A library background is crucial to effective systems work in libraries. One reason librarians tend to complain about institutionwide systems departments staffed with non-MLS computer science personnel is because this leads to gaps in communication and outlook between IT and the library. MLS systems librarians working in institutions with separate IT departments often find themselves bridging these gaps, which highlights the necessity of communicating equally well with technical staff, librarians, the library administration, and patrons. One of the most important roles of any systems librarian in a larger institution is that of liaison between librarians and the IT department, and, in smaller institutions, that of liaison among patrons, librarians, and the technology itself. Communication and people skills are paramount for any technology librarian, as is the ability to view systems issues from both a library and an IT perspective.

Many survey respondents emphasize the importance of bridging such communication gaps, and I found that I was often used as a translator between IT and the librarians when I was working as a web developer at a library. Sandra Gisela Martín, library director at Universidad Católica de Córdoba, expressed her opinion that "the systems librarian must [have] fundamentally good communication skills." One library supervisor stressed the role of a systems librarian as a people person: "Although you'll work with systems, the people running them are key. Work to establish and maintain excellent working relationships with personnel in all departments." And Eileen Lutzow, systems librarian at Charleston Southern University, finds that in some libraries "you most likely will be the only one doing anything related to technology, and your biggest asset will be an ability to translate techno-speak to library-speak."

As you advance in your career, and the more you learn on both the library and the technical sides, the more effectively you will be able to communicate with all these constituencies. Your library background will give you credibility with staff and patrons, while your technology knowledge provides a way into the world of IT. I found that my computer programming degree went a long way toward helping me work with my IT department. Librarians who work in institutions with a separate IT department must gain familiarity with technology in order to build their credibility and work effectively with an IT staff. Your familiarity will also help you see things from the perspective of IT staff members and understand the reasoning behind their actions.

It is precisely because technology is interwoven into library operations that systems librarians are essential in ensuring that technology always serves the needs of the institution. If a library lacks systems support or lacks librarians who are able to interface with its IT department, technology may either fail to meet institutional needs or it will just plain fail. One reason why library skills

are so useful in managing library technology is that systems librarians use their core principles of librarianship to communicate with all library constituents and determine how technology can be used most effectively. This includes communication to bridge the gap between techies and nontechies; communication with library patrons to ensure that their needs are being met by the current technological environment; communication with library staff and patrons when training, providing technical support, or creating documentation; communication with the library's administration to ensure they understand the importance of funding technology and training; and communication with software and hardware vendors to convey the library's unique needs and existing technological environment.

Despite the popular image of librarians as asocial individuals locked away in rooms filled with dusty books, we have always recognized the importance of interacting with others. This is doubly necessary in a systems environment where miscommunication is all too easy. As one systems librarian said, "Learn people skills! Even though you're working with technology, you need to be able to explain to the reference librarian or administrator why things are being done the way they are."

While systems librarians coming from a library background must work to extend their technology skills and vocabulary to communicate effectively with IT departments and vendors, systems personnel in libraries who come from an IT background have the opposite problem in this liaison role. They have the technology skills, but they may lack the background to use them effectively in a library environment or to communicate effectively with library staff and users. IT personnel tend to be heavy on jargon and may emphasize library systems over the people who use them. IT people who find themselves in library roles need to acquaint themselves with the unique requirements of libraries and with the user-centered foundations of the profession. One library systems

administrator answering the survey recommended that "[e]ven if it's only for 2 weeks each, work for or shadow a circulation staff member, a reference librarian, an instruction librarian, and a tech services staff member to really get a feel for their needs." IT people (and this also extends to systems librarians) must also realize the importance of keeping the lines of communication open when there is a problem with computing equipment or services. While nontechnical library staff will understandably be frustrated when a service or machine is "down," they will be more understanding if they are kept informed about the progress of the situation.

Realize also that there is no one right way to communicate with others in your institution. One of your goals, for example, will be to communicate to nonsystems staff members how they can use technology effectively in their day-to-day activities. There are a number of ways to do this, ranging from informal one-on-one conversations ("Did you know …") to formal training classes to providing printed and online documentation. You might create a regular newsletter or blog of technology tips that you can post to your staff intranet, send via email, or distribute in print—whichever will reach your colleagues most effectively. You can create tip sheets and brochures describing various aspects of the library's computer technology that public services staff can hand out to patrons and refer to when assisting library visitors. You can archive tip sheets in a subject-divided binder at public services desks or create a section for this information on your library website or intranet for easy searching, so that staff can quickly find half-remembered information. You can create a "what's new in computers" slideshow or screencast that staff members can run on their own PCs. You can also send out tips and reminders explaining how to accomplish occasional tasks, since people are likely to forget if they do not use a feature often. Finally, you can create a regular podcast or videocast that answers frequently asked questions for your colleagues on how to perform specific tasks.

Think of creative ways to get people to use technology more effectively and efficiently in your own environment. When creating these resources, however, keep your audience in mind. Do not inflict excessive jargon on nontechnical library staff, and do not overload them with extraneous information. Keep tips and instructions straightforward, to the point, and useful. Your job is to help staff members use technology to do their jobs more effectively.

If your library is large or tends to have heavy turnover, consider creating a computer procedures manual for public services staff that explains common uses of technology in the library. You can use this while training new staff members, and newer individuals can use this as a resource when they are alone at the desk and no systems support is available. The manual should outline basics such as the process for turning on and logging in machines each morning, lists of available software on the public workstations, basic troubleshooting steps for common problems, and so on. Consider creating equivalent manuals for other departments as your institution's needs dictate; work with department heads to see what specific processes their staff might need to have outlined for them. Publish these guides online and make sure that they are searchable. This way they will help both the new and existing staff in finding answers.

Lastly, understand the necessity of effective communication with your library's administration. You will need to help administrators understand the importance of funding technology projects, staffing technology departments, and allotting sufficient time and resources to your efforts. If members of your administration are less technologically savvy, they may have difficulty seeing why such time, funding, and personnel should be allocated to technology when other departments and projects are also clamoring for funding and attention. You will need to work with your administration on grants, technology plans, and large-scale projects, which requires you to outline the benefits of your proposals and to

describe ideas in nontechnical language. (See more on this in Chapter 10.) You will also need to help your administration understand the reasons why technology and related expenses such as staffing and training need to be ongoing. Too often, institutions have funded technology as a one-time allocation on an ad hoc, as-needed basis; you will need to convince them about the necessity of consistent funding.

Yes, You Are a Systems Librarian

Any library, no matter how small, needs to find someone who is willing and able to take responsibility for its technology. As soon as one computer is set up on a desk, one ebook reader purchased, or one tablet computer handed out, somebody needs to support that technology—whether or not that library has a formal IT department and whether or not anyone is formally prepared to assume that role. If you have found yourself in one of these accidental roles and your job title and compensation have not changed to match your new duties, do not hesitate to bring up the topic with your library's administration. (See more on negotiating promotions in Chapter 12.) Take the initiative to try and clarify the boundaries of your own position, and offer to help draft a new job description that reflects your systems as well as your nonsystems responsibilities. Most administrations recognize how important smoothly running technology is in today's library and will be willing to work with you on these points.

Although some librarians' technological skills obviously become more specialized to fit their institutions' needs, all librarians now need a basic facility with technology. The more you know, the more effectively you can use technology to serve your staff and patron needs, instead of the other way around. You may not have defined yourself as a systems librarian, but if you have any responsibilities for supporting and implementing technology, you have

responsibilities that fall under the cloak of systems librarianship—in the same way that a children's librarian who works at the adult reference desk once a week can be credited with having reference responsibilities. In some sense, this makes us all systems librarians. As Mayo and Nelson note: "Everyone working in libraries today is part of the technological revolution whether they want to be or not."[5]

It's worth taking the time to learn the skills to work effectively in your position. The more you learn to use your library background to help you discharge your systems responsibilities, the more effectively you can carry out this part of your job. As one systems/reference librarian wrote in her survey response, "I think librarians are so well-versed in teasing out any applicable knowledge from a problem. Systems can often be like patrons, with their vague messages and insufficiently communicated demands, that teasing out the information failure of a system versus a patron often involves the same skill set. A good reference interview, between myself and the system, or sometimes just myself, will often lead to a solution."

Of course, systems librarians with full-time responsibilities for technology in their libraries will devote more of their time and education to their specialty. But realizing that we all share similar responsibilities helps bridge the perceived gap between systems librarianship and other subfields of the profession. This realization also encourages nonsystems librarians to take responsibility for familiarizing themselves with technology and not depending on the systems librarian for day-to-day tasks such as changing the printer toner and minor technical troubleshooting. All librarians today require technological literacy to carry out their duties effectively. Nonsystems staff members need to be comfortable with modern technologies such as ebook readers, tablet computers, and mobile phones (among others) to effectively assist patrons in using such technology. Public services personnel are also fielding more technical questions from their patrons who expect librarians

to be knowledgeable about technological issues. Eric Lease Morgan says it best when asking: "In today's world, why would anybody trust a librarian, whose profession is about information and knowledge, who hadn't mastered a computer?"[6] You may have some difficulty convincing your fellow staff members of this truth, but librarians today must come to realize that computers are integral to both library functions and their own jobs.

Writing in *American Libraries*, Joyce Latham points out that "True functional literacy in a library organization begins when frontline staff start to accept responsibility for how their technical installations function and explore just how much they can do with them. Another important moment in the development of institutional literacy occurs when administrators begin to explore ways to crisscross these service areas, involving librarians in technical problem solving and technical staff in public program design. Creating avenues for communication and partnership between these two groups is key to developing the inherent potential of technology."[7] Literacy today includes technological literacy, and as librarians, we cannot pass such literacy on to our patrons if we do not first obtain basic technological skills of our own.

Another part of your responsibility as a systems librarian will be to help transfer appropriate technological skills and a comfort with technology to other library staff—and to your administration. Find more on training staff and patrons in Chapter 8, but for now, realize the importance of communication skills in inculcating technological literacy and the importance of having technologically literate staff. This is as true in the smallest public library as it is in the largest research institution.

Establishing Competencies

If you are in a larger institution with staff from varying backgrounds and with varying levels of computer competence, it will

be useful to establish basic technological competencies for all staff. Of course, official computer services staff will be expected to attain a higher degree of competency with library systems than will nonsystems personnel, but you can identify and require the necessary minimum requirements for all staff so the technology in your library runs smoothly. Competencies define the basic computer/technology skills expected of library staff, so they must be observable, measurable, and improvable. Establishing computer competencies for everyone recognizes that technology is integral in all departments, allows staff to use technology effectively to meet institutional needs, and lets systems librarians concentrate their efforts on more complex issues rather than continually helping other staff members with the basics.

Your library's technology competencies should reflect the specific skills that are necessary for staff to carry out their daily duties effectively. To determine individuals' existing levels of competency with your institution's systems and software, it's useful to create a checklist of desired skills and then to let staff members evaluate their own levels of comfort with completing those skills. Emphasize that this is not a test and that no one's job performance will be graded on these sheets. The goal is for staffers to answer honesty so that you can evaluate the areas in which you need to shore up staff skills and provide targeted training, cheat sheets, and other resources to help people use technology to do their jobs well.

Staff Competencies

Nearly every library position, whether professional or paraprofessional, now requires a computer, and more and more are requiring the use of mobile devices such as tablets and smartphones. For the sake of library productivity and staff sanity, employees need to learn the skills to use these devices in their daily work. When developing your competencies, target them to the tasks that the staff will do in their daily activities. In a larger institution, it will be useful to

create competencies for each job description or classification; in a smaller library, competencies by department may suffice. For help with developing competencies for your librarians, review Technology Competencies and Training for Libraries by Sarah Houghton-Jan.[8] For an example of thorough staff technology competencies, see the State Library of North Carolina's list of competencies (www.statelibrary.ncdcr.gov/ce/images/Competencies.pdf) for librarians in the state. The University of Minnesota—Duluth has posted a more general set of the technical competencies (www.d.umn.edu/itss/policies/techplan/staff.html) recommended for its staff. These competencies include items such as the ability to "create a secure password" and "access and use general library resources (e.g., catalog, databases, and electronic journals)." Looking at these more general competencies may be useful as a starting point for creating your own set, which can be customized as necessary for your institution's computing environment. One last useful example is Maryland's Eastern Shore Regional Library's set of core competencies (www.esrl.org/Core_ Competencies.pdf), which includes a number of resources for self-study and review.

If your library's environment includes a number of different software packages, electronic databases, and hardware configurations, you might consider dividing these core competencies by subject area. Create a competency checklist (or one basic and one advanced checklist) for operating system usage, each office program, internet usage, email software, basic hardware knowledge, Web 2.0, mobile devices, your ILS, and so on. Be sure to update these lists whenever the library upgrades or changes software packages; keep them current so that they are always usable tools. Remember to never assume that everyone must know how to perform a specific task. It never hurts to list all of the software and hardware in use in your library.

After staff members have been tested (or have self-tested) on these technological basics, use the results to determine whether

training is needed to get staff to appropriate levels of technical knowledge. (See more on creating and implementing a staff training program in Chapter 8.) Formal training for the staff can be supplemented with online tutorials, cheat sheets, and other self-study materials. Once staff members have completed training, let them retest their skills on your competency checklists.

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Systems Competencies

After mastering the basic competencies required of all staff members, systems personnel should then acquire the additional competencies necessary to run the library technology smoothly. While basic staff competencies will tend to be similar for personnel in most libraries (who mainly use standard browser software, ILS modules, office software, and so on), the specific competencies required of systems personnel will look radically different in

different institutions. These competencies need to match the duties assumed by each systems librarian and the software and hardware environment in their institutions.

Sample Questions for a Firefox Competency Self-Assessment Test

Please rate your comfort level on a scale of 1 to 3 with completing the following tasks, with 3 being "very comfortable" and 1 being "not at all comfortable."

I am able to type an internet address into the address bar to visit a particular webpage.

    1   2   3

I am able to use Print Preview to select certain pages of a document for printing.

    1   2   3

I can use the Find function to locate a word or phrase within a particular webpage.

    1   2   3

I can copy and paste a web address from my email or other application into Firefox.

    1   2   3

I know how to use toolbar buttons to move back and forward, and to go to the homepage.

    1   2   3

I know how to clear the history in Firefox.

    1   2   3

I know how to install a plug-in in Firefox.

    1   2   3

The Federal Library and Information Center Committee of the Library of Congress has posted a general list of "Knowledge, Skills, and Abilities" for systems librarians (www.loc.gov/flicc/wg/ksa-sys.html). Note that these are not all strictly "technical" skills and that this is a list intended for use in drafting job ads for systems personnel. Still, this gives you a useful starting point for drafting systems competencies for your institution, adapting and adding more specific skills as necessary. Each of these general areas can be divided into specific tasks or competencies and made more specific in terms of the technology used in your institution.

If you have a systems staff, consider creating competencies for each position within your department that will reflect an individual's specific duties. This will help you to see if the skills of current staff members need upgrading and to evaluate new hires for specific skills needed. It will also enable you to balance workload and duties among staff according to their areas of expertise. If you do not have a staff, you may be in the awkward position of creating competencies for yourself, which is especially difficult if you are just starting or working your way into a systems position and do not necessarily know what you need to know. To create competencies in this situation, it will be useful to start by making an inventory of the software and hardware used in the library. Evaluate what you are responsible for supporting and begin to think about how you would like to improve the library's future technological environment. This will give you a base for creating competencies for yourself and finding out what you may need to learn.

Systems Librarians as Change Agents

Beyond the specific responsibilities that systems librarians hold in common to operate library technology smoothly, they hold similar personal responsibilities for maintaining a flexible outlook and

fostering the capacity to accept and facilitate technological change within their institutions. While the previous sections have focused on defining systems librarianship in terms of common skills and tasks, focusing on a common outlook is equally important. Just as librarians as a group share a common foundation of principles and philosophy, systems librarians do, too.

In the not-too-recent past, librarianship was seen as an extremely stable profession. We had a fairly clear concept of what a library was supposed to look like (thanks to Carnegie), what it contained (books), and what a librarian's job entailed (selecting, looking up information in, and maintaining the order of those books). From such concepts, stereotypes are made, and libraries of all types and sizes, and librarians of all descriptions, have always flourished. Yet historically, many have been drawn to this profession largely because of its perceived stability and from a love for the permanence of the written word and the books housed in our institutions.

The principles of our profession have not changed, but the containers of information and the methods we use to access such information have. What is most distressing to many is the rapidity of such change; an organization may have moved from providing print-only collections to adding one stand-alone CD-ROM station and setting up a bank of internet terminals with access to subscription databases, to canceling print journals in favor of digital subscriptions and negotiating borrowing rights for ebooks—all within a few short years. As systems librarians, however, we can afford neither to be blinded by appearances nor stunned by change. We must concentrate on the ways we can best facilitate access to all parts of our collection today. We must also be open to new technologies and new methods of information storage and retrieval tomorrow. In fact, we should welcome and work to develop such technologies if they offer advantages to the users of our library's resources. This is not to say that any technological

change is automatically desirable merely because it is possible. Our primary goal is to facilitate those changes that help our institution carry out its mission. A secondary role is to help our fellow librarians adapt to these inevitable changes.

We should always view the prospect of technological change first as librarians and second as technologists. IT staff may wish to implement a technology because it is new, cool, and different, but, as librarians, we understand that technology serves the institution rather than vice versa. As systems people, we should be comfortable with and appreciate the power of computing technology, and as librarians, we should appreciate that technology is merely a tool. Mark Stover explains the process: "As librarians gain more power and responsibilities in the arena of information technology, we must not lose sight of our core values as a profession. We have a special imperative to shape the new age of computing with the traditions and values of those who came before us in the information professions."[9] As change agents, we again find ourselves in the role of liaison between technological possibility and institutional goals.

Endnotes

1. Patricia Ingersoll and John Culshaw, *Managing Information Technology: A Handbook for Systems Librarians* (Westport, CT: Libraries Unlimited, 2004), 25.
2. Of the 93.23 percent of respondents who answered this question on the survey, 76.56 percent had an MLS and 16.67 percent did not.
3. Michael Porter and David Lee King, "101 Resources and Things to Know (RTK)," Library 101, 2009, accessed May 21, 2012, www.library man.com/blog/101rtk.
4. Eric Lease Morgan, "On Being a Systems Librarian," Infomotions, November 16, 2004, accessed May 21, 2012, www.infomotions.com/musings/systems-librarianship.
5. Diane Mayo, Sandra S. Nelson, and Public Library Association. *Wired for the Future: Developing Your Library Technology Plan* (Chicago: American Library Association, 1999), 49.

6.   Eric Lease Morgan, "Computer Literacy for Librarians" *Computers in Libraries* 18, no. 1 (January 1998): 39–40.

7.   Joyce Latham, "The World Online: IT Skills for the Practical Professional," *American Libraries* (March 2000): 41.

8.   Sarah Houghton-Jan, *Technology Competencies and Training for Libraries*. Vol. 43. Library Technology Reports 2 (Chicago: ALA TechSource, 2007).

9.   Mark Stover, *Leading the Wired Organization: The Information Professional's Guide to Managing Technological Change* (New York: Neal-Schuman, 1999).