DEVELOPING LIBRARIAN COMPETENCIES FOR THE DIGITAL AGE

EDITED BY JEFFREY G. COGHILL AND ROGER G. RUSSELL

Developing Librarian Competencies for the Digital Age

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Preface

Change is inevitable. Libraries, librarianship, and the expectations of library users seem to be in a continual state of change. Predicting future changes with accuracy is nearly impossible. We can, however, identify trends that help us understand what the future might bring. Current trends hint at profound changes and more. Other factors, such as changes in funding models for higher education, changes in publishing, the uncertain future of the tenured faculty model, and the aging of the librarianship as a profession, all compound with emerging technologies to create an environment ripe for substantive change. The trends suggest that there are more opportunities than ever before for librarians and for those with other degrees to expand traditional roles into new areas of work and expertise in libraries.

Emerging technologies in higher education have shifted student usage trends in libraries.[1] Freshmen college students today grew up using Google and *Wikipedia*; by the time they became teenagers, smartphones and tablet computers offering wireless access to the Internet were revolutionizing our work, school, and home lives in much the same way that the television did in their grandparents' generation. This fact is manifest in library research and in day-to-day interactions with students and the faculty teaching them. Requests continue to increase for library services and resources such as ubiquitous access to full text, equipment checkout, and unlimited online access to services and resources via mobile devices. In turn, library jobs increasingly require "technology associated with LIS [library and information science] applications in the digital era" as a skill set. General computer skills and computer literacy, including social media skills, rank third among the knowledge and skills requirements in the digital era academic library."[2]

Librarians are devoting great amounts of time, effort, and funding to tracking and interpreting transformative trends. In May 2014, the American

Library Association, the largest library-focused organization in the world, announced the launch of the Center for the Future of Libraries.[3] Other such organizations are likewise transfixed by the prophetic prospects of reading the trends. What does the future hold for libraries and user experience, makerspaces, and delivery of mobile content? What do trends in virtual and augmented reality such as the development of libARi and digital-print interface technologies like FingerLink and Nimble mean for libraries? How might trends in open education resources, research data management, open access publishing, and data visualization change libraries? What can trends in library design and library leadership tell us about our future? This book focuses on what it means to a librarian in the twenty-first century. It is divided into ten chapters. Chapter 1 focuses on the foundations of librarianship and the move toward the new librarian. Chapter 2 covers the sources of information and collections found in the modern library. Chapter 3 examines the organization of knowledge and information. Technical knowledge and skills is the theme of chapter 4. Chapter 5 examines reference and user services in the twenty-first century. Chapter 6 concentrates on the research abilities necessary for librarians to thrive in the library. Chapter 7 relates to the marriage of continuing education and new ways of teaching that have changed library services to clients both on and off campus. Chapter 8 analyzes new ways that library administrators are adapting to managing a library in the twenty-first century. Chapter 9 examines core competencies across the profession as outlined by professional organizations such as the Medical Library Association (MLA), the American Library Association (ALA), and Special Libraries Association (SLA), to name a few. Finally, chapter 10 examines who library patrons of the future might be and how library services could change to meet their needs. The intended audience for this book is library professionals at any stage in their careers or in any library setting to become proactive in coping with the near-constant state of change affecting all libraries and all library users in the modern era.

NOTES

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Finally, I thank my friends and family for their support and encouragement to help me through this project from beginning to end.—Jeffrey Coghill

Chapter One

Foundations and History of the Profession

Jeffrey G. Coghill and Roger G. Russell

By 2030, when all new information is digital and readily available, what will librarians be doing? Just the usual things:

- text mining
- wrangling and tagging raw data for scientists
- managing maker spaces
- publishing academic journals
- creating online learning environments for K–postdoc . . . you know, the regular info-ninja stuff

Mark Funk, Medical Library Association (MLA) past president, 2007–2008

HOW DID WE GET HERE?

Some would argue that the library profession has evolved over thousands of years. Change was slow and incremental, sometimes requiring years to take root. Librarians adapted. Computers and libraries seemed to be a match from the very beginning of computing history. We can trace the lineage of computers back to Babbage's Analytical Machine from 1834.[1] However, after the development of computers in the 1940s, it did not take long for librarians to see the value of building databases to store library catalog information and having a mechanism available to retrieve the data put into a catalog.[2] Yet we still did not have an easy way to get information into and out of a database. Computers were usually stand-alone machines in large rooms on research university campuses. The logistics of inputting, organizing, and retrieving data and information were still not practical due to limitations in computing

technology. Later, as dumb terminals became the norm on campus, it was feasible to move data from sites around a campus to a central computing center, usually called a mainframe computer. Today, the old mainframes have been replaced with cloud computing. Instead of one mainframe computer physically located on a college campus, there are thousands of servers that can store data and send that information around the world in seconds. These servers can be located anywhere in the world and function as long as there is an Internet connection readily available.

In Vannevar Bush's visionary article "As We May Think," he foresaw a future where the centuries of collective human information, technology, and knowledge could be made readily accessible. He urged scientists who had enlisted science and technology to strengthen our military in World War II to focus on unlocking the massive collections of recorded human experience using the same science and technology.[3] It could be argued that Bush's vision led to the development of the Internet and the subsequent growth that gave birth to Silicon Valley. Other visionaries saw opportunities for the connected world to begin sharing information and data at lightning-fast speed around the world in seconds. Were it not for Tim Berners-Lee and the CERN group (Conseil Européen pour la Recherche Nucléaire, or European Council for Nuclear Research) creating a way for computers to share information through the early ARPANET/DARPANET (1969–1990) and later the World Wide Web (1990–present), we would not be moving forward so quickly into the "information future."[4] By 1992, the Mosaic/Netscape browser from the University of Illinois had made searching for information on the Internet easier.[5] Later, the big players in the Internet browser wars were Microsoft's Internet Explorer and Netscape. Yahoo was also one of the first widely used search engines but was surpassed by Google in the years to come. Google was founded in 1998 and eventually released its own Web browser, Chrome, in 2008.[6] By 2015, with so many Internet browsers on the market, Microsoft ceased supporting its Explorer browser in favor of other pursuits within the company.[7]

Desktop computer development had parallel paths with development of the Internet and future library applications. Creating a better and faster computer became central to the goals of computer engineers, coders, and developers. The race for better and faster computing set the stage for the explosion of personal computers marketed to businesses and for home use during the late 1970s and 1980s. The major players were companies that built IBM-compatible computers (Dell, Gateway, Asus, Hewlett-Packard) and Apple computers. Mass adoption of home computers during the 1980s paved the way for massive commercialization of the Internet and the establishment of the World Wide Web during the 1990s.[8] The rapid pace was dizzying for consumers and intoxicating for investors, leading in part to the overvaluation of Internet businesses and subsequent "dot-com bubble" burst in early 2000.[9]

The number and variety of devices, however, continued to explode during the 2000s with Apple's iPod in late 2001, the iPhone in 2007, and the iPad in 2010.[10] Competing devices such as Google's Android platform (both phones and tablet devices) quickly followed suit. A key function of these new devices, as well as newer desktops and laptops, became access to the Internet and untethering the users from wires to provide the connectivity. Users are no longer tied physically to modems or data ports, and they can access the Internet via mobile devices that need only a connection to a local Wi-Fi network or cell phone plan to put smaller and more powerful devices into the hands of users.

Given this milieu of technology and the evolving librarian roles, there was a fundamental shift in the way library services were delivered toward the latter part of the twentieth century. No longer were librarians bound to the library building, and no longer were collections solely in print. The library "as place" became less relevant, and the bounds of four walls could not hold either librarians or collections.[11] Many book and journal publishers began quickly moving from print only to print and online archives—and to books and journals that were born online. Libraries became brokerages for access to online content and increasingly identified and marketed as an online entity. Librarians shifted into new roles such as emerging technologies librarian, data management librarian, digital librarian, scholarly communications librarian, and metadata librarian.[12] Librarians empowered by new wireless computer devices moved from sitting at reference desks and waiting for reference questions to embedding themselves with teaching faculty, performing tasks such as physically joining them on grand rounds, coteaching classes, developing modules to contribute to online classes, and participating in online class discussions. Librarians became accessible for questions and consultations from nearly any location through instant messages, chat, text, and e-mail. They were encouraged to leave the building to meet with constituents as partners. Essential knowledge and skill sets for new library science graduates included both print and online publishing, desktop hardware and software, various mobile devices, and an ever-growing market of online databases and tools for library users. The professional landscape of librarianship became focused on embracing and leveraging change, integrating technology, marketing library services, and training librarians to prepare for the coming generation of "digital native" users.[13] Understanding not only the needs of users but also their information-seeking behaviors and being familiar with pedagogical research on technology adoption have begun to play bigger roles in librarianship.

> This is not to say, of course, that these advances address all of the social needs that twentieth century libraries attempted to resolve. But for us to come to a clear understanding of these changes, and what they mean for us as individu-

> als, requires that we think clearly and analytically about our relationship, as librarians, to both our libraries and to the larger communities that we serve. Indeed, I believe that if we do this, we find that while the great age of libraries is coming to an end, the great age of librarians is just beginning.—T. Scott Plutchak[14]

The purpose of this book is twofold: to understand where we, as a profession, have been and where the profession is headed. We strive to answer the following questions:

- What is the composition of a modern library collection?
- Will that collection look different in the future?
- What are the information sources and how do we manage them?
- What are the technical skills needed for a twenty-first-century librarian?
- How will reference services change and adapt to embrace new ways to interact with library patrons or clients?
- What kinds of library skills are needed for the librarian of today to grow and thrive, now and into the future?
- How will service models change to serve existing clients, and how will the model change going into the future of librarianship?
- What kinds of budgeting challenges are there for libraries and the administrators who oversee these libraries?
- What do the library professional organizations see as the core skills needed for new graduates and those practicing in the profession going into the future?

Librarianship is both an art and a science. Librarians study the science of information and how to work with clients to help them find solutions to their information needs. They also learn quickly that there is an art to working with people, to finding the answers to tough questions using the resources available and in knowing which information resources to use to find the information being sought in short order. So many times we have heard from clients, "you found me some relevant articles fast. My searches in databases yielded me nothing." Librarians of today need to have the following broad-based skills:

- Adaptability—How well do you adapt to change? Databases change interfaces all the time. Can you, as a librarian, adapt from one way of doing things and switch to another way of doing the same task?
- Flexibility—No longer do librarians sit at a reference desk waiting for their patrons to come to them. Instead, we should meet our patrons where they work or live. Can you, as a librarian, change with the times? Can you work with multiple constituent clients and change to suit their needs?

Although no single person can master the wealth of information being created daily, librarians can be "generalists" who have a basic understanding of the literature of their clients, which can be a tremendous help to the public, faculty, and researchers.

- The ability to multitask—First, there are a myriad of technological devices to master. Then there are the interpersonal relationships that should be built and maintained. Since librarians are no longer confined to the four walls of libraries, going out into "the wilds" to meet clients or patrons where they work and where they need assistance is key. And working on multiple projects with several constituents at once is paramount.
- Creativity—Can you find new ways to serve the constituents of your library? How about a new way to program in your library to attract more users and to publicize that information? Being the shy, reserved type is not workable in the future. Becoming more familiar with getting the word out, via advertising or merchandising, can be fun and the results surprising.

NOTES

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Chapter Two

Information Resources and Collections

Joseph Thomas and Yunting Fu

This chapter focuses on managing library and information center collections and liaison services in support of building collections, as well as expected changes in the next ten years in collections and scholarly communications services. We address primarily academic and medical librarians within the United States, and the bulk of consulted literature has been published within the most recent ten years. We avoid referring to specific acquisition functions because of our expectation that these tasks and workflows will change rapidly. However, we address decision making and analytical characteristics that librarians will need in an era of shifting collections, collection priorities, and librarian activities. Related topics include the management of electronic resources, which is treated in chapter 3, "Organization of Knowledge and Information," and general reference services, which is addressed in chapter 5, "Reference and User Services."

Significant shifts since the mid-1990s have affected information resources and library collections. They include a reduction in print collections and the move toward distributed print repositories, a shift to electronic collections, the rise of the Big Deal and of e-books, the development of patron-driven acquisitions, and the growth of library publishing and locally produced digital collections. Taken together, these changes require collection managers to spend less time on title-by-title selection and more time on managing profiles or evaluating packages. Although these developments have been referred to as the "demise of traditional collection development," the truth is that collection development has simply changed—not died out—just as it has from earlier periods of library history.[1]

COLLECTIONS MANAGEMENT

If collection managers are spending less time reading book reviews, poring over *Choice* notifications, and selecting individual titles, what do they do? How do they manage their collections? Collection managers haven't been "bibliographers" in a long time; more and more they are becoming analysts and strategists, managers of portfolios and profiles instead of selectors of individual titles. The reasons these shifts are occurring are directly related to the library finances that make collection building possible, the changing nature of the collections they are building and maintaining, and changing strategies for libraries to support the total system of scholarly communication. Although the reasons for the changing nature of collections and strategies for supporting scholarly communication are explored in greater detail later, there are also ongoing skills that collection managers need to maintain, including budgeting and funds management, vendor relations, facility with required business systems, and assessment.

Budget Management

Budgeting and managing library funds are in a sense a beginning point; after all, the majority of materials libraries collect must be purchased. The financial crisis that occurred starting in 2007 and 2008 coupled with other problems that had been brewing for decades—inflationary increases and an explosion of published content—forced librarians into "adapting to scarcity."[2] Collection managers normally allocate budgets for library materials, often based on format and/or subject area. Allocations must be made systematically and via a process that can be explained to key stakeholders in order to avoid the appearance of favoritism or neglect. Library literature suggests a wide variety of the methods of allocating funds, although it seems that many schools begin by distinguishing funds for continuing resources versus one-time purchases. Fund structures should be as simple as possible and with the fewest tags necessary for internal record-keeping tasks such as forecasting inflationary increases or gathering expenditures for accreditation reports.

Library materials are purchased primarily for two reasons: to support the curriculum and to support research. Smaller schools and those oriented primarily toward teaching often have library collections focused more on the curriculum than research.[3] Decisions on allocation amounts must take into account differential pricing by subject area as well as the varying inflationary increases by format (journal subscriptions have recorded at least double the inflation rates of books for more than twenty-five years). Fund managers should monitor university curriculum committees for new program proposals in the event the library needs to do any collection building in that area or in the event that a program is being discontinued so that they can stop purchas-

ing in that subject. Likewise, make sure to stay in touch with new faculty members to support their teaching and research interests and know when professors leave the institution. In addition, collection managers, especially at larger institutions, should take into account research activities, particularly funded research.

Collection managers must often juggle priorities, for instance, between consortial and local needs.[4] Another potential conflict is between supporting niche areas and broader areas of focus—should the library subscribe to a low-use niche journal needed by a few professors who are working on a grant or purchase additional books in support of an undergraduate class that is regularly taught? Collection budgets are also sometimes used for purchases that are not content related, such as discovery platforms or open access funds. Collection managers must then decide how much content they are willing to sacrifice in order to support these other needs. Regardless of how collection managers determine the individual outcomes, the rationale for materials support should be codified in the library's collection development policy.

Vendor Relationships

Working with vendors is another ongoing skill that collection managers need and an important part of their job. General tips on vendor relations are to be clear and responsive in communication, to respect each other's time, to set agendas for conference calls or meetings, and to be familiar with the proffered products.[5] Rick Anderson, Jane White, and David Burke describe desirable characteristics of librarians in their "top ten qualities of a good customer": they must be assertive on behalf of their libraries, tough when necessary but also reasonable in their expectations, fair and ethical, strategic and professional.[6] What can become confusing for librarians is the proliferation of products and their associated representatives, especially when content providers add new services or there are mergers and acquisitions among companies.

This vendor activity reflects rapid changes in the scholarly communications arena and has a direct impact on the library's vendor contacts and collection management decisions. One of the interesting developments to watch is content providers diversifying into other scholarly communications systems, especially workflow systems. For instance, Elsevier acquired Mendeley, a citation management and social networking platform, in 2013.[7] Figshare, a data storage and sharing platform, Altmetric.com, a provider of altmetrics, and ReadCube, a software for managing readings and enabling pay-per-view access to select journal providers, are all products of Digital Science, a company owned by the Holtzbrinck Publishing Group, which has a large textbook business in Macmillan Publishing and a significant journal

business in Springer's *Nature*.[8] Last but not least, EBSCO in early 2014 took on Plum Analytics, a provider of altmetrics, and in early 2015 acquired YBP, a book vendor for academic libraries.[9] How could these business relationships benefit libraries and their patrons? How will they affect the overarching scholarly communication landscape? All of these scholarly communication workflow products (Mendeley, Figshare, Altmetric.com, ReadCube, and Plum) have recently begun offering institutional subscriptions aimed squarely at libraries. Should these be considered from the collections budgets? There may be additional branching out in the future as content providers move into the scholarly communication workflow systems.

Administrative Tools

Familiarity with required business systems is a third necessary ongoing skill for collection managers, even though specific workflows, such as creating a purchase order in the integrated library system, will certainly change through time. Collection managers must navigate not only the vendor systems such as YBP's GOBI selection and ordering software or ebrary's administrative module, but also library systems. These may include an integrated library system's acquisitions, serials and/or reporting modules, and an electronic resource management system (ERMS) and/or link resolver if these are not integrated into the primary library management system. Perhaps more important than the specific systems is for collection managers to be open to learning new administrative tools and aware of standards development that will enhance librarian workflows through time. The importance of standards cannot be overemphasized in this context: the integrated library system (ILS) or the link resolver will change, but the development of standards will enable interoperability of these various systems and the creation of new ones.

Assessment

One of the most important areas of standards development for collection managers is the gathering and reporting of usage statistics, which are directly relevant to another significant ongoing duty: assessment of the library collections. Assessment will only increase in complexity as the collections themselves diversify in formats, holdings, and other ways. Why conduct assessment? One of the most pressing reasons is the need to justify expenditures and forecast future budget needs; managers should also ensure periodically that their collections adequately serve the library users. A third reason (but certainly not the last) is the pressure on physical collections for space to devote to other purposes.

Librarians have done traditional sorts of assessment such as citation analysis and examination of usage patterns for both monographs and journal

holdings for many years now. Cory Tucker provides an excellent brief overview of assessment methods and Doralyn Rossmann demonstrates an in-depth assessment combining several methods.[10] Additional factors librarians may consider in their assessments include total use (circulation figures for print items, COUNTER reports when possible for electronic materials), total cost, cost per use, and physical condition of print items. Consider as well the subject coverage provided by the resource, duplication of content or subject coverage within alternative resources, the currency of information, and the authority of the author and/or publisher. Librarians may also survey their users, examine the university's curriculum, review the expressed research or teaching needs, and compare their holdings to those of peer libraries. Citation analyses have been performed to check the library's holdings cited in published articles, books, theses, and dissertations, and they can also be performed on the literature reviews that accompany grant applications.

We can debate whether the circulation of a print book or in-house use is equivalent or how the use of a print book might equate with the use of the electronic book. But how much more is the assessment complicated when journal holdings can be subscribed, access-only as part of a package, consortial holdings, open access, or hybrid open access? Even more difficult is assessment when library collections contain formats such as data sets that would need to be factored into the total use of materials in support of the institution's research and teaching. This increasing complexity will require more devoted time by professionals and likely a fewer number of them.

The future of collection management, we believe, lies in fewer positions as dedicated "analysts" or "strategists" who manage profiles and portfolios and conduct assessment. The current changes in collection development such as patron-driven acquisitions and reduction of time devoted to title-by-title selection mean that liaison librarian time is freed up for "new or emerging roles" including perhaps increased university service, conducting original research of their own, or notably, scholarly communications services such as data management, open access advocacy, or publishing.[11] The turn toward scholarly communication is revisited later in this chapter. Before that, we address the changing nature of collections that we are building and managing.

COLLECTIONS

Collections are intimately intertwined with the meanings of the term "library"—a word that can refer to a group of collected materials, the building that houses them, or the organization charged with creating them. Patrons consistently associate the library with "books."[12] If by this term they mean printed volumes, then we must overcome this problem: "If our brand is the

print collection, there is a serious disconnect between perception and reality."[13] Academic libraries especially have changed their collection emphasis from print to electronic and subsequently have had to face significant issues that challenge the very notion of what a library collection is and how to build it. The shift to electronic collections was a primary driver in collection building changing from "just in case" to "just in time," and libraries' licensing rather than owning materials has many consequences with respect to how they make materials available to patrons, to restrictions on resource sharing, and to new difficulties in preservation. Print collections were not unaffected by this shift, leading some to wonder whether libraries need print anymore and how to create efficient distributed print collections.

Electronic Collections

One of the most striking changes to happen in libraries since the advent of Gutenberg's press has been the rapid growth in electronic collections since the mid-1990s. Growth has been in the number of volumes and titles acquired and the amount and percent of the materials budget spent on electronic resources. The Association of Research Libraries (ARL) provides a statistical trend graph showing increases in library serials expenditures from 1986 to 2011.

From 1994 to 2004 (the real ramp-up of electronic journals), ARL libraries went from spending about 4.5 percent of their budgets on electronic materials to spending about 30 percent on them.[14] Ten years later, large academic libraries were expending roughly 70 percent of their budgets on electronic resources.[15] This situation is certainly replicated in other libraries, including the authors' own. E-journals and e-books represent the lion's share of this growth, although there are other material types to consider, from streaming video to aggregated collections of primary sources. Our attention, therefore, will focus on e-journals and e-books, as well as the rise of open access literature.

E-Journals and the Big Deal

Big Deals, over the last two decades, have been the big deal in library expenditures and content availability. Beginning in 1996 with Academic Press, they are agreements between publishers and libraries for packages of journals offered normally for a multiyear period with capped inflationary increases.[16] There are benefits to libraries, publishers, and faculty. The faculty has access to much greater content than they would have otherwise, and libraries accrue the benefit of offering a wider variety of content than they would have under title-by-title subscriptions. Publishers were provided some stability in their transition to electronic journals and protection from the

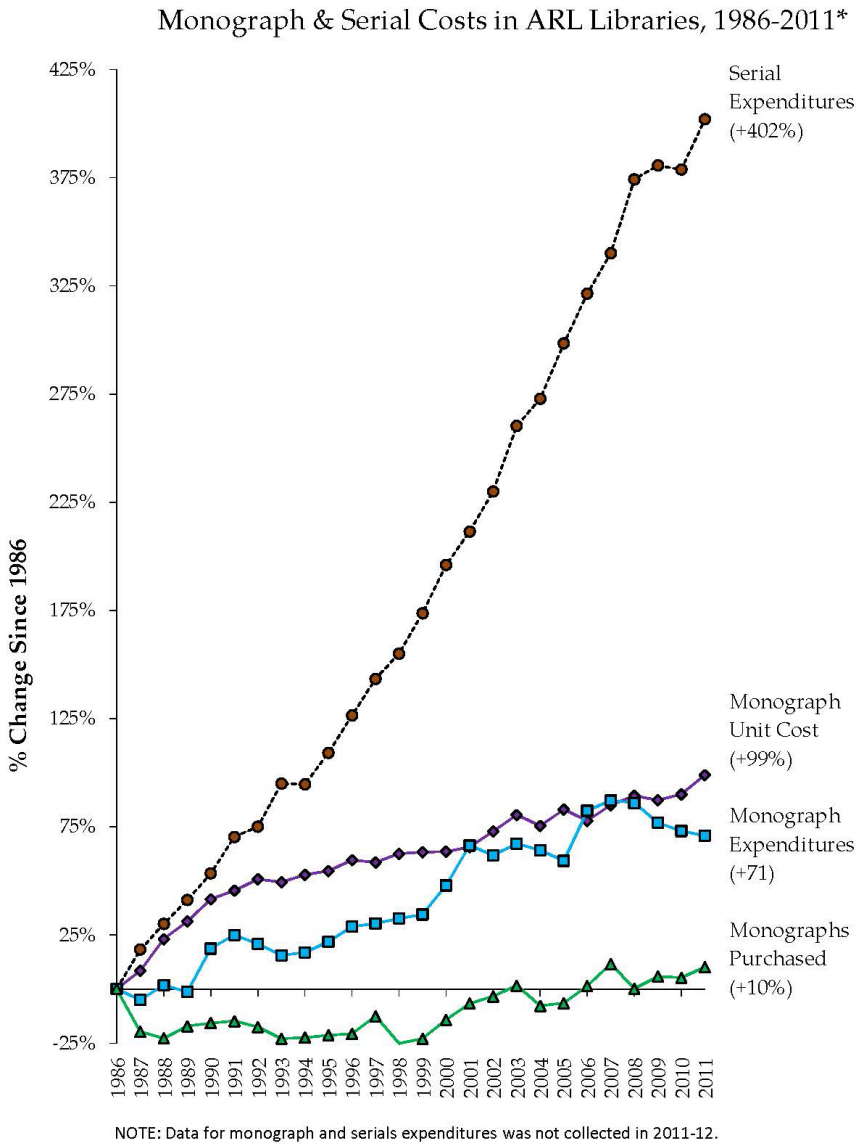

Figure 2.1. Monographs and Serials Costs in ARL Libraries, 1986–2011 Association of Research Libraries (2012). Retrieved January 7, 2016, from www.arl.org/storage/documents/monograph-serial-costs.pdf.

"subscription spiral" of cancellations that led to higher prices, which led in turn again to further cancellations.[17]

However, Big Deals have consequences to them: consolidation in the publishing industry, serials expenditures "eating up" monograph budgets, and the difficulty librarians face in controlling their expenditures since the Big Deals were perceived as "all or nothing" with locked-in price increases. Poynder points out that Big Deals, while they might have provided some short-term benefits, have proven to be ultimately unsustainable because they fail to address the "affordability problem" created by an ever-increasing volume of published research. Consolidation in the publishing industry has led to an "oligopoly of academic publishers in the digital era," concentrating a large portion of the scholarly communication production within the hands of five publishers. Larivière, Haustein, and Mongeon find that for all papers indexed in 2013 in Web of Science, the five largest publishers control 70 percent of the social sciences content and 53 percent of the natural and medical sciences, and their dominance of this inelastic market has led to profit margins ranging from 28 percent to 39 percent.[18]

The only way to control the affordability problem is to shrink the total volume of published research. That is, break the Big Deals, for the libraries' part. This suggestion has elsewhere been suggested by economist Theodore Bergstrom, who calls Big Deals "the terrible fix."[19] And find—or help create—alternative means of scholarly communication that are recognized and rewarded by funders and the faculty members' tenure committees. Various libraries since the early 2000s have broken Big Deals, and although some have reentered them, others have not. Southern Illinois University at Carbondale and Oregon, for instance, report still being satisfied with their decisions to break Big Deals, five years later, with follow-up research supporting their success.[20]

Pay-per-view by publishers or third-party alternative article providers such as ReadCube, DeepDyve, or Copyright Clearance Center's Get It Now have helped some libraries deal with serials cancellations. ReadCube, in particular, has shown some early successes in end-user satisfaction and reduction of total costs to libraries.[21] ReadCube Access provides an option for patrons to rent a view-only copy of the article for a short time, to purchase a digital rights management (DRM) restricted cloud copy of the article, or to purchase a DRM-free PDF. These micropayments are normally made from library materials funds and may be mediated or direct. One of the primary philosophical issues libraries face with ReadCube (which came about to a limited extent with interlibrary loan [ILL]) is that the library does not own a copy of the purchased articles, so it cannot provide them to multiple users. This is a complication of the loss of first-sale rights with electronic resources compounded with an existential question about whether the journals serviced by ReadCube or Get It Now are actually part of the library's collections.

Competitors to ReadCube Access in the future may include current citation managers, such as Mendeley, or distributed profile systems that permit direct queries of the authors, like ResearchGate.

Electronic Books

Academic librarians have been anticipating the widespread adoption of e-books since the early 2000s and continue to find reasons that the uptake has been slower than some people might have wished.[22] The truth is, though, that e-book adoption has proceeded pretty quickly given the history of print publishing. By 2012, e-book acquisitions had significantly outpaced print book acquisitions in academic libraries—nearly forty-six million e-books to just more than twenty-five million print books.[23] Total library holdings for that year saw some one billion print items compared to nearly a quarter million e-books. E-books are rapidly becoming a significant portion of the library's collection, and collection managers will need to consider how they will collect e-books and manage them in the future.

Concerns about e-books have included confusion over the varying e-book interfaces and acquisition models, concerns over permanence, lack of standard formats, and integration into the curriculum.[24] Some of these concerns have been at least somewhat satisfied with the adoption of standard EPUB formats, some consolidation among third-party vendors, development of reader-friendly tools like highlighting and commenting, and the fact that they are beginning to be integrated into the curriculum. Also, there remain worries regarding how learning and retention of information are affected by the change in format from print to electronic, especially since educators and researchers treat long-form reading differently than they treat shorter forms like journal articles.[25] Perhaps the greatest negative pressure on e-books is that library collection managers devote less and less time to individual title selection.

E-books, though, should enjoy a prosperous future because, like journal articles and other online text-based formats, they will be able to incorporate multimedia and interactive content running the gamut from videos on related content to embedded quizzes for students. There are primarily three methods of acquisition—title-by-title selection by librarians, packages, and demand-driven acquisition (DDA, also referred to as patron-driven acquisition, or PDA), along with its variant evidence-based purchasing. Librarians can subscribe or acquire via short-term loan or outright purchase. Limitations on the number of simultaneous users, especially on third-party platforms like ebrary and EBSCOhost, remain a consideration. Packages can include current or retrospective content. Some librarians have expressed concern about purchasing e-book backfile packages, in consideration of the potential for duplicated content with print, outdated content, and especially the concern to

avoid e-book "big deals."[26] However, DDA will become, as Levine-Clark puts it, "the default" method of collection building for scholarly literature.[27]

Open Access Scholarly Materials

The most significant shift in library collections and librarian engagement with their institutions centers on the increasing availability of open access scholarly materials. Open access (OA) content in some senses has been available as long as the Web has been around and is composed of a mix of formally published books and journals, informally shared white papers, reports, and, more recently, open access textbooks and other open educational resources. Here we are referring to items that can be identified and selected at an individual rather than collective level, such as research data sets or repositories or open access repositories such as ArXiv or RePEc. We agree with David W. Lewis that the "transition from purchased to open access content" will "do more to reshape" libraries than the transition from print to electronic format.[28] After all, can a library really "collect" open access content? What responsibilities for preservation and access should a particular library take on if the content was not produced by its institution?

Stimulating the availability of and attention to freely available scholarly materials have been some high-profile e-book ventures and a series of funder requirements for public access to published research. Google Books, Internet Archive, and HathiTrust have all focused a lot of attention on making print books available electronically, and some libraries consider whether to add access points to these free-to-read books alongside other library resources, as well as whether any of these would permit the library to withdraw its print copies to rely on these electronic versions. These and other electronic preservation and access schemes will continue to increase the online availability of published works and permit libraries to expand what materials they offer their patrons as well as to reclaim valuable space for other uses.

The first significant impact requirement in the United States for public access to articles arising from funded research was the National Institutes of Health, which in 2008 began requiring authors or their representatives to deposit post-prints to PubMed Central to be made freely available to read within one year of publication. Other U.S. federal agencies began drafting policy statements after a 2013 directive, as well as large foundations like the MacArthur and Gates Foundations. The Registry of Open Access Repository Mandates and Policies (ROARMAP) tracks more than one hundred government and foundation agencies from around the world who have OA requirements for funded research.[29] These requirements radically increase the availability of published research. It should be noted, however, that copyright remains a contentious issue for funder mandates. Some agencies, including U.S. federal funders, require "public access," which means a free-to-read

copy is made available while the publisher retains copyright. Other funders require publications to be licensed under much more open Creative Commons licenses.

Some authors have staked an economic claim on freedom of access by referring to scholarly OA products as "public goods."[30] Providing access free to readers does not mean, of course, that open access publications are without costs. Libraries have provided material support for open access publishing by setting up open access funds to pay article processing charges (APCs) by memberships and collaborative publishing agreements such as Knowledge Unlatched or Open Library of the Humanities and by establishing their own publishing activities. Some libraries fund APCs from the materials budget, but we believe that this is a transitory development. Memberships in support of open publishing collaboratives are more likely to be successful. Will OA ultimately divert funds from universities to their libraries? Maybe eventually, but that would not diminish the library's role in collecting and offering to the institution the most relevant open access scholarly products.

Discovery

Considering the combination of material types and formats available within librarians, compounded by the fact that the materials may be owned, licensed (that is, with controlled access), or open access, discovery is critical to expose and enable the use of the library's collections. Competition has arisen between commercial subscription discovery services like ProQuest's Summon or EBSCO's Discovery with freely available meta-indexes like Google Scholar or CiteSeer. Link resolvers are an additional necessary tool tying discovery to access of content, and another tool is increasingly of interest to libraries. Most universities use some learning management software such as Blackboard or Canvas, and integrating library content seamlessly into the system that students are most likely to use will certainly facilitate the use of library collections. We hope that integrated library systems will evolve to incorporate necessary discovery mechanisms, obviating the need for separate products, and that standards development will ease integration of library content into learning management systems. Rossmann and Arlitsch contend that discovery, provision, and creation costs should be factored among total library costs in addition to purchasing published materials.[31]

Do Libraries Still Need Print Collections?

Because the majority of collection building focuses on electronic materials now, some people wonder if libraries still need print. In fact, the "Report of the Collection Development Executive Committee Task Force on Print Collection Usage, Cornell University Library" found that 55 percent of books published from 1990 to 2010 had not circulated by 2010, that usage patterns

varied by discipline in ways that would require in-depth study to predict, and that usage of books that did circulate reached a plateau after a dozen years.[32] Viewed skeptically, that's a lot of wasted money and valuable space that could be reused. However, we believe there are strong reasons why libraries will still need at least some print collections for at least the next several decades.

Yes, to repeat, libraries still need print collections for several compelling reasons. Among them are the fact that some materials are not available electronically, that there are differences among the disciplines in their need for printed materials, that research libraries may still want to build collections of distinction on specific subject matter, and that research on reading print versus reading on a screen does not show that they are equal activities for learning and retention. Durant and Horava provide an excellent summary of current research on print and screen reading and encourage libraries deliberately to build hybrid collections in recognition that e-books and print books are complementary rather than interchangeable.[33]

Types of print collections still needed include some ready reference, materials in support of print-favored disciplines, popular reading collections, and distinctive and special collections. Selected reference titles may be easier and/or faster to use in print than online, including certain manuals, handbooks, or point-of-care materials for medical libraries. Certain disciplines, especially among the humanities, still favor deep reading in print for monographs, so librarians should continue to purchase at least some print in support of their research.[34] Popular or leisure reading collections are meant to draw patrons into the library, revitalizing its sense of place, especially for students, and to foster reading for pleasure.[35] They are usually very small collections and may be leased rather than purchased in order to ease staff workload and make it easier to provide fresh titles. In addition to these, research libraries might still elect to build more extensive collections in areas of particular strength and, as we describe later, to collect those materials as a contribution to a regional or national "collective collection." Special collections still, and will continue to, contain print materials and to serve as enticing primary source research repositories.

The future of print collection development includes a mix of approaches. As a strategy to acquire materials with a higher likelihood of circulation, patron-driven and interlibrary loan purchase-on-demand will be prominent. Collections of distinction will focus on special collections materials, and a few libraries will try to collect comprehensively for narrow subject areas. Many libraries will reduce the overall footprint of the physical collection, requiring concerted action to provide the print materials not held locally. Libraries will contribute regionally and nationally their collections of distinction.

Preservation

As fewer libraries retain individual copies of printed materials, the development of distributed print collections helps to address preservation and access at a regional and, hopefully soon, a national level. Many libraries participate already via membership in distributed print archive arrangements such as Scholars' Trust, Committee on Institutional Cooperation (CIC), or WEST, or by taking advantage of services such as OCLC's Shared Print Management Program. Some of these consortia and some individual libraries have high-density off-site storage, whereas some distributed print archives agreements take advantage of in-place collections. Sam Demas has observed that shared print archives are maturing from "last-copy" agreements toward more mature status incorporating preservation, assurance that others can repurpose space, and sharing networks.[36] The trust required for libraries confidently to conduct a "managed drawdown" of their print collections can be built in part through explicit policies addressing retention terms, storage models, validation and bibliographic control, lending, robust discovery of content, and delivery mechanisms.[37] As a result, many academic libraries can reduce the footprint of their physical collections and their print preservation activities and focus them on agreed-to materials.

Preservation of electronic materials is an even more immediate problem to solve. Libraries were at first cut out of preservation of electronic publications in part because they were licensing rather than purchasing the content and in part because publishers maintained access on their own servers. That began to change with a few notable initiatives. JSTOR was started in 1995 in part to allow libraries confidently to rely on electronic access rather than their own print copies.[38] In 2002, JSTOR's parent company Ithaka created a more explicit preservation arm with the Portico initiative. LOCKSS (Lots of Copies Keep Stuff Safe) originated at Stanford University, followed by the dark archive CLOCKSS (closed LOCKSS). HathiTrust was founded in 2008 by the CIC and the University of California in order to create a digital archive; within eight years, HathiTrust has grown to more than one hundred member institutions and preserves nearly fourteen million volumes. Academic libraries have participated in electronic preservation through these organizations via their ongoing financial commitments and memberships.

Although these initiatives are laudable, there are still several critical developments for the preservation of electronic scholarly content. E-book providers must contribute to Portico, CLOCKSS, or other preservation initiatives so that libraries can be reassured that these items will be a persistent part of the cultural record. Open access publishers, particularly the small and/or new publishers, must find preservation partners for their content. Librarians and university officials must work together to determine what locally produced scholarly materials, including data sets, open educational re-

sources, and digital humanities projects, should be preserved and how to do so. One of the best enhancements that can happen is to work out the place of third-party providers like ebrary to be able to trigger content.

Changing Notions of the Library Collection

Collection building from the 1990s into the second decade of the 2000s went from just in case to just in time, and the shift to primarily electronic collections was accompanied by significant issues that librarians have been grappling with: licensing versus owning materials, loss of first-sale rights for electronic resources, and the fact that licensing electronic materials places the burden of preservation back on the publishers, at least originally, until libraries began working with them in initiatives like Portico and CLOCKSS. Development of a coordinated nationwide network for preservation and access of printed materials is under way, and we believe the framework will be in place in the near future. Rapid creation and deployment of systems for acquiring books, chapters, and articles on demand in exchange for micropayments not only have helped libraries ameliorate the loss of Big Deals, they have enabled libraries to extend the research offered to their patrons. Open access materials are also being selected, promoted, and published by librarians who are likewise exploring with publishers and scholars varying funding models in support of open access.

The mix of material types and formats, print and electronic, locally produced and those that are licensed, purchased, consortial, access only, open access, and available as pay-per-view raises the question: What is a library collection? In the past, the collection was made of the printed materials the library owned and was acquired primarily on a title-by-title basis. In the future, the library collection will still need some printed books and journals, but they will make up a small part of an imagined whole. The library collection will be—indeed, it is now—the universe of information that librarians have selected as relevant to the research and teaching needs of their institution and to which the library can provide access to their patrons. We will regard the library collection, as Plutchak suggested, not as an aggregation but as a tool to connect people to "the intellectual content of the past and present so new knowledge can be created."[39]

SCHOLARLY COMMUNICATION

Scholarly communication has been defined as the "creation, transformation, dissemination, and preservation of knowledge related to teaching, research, and scholarly endeavors."[40] Academic libraries' interest in the scholarly communication arena arises out of a radical juxtaposition of crises and magnificent possibilities. Crises in serials and books pricing meant that no li-

brary, however well funded, can afford to collect everything, so librarians began advocating for change in the system of publishing, seeking to augment (or overthrow) the grip of commercial publishers through open access and, increasingly, library publishing activities. The crisis in affordability mentioned earlier is compounded by an explosion of content. Magnificent possibilities, though, opened up at the same time in new forms of scholarship available and the ease of distributing them online.

Libraries began responding in multiple fashions to these new circumstances under the wide rubric of "scholarly communications." In particular, liaisons were among the first librarians involved in a wide range of related activities: advocating for author's rights and for publishing in open access venues, working with faculty on selecting and evaluating journals, and measuring the impact of their published and unpublished research.[41] Libraries began creating new types of positions or departments and engaging in a variety of publishing ventures, including institutional repositories, scholarly journals, digital humanities, and digital scholarship. Research data management services offered may include help writing the data management plan and depositing to a repository; some libraries have their own data repositories. In addition, librarians work with faculty on discovering and developing open educational resources (OERs), conducting systematic literature reviews, and creating faculty profiles in systems such as VIVO. The overarching aim in the development of these services is to position the library strategically within the workflow of the authors and researchers.

Librarians can reasonably be expected to question what amount of time they might need to devote to such activities or what they need to know to be involved in scholarly communication programs. The first question's answer will vary by library, but it seems that many liaisons are already dedicating on average one-quarter of their time to liaison activities, chief of which seems to be collection development.[42] Arendt and Lotts found that the most important aspect of the liaison assignment is the relationship itself, and the most valued activity between both liaisons and faculty members was communication.[43] Further, they suggested that liaisons focus "more on the needs and wants of their faculty and put their own agendas as liaisons aside."[44] Notably, although Arendt and Lotts did not explore it, more than 80 percent of respondents indicated that they wanted liaisons to provide them with information about scholarly communication and open access.[45] We propose that liaison librarians stop engaging in collection development activities. Further, we propose that time freed from collection development should be redirected toward scholarly communication initiatives.

Difficulty arises for library leaders in determining what might be core competencies in scholarly communication that collections and liaison librarians should master, compared with what competencies should lie within the realm of a specialist such as a data librarian or an institutional repository

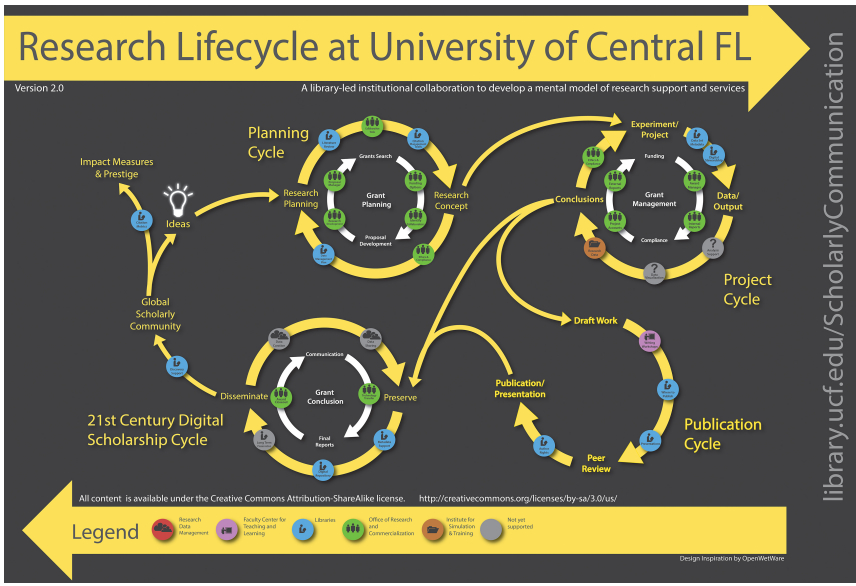

Figure 2.2. The Research Life Cycle at UCF University of Central Florida Libraries Research Life Cycle Committee (2012). Retrieved January 7, 2016, from library.ucf.edu/ScholarlyCommunication/ResearchLifecycleUCF.php.

manager. Jaguszewski and Williams and Kenney describe a developing hybrid model in which liaisons are being paired with functional specialists in areas such as copyright, data management, geographic information system (GIS), user experience, instructional design, digital humanities, and digital scholarship.[46] In their examination of scholarly communication job ads from 2008 to 2014, Xia and Li uncovered a transition from soliciting content for institutional repositories toward copyright and author's rights, to policy making, and from there to collaborations (both internal and external).[47] Their findings, we propose, demonstrate the institutionalization of scholarly communication within academic libraries. Thomas has elsewhere proposed developing core competencies in scholarly communication: for librarians to understand a variety of publishing models, to help authors make their works open access, to advise them on publishing agreements, to help patrons use copyrighted materials legally and fairly, to help library users evaluate open access materials, and to help authors comply with funding mandates.[48]

In addition to core competencies for liaisons generally, specialist work in areas related to scholarly communication may necessitate the library creating a new unit within or alongside other collections and technical services units. Research data management (RDM) is an example of a specialty area that, as

it grows, may require its own unit within the library. RDM really began to grow in U.S. academic libraries after the National Science Foundation began in requiring in 2011 for all funded proposals to have a data management plan.[49] In considering the establishment of its own unit, RDM follows the same trajectory as its parent scholarly communication, requiring libraries to consider internal training and external needs.[50] RDM requires that data are selected and acquired, described, made accessible, and preserved—traditional library functions. However, RDM is different from other library operations in its strong ties to campus information technology units and university research offices—partnerships that could inform other scholarly communication ventures. Even though RDM may be centered in its own unit, all liaisons should have an awareness of data management plan requirements and data repositories in their disciplines as part of helping authors comply with funding mandates.

We are not just advocating for collection development librarians to be revamped into scholarly communication librarians—as Corbett notes, this is a "whole-library" issue, so a whole library approach to developing scholarly communication programs is relevant.[51] After describing briefly the varieties of staff who may already have a stake in scholarly communications, Corbett focuses on technical services, including collection development, electronic resources, and catalogers in selecting and making accessible open access resources, as well as the need for these departments to be involved in serials reviews, cancellations, and administering pay-per-view. Wiegand also discusses roles for serials and electronic resources librarians to be involved in scholarly communication, and Dresselhaus maps electronic resources core competencies to scholarly communication.[52] Beth Bernhardt briefly laid out ways that acquisitions and cataloging librarians do scholarly communications work by selecting, tracking, and making accessible open access and hybrid open access journals, creating metadata for institutional repository content, and assigning DOIs.[53] There are certainly other ways that acquisitions, electronic resources, and cataloging staff can be engaged in scholarly communications, including creating metadata for profile systems, selecting and acquiring OERs, or working on preservation or metadata tagging of digital scholarly projects.

The Changing Library Mission

The shift to scholarly communication is, we believe, concomitant with a shift in the mission of librarians and in the mission of the library as an organization. Specifically, we propose a transition from traditional functions of collecting and making available published scholarship to consider R. David Lankes's statement about the mission of librarians: "to improve society through facilitating knowledge creation in their communities."[54] This shift

builds on traditional library values and places the new mission squarely in line with the missions of universities to create new knowledge through teaching and research. The library is a "site of curated collections," as Paulus says, and those collections include not only materials that were published elsewhere, but also materials that are locally produced.[55] The mission of the library organization, then, is to enable new knowledge production in part by creating collections that support institutional needs. Aggregating these collections will not be the chief aim of the library organization; the collections will be, as noted earlier, tools to connect people to "the intellectual content of the past and present so new knowledge can be created."[56] Or, as Horava puts it: "Consider what a collection does rather than what a collection is."[57] As active agents in the scholarly communication ecosystem, librarians will work to ensure that the collections are integrated into the scholars' workflows in more iterative fashions than in the past and will construct and use additional tools with faculty and students in the creation of new knowledge.

FUTURE COMPETENCIES

The future of library collections will follow the resolution of current scholarly communication struggles, especially with respect to open access, preservation of electronic materials, and development of nationwide distributed print networks. We predict that the importance of library collections will focus on providing access to needed material and contributing the library's own unique collections. We believe that collections strategists will preselect a range of materials for their library's discovery systems based on relevance to curricula and research interests, the authority of publishers and/or authors, timeliness of content, and available materials budget. Collection analysts will evaluate the use and the sustainability of library's commitment to the resources. Although the majority of published research will be open access, libraries will have some mix of purchases, micropayments based on use, and subscriptions for a long time to come.

The future of library collections' and collection managers' involvement with scholarly communications will be clearer upon "reframe[ing] the work we do in a broader context."[58] In addition to selecting, acquiring, preserving, and making accessible published scholarship, libraries have real and concrete roles that they should adopt in helping support their campus authors and researchers to create, disseminate, and preserve new scholarly works. These roles should be formalized in library organizations' changing mission: to facilitate the creation of new knowledge, in part by creating collections that support institutional needs. There may be some tension between developing local collections and serving the library's home community with a perceived responsibility to make a more global impact on scholarly communications—

a tension Rick Anderson has described as a "quiet culture war."[59] However, even as Anderson reflects, libraries are ultimately situated within a home community, funded by it, and expected to contribute to its mission. We all need some revolutionaries to keep our soldiers' perspective from becoming too parochial, and perhaps the best way forward is to find ways we can exert pressure for change within our own institutional context. Although the net results might look revolutionary to library lovers from the 1970s, we believe that these changes in the library's mission are a needed evolution.

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Chapter Three

Organization of Knowledge and Information

Sarah W. Sutton and Mira E. Greene

Organizing is at the heart of what librarians do, have always done, and will continue to do. The values of our profession demand that we not judge the resources our customers choose to seek and use, but rapid increases in the number of available information resources force us to pick and choose among those resources and help our customers to do the same. Discovery systems, complex tools for discovery, knowledge bases, new venues for scholarly communications, new formats for conveying not only the results of scholarly communication but also the availability of new scholarly products, rapidly advancing technology, rapidly changing customer demand and information-seeking behaviors, which will, in turn, drive new advances in organizing, tools for organization, and formats and products to be organized all are the state of the art for organizing information.

In this chapter, we begin by exploring the influence of information-seeking behavior on the development of tools for and theories of information organization. This is followed by a brief history of organizing information in libraries, particularly the standards and tools used for that purpose like cataloging and bibliographic control, which was historically the main focus of information organization efforts in libraries, and discovery and how cataloging expanded to discovery. A discussion of how advances in technology resulted in new ways of organizing and thinking about organizing information in libraries precedes a summary of the state of the art of organizing information in libraries and the influence of this on scholarly communication. All of this leads up to a discussion of the competencies that librarians will need to achieve in order to become and remain effective in organizing information for library customers.

INFORMATION-SEEKING BEHAVIOR

In the early years of library and information science, the study of information-seeking behaviors focused on the creation of systems for locating information such as indexes, classification systems, and card catalogs. The focus on information users prompted the development of models and theories of information; in particular, how users behaved toward or sought out and used information resources. Two prominent theories of information behavior that contributed to the understanding of how individuals seek and use information are Brenda Dervin's sense-making theory and Carol Kuhlthau's information search process theory.

Dervin's sense-making methodology (SMM) was developed for use in understanding the relationship among communication, information, and meaning.[1] In library and information science (LIS), the sense-making methodology is associated with the shift to research emphasizing the information users and away from the information resources.[2] Sense making has been in development since 1972, although the term was applied for the first time in 1983. Dervin worked with Douglas Zweizig on understanding users of library services. Zweizig and Dervin distinguished among "use," "users," and "uses."[3] They changed the focus of library research from the user in the life of a library to the library in the life of the user.[4] Sense making shifts researchers' focus from organization to process that better reflects the intricacies of information behavior. It transforms "distinct notions of need, seeking, and use into unified investigation of the processes by which people become informed."[5] Dervin's methodology influenced research on information seeking in context.

Kuhlthau created a model based on theories of learning in education that describes the series of the thoughts, actions, and emotions students face when seeking information. Kuhlthau developed her model over many years of research, mainly with students. The model is applied both in education and library and information science and is particularly influential in the qualitative interviewing of students. The key concept of the information search process is uncertainty that leads to emotions that play a factor in motivating the search for information. However, Kuhlthau does not address the context that instigates the question and information need, such as an assignment or what types of sources are considered or acquired.

The model has seven stages: initiation, selection, exploration, formulation, collection, presentation, and assessment. During the initiation phase, students identify a need or a lack of information that creates a feeling of uncertainty. This uncertainty instigates students to seek the missing information. Students then move to the selection stage when they decide on a topic and where to search for information about it. During the exploration stage, students become frustrated or doubtful when encountering difficulty during

the search. At this stage, students may abandon their search to expand their understanding of the information need. This leads to formulation as students sharpen their focus on the topic and clarify the purpose to be achieved. Thoughts move from vague to focused at this stage of the information search process. Students then begin the collection phase as gathering, digesting, and recording the most relevant information begins. Confidence in the outcome tends to increase during the collection stage. In the presentation stage, students are able to use the relevant information to answer the question and complete the task. Kuhlthau notes that any further searching at this stage only turns up redundant information. During the last stage of assessment, students assess what was accomplished, leading to greater self-esteem and awareness. Kuhlthau has influenced the way librarians approach and instruct students.[6]

Theories and models of information-seeking behavior inform how libraries and other information agencies organize information for users. Information systems are designed to assist patrons at the point of need. For example, LibGuides can be created to assist students with the formulation of subject-specific search queries. Instruction may be focused on assisting and identifying the stages necessary to obtain the information needed for learning. During the last ten years, the discovery tools have been developed to assist users to search a library's catalog, databases, resources available at other institutions, and institutional repositories. As search engines like Google, Bing, and Yahoo have become go-to resources for information needs, libraries have begun implementing discovery tools for patrons to access purchased content. However, the implementation and maintenance of these systems require a thorough understanding of the organization of information.

DISCOVERY

Organizing information is at the heart of what libraries and librarians do; we organize information resources in order to assist our customers to find, identify, select, obtain, and navigate information.[7] The systems and standards that libraries and librarians use to accomplish this professional task have recently come to be known collectively as discovery systems. Bibliographic control and cataloging refer to means of facilitating discovery, means that have changed and evolved in the past century. In particular, advances in technology greatly expand the ways in which discovery is accomplished. In this section we explore the state of the art of discovery in libraries, beginning with its origins in cataloging and bibliographic control and ending with the current state of the art.

Cataloging

Bibliographic control refers to the operations taken to record information in an organized fashion, arranged according to established standards, and therefore made readily identifiable and retrievable, also known as cataloging.[8]

In the late 1980s, cataloging librarians recognized that there were changes in the landscape of library resources that required a rethinking of the way we conceived and organized information. This landscape included the advent of automated systems, bibliographic utilities in the form of electronic databases, electronic versions of print journals, as well as other new formats. A new model was needed to describe these new formats into bibliographic control. This new model needed to help reduce the duplication of efforts and contain costs associated with cataloging multiple formats. This landscape also changed the way patrons sought information and a new method of information seeking developed in both digital and print formats.

Beyond Cataloging

The digital revolution in libraries started slowly as the advantages of electronic indexes over print indexes became clear, and scholarly journals began to publish some of their content digitally. Digital resources were few enough at the time that librarians actually kept lists of Web sites for users. Very quickly, however, the few became hundreds and the hundreds became thousands. The expansion of digital content, including systems for managing it, exceeded the advance of library workflows. Integrated library systems (ILS) worked well for describing the collections of resources a library owned, but they were inefficient for managing licensed (leased) content because the unit of analysis was too large; single records described entire books and journals, making discovery of individual chapters and articles nearly impossible. Electronic, Web-based indexes and databases of digital content were more efficient for this level of granularity, but there was a management system for each index or database, which meant libraries must keep up with access and discovery in multiple systems, which is also inefficient. These systems often lacked interoperability; that is, they did not always allow for accessing multiple online copies of an article. Libraries quickly recognized the need for systems designed to manage the vast electronic resources they were purchasing and licensing as well as to manage customer access. One such system specifically designed to manage library workflows was the electronic resource management (ERM) system.

The OpenURL standard was introduced to support customer access to electronic resources by creating on-the-fly links between citations and full-text SFX, an XML-based product that was built on the OpenURL framework, the first OpenURL link resolver on the market. It was first developed

at the University of Ghent by Herbert Van de Sompel and released in 2001 by the library systems vendor Ex Libris as a commercial product. Full-text and index aggregators and publishers would submit the metadata describing digital resources to the SFX database, which was called the knowledge base. The term "knowledge base" eventually became a common noun that named a system that enables the library user to access the full text of a specific article without needing to know in which database the article resides.

At the same time that vendors of library products and services were developing and improving upon the interfaces through which library customers searched for library resources, commercial organizations were developing interfaces through which their customers searched for World Wide Web content. The most obvious and successful example is Google. Recognizing the success of Google's search interface—not only for its simplicity but also for its capability for searching across multiple Web sites in a single search—libraries began to look for a way to search their electronic resources with a single end-user interface. The first iteration of this was "federated searching," which made it possible for customers to search the library's online catalog and electronic resources together using the OpenURL link resolver. Although an improvement over the need to search multiple databases for information, federated searching with systems like Encore and AquaBrowser were plagued by slow response times, and users preferred the faster response with search engines like Google.

Pre-indexed discovery systems represent the second generation of discovery. These systems use a central database of pre-indexed content from the majority of a library's resources—owned and leased—print and electronic, with a Google link search box. They provide a solution to the challenges presented by federated search engines. Proprietary discovery systems like Primo, Summon, and EBSCO Discovery Service are the state of the art for discovery in academic and some special (law, medical) libraries, although their high cost is one reason they are not yet being adopted by many public or school libraries.

Discovery systems have not replaced the need for bibliographic control, cataloging, and other means of organizing information in libraries for customer access, nor are they likely to do so in the near term. They have, however, changed the way libraries go about organizing the resources and descriptions of the resources that they own and lease in order to assist customers to find, identify, select, obtain, and navigate those resources.[9]

EMERGING TECHNOLOGIES

Libraries and librarians primarily organize information resources in order to help patrons find, identify, select, obtain, and navigate to the information

resources they need. This truth is not likely to change in the twenty-first century. What is likely to change—indeed, is already changing—is the way information is packaged, described, delivered, and consumed, all of which will have a direct impact on how those information packages and resources are organized. As is their tradition, librarians are looking outside their profession for new ideas for organizing not only digital but physical information resources in their collections. Much of this impact is driven by advances in technology, so it is informative to address technological forecasting as well.

Discovery

The future of information resource discovery is envisioned in the Semantic Web, which, in turn, is made possible as a result of rapidly evolving formats for storage, delivery, and access to information resources.

Linked Data, BibFrame, the Semantic Web

The Semantic Web is a web of digital objects—information resources—linked together through relationships recognized and often created by machines rather than humans. Although the technologies that support it and even the idea itself existed long before, Tim Berners-Lee is credited with coining the term "Semantic Web" in a 2001 *Scientific American* article.[10] It makes use of the notion of "triples," three-part statements that specify a subject, a predicate, and an object (as defined by the Resource Description Framework [RDF]). Each part of the triple has a uniform resource identifier (URI). Together, the three URIs in a triple form a statement about a relationship between the subject and the object of the triple. The Semantic Web will allow a machine to identify relationships between triples that contain the same URI. For example, the triple "Mark Twain (subject) wrote (predicate) *The Adventures of Huckleberry Finn* (object)" and the triple "Mark Twain (subject) is a pseudonym used by (predicate) Samuel Clemens (object)" have Mark Twain in common. Either a machine or a human will recognize that these two triples together identify a relationship between *The Adventures of Huckleberry Finn* and Samuel Clemens, but a machine can do so much more quickly than a human can. Berners-Lee's dream of a Semantic Web was a system of machines that would make faster connections, that recognizes relationships between triples so fast as to make discoveries that humans have not yet made.

In the world of libraries and organizing information, the benefits of such a system are twofold. First, and fairly obviously, a library catalog that could identify relationships between resources would allow library customers to quickly find multiple resources between which bibliographic relationships existed. Such a product would certainly be a boon to those customers in terms of finding, identifying, selecting, and obtaining needed information

resources, particularly when those relationships were unknown to the customer to begin with. But second, and perhaps less obvious, is that the idea of the Sematic Web as Berners-Lee envisioned it assumes that library catalogs are part of the open Web and contain metadata (including URIs) that are open to and readable by other systems. This is not currently the case, although efforts are being made to make this happen.

BibFrame, the Bibliographic Framework Initiative, is one of the foremost efforts to make real the notion of library catalogs that are open to the greater Web and contain metadata that is compatible in a linked data environment.[11] BibFrame applies the idea of linked data to bibliographic description (cataloging). It accomplishes this by replacing MARC encoding with an XML encoding schema that relies on RDF triples to describe relationships between the properties of information resources. Because it makes use of standard data encoding that is interoperable with—that is, readable by—systems outside the library, descriptions of information resources that were once "illegible" to those systems become "readable" and, more importantly, actionable by machines, computers that are (or will be) part of the Semantic Web. In other words, BibFrame aims to make library catalogs part of a larger, Web-based system for information organization.

Formats for Information Resources

For the most part, libraries, in North America at least, are still using Library of Congress Classification (LCC) or Dewey Decimal Classification (DDC) for the intellectual organization of physical resources. One of the oddest organizational practices libraries have is separating materials, particularly physical materials, by type or format. For example, print resources like monographs are housed and organized separately from periodicals, audio and visual media, and government publications. Current discovery systems do not operate this way; in fact, their functionality continues to move toward collocating all types of information resources by topic/subject.

The debate over how to organize information resources in libraries will continue in the short term—the next five years—and maybe longer. In some ways, public and school libraries are currently more adventurous in their experiments with different organizing systems than are academic libraries. The evidence includes the use of BISAC and other organization systems for physical information resources, moving away from DDC, "neighborhoods," and so forth, and also trends toward designing interfaces for children that take into consideration their stages of cognitive development.

The Future of Discovery

Predictions about the library are easy to come by—just take a look at the keynote addresses for almost any library conference these days—and some

of them even make sense. One of those predictions has to do with organizing information resources in libraries. What makes sense to librarians is not necessarily what makes sense to library customers. Call it tradition or just plain laziness, librarians like to start by categorizing things by type; that is, they like to have all of the books in one section of the library, neatly separated from the magazines, audio and video materials, government documents, games, and so on. But wouldn't it be cool if you could find the film version of a book next to the book on the shelf?

It's just as easy to imagine this kind of arrangement in the digital world. Imagine a Web site where a search for Beethoven's Fifth Symphony returned results that included the score for the symphony, videos of well-received performances, biographies not only of Beethoven himself but of conductors and musicians, reviews of performances, relevant encyclopedia articles, journal articles, and criticism. The list could go on and on. And, in fact, such a Web site exists not just in our imaginations, but in reality at Alexander Street Press (ASP). Its Open Music Library, which debuted in early 2016, leverages "shared ontologies, linked open data and principles of the Semantic Web [in order to] integrate disparate digital collections and establish meaningful links between the items they hold."[12] Not only that, this project takes advantage of open access to provide free content alongside fee-based content. It's the embodiment of ASP president Stephen Rhind-Tutt's vision for giving customers what they want.

In a keynote address at the 2015 NASIG annual conference, Rhind-Tutt explained that projecting the future is not as difficult or risky as one might think. Using examples of predictions from the 1900s of technological advances that have come into being (e.g., a classroom full of students wearing metal caps connected to a central piece of machinery into which a man is feeding books), Rhind-Tutt makes the point that "the future is clear enough to act on."[13] He goes on to point out that, in order to act in the future in the most feasible and efficient way, we must use new technology in ways that make the most of its capabilities rather than trying to bend it to fit old ways of thinking. For example, e-books make it possible for multiple people to read the same book at the same time, and yet the one-checkout model still pervades some publishers' and thus libraries' policies.[14]

Scholarly Communication

Technological advances have also changed both the products of scholarship and scholarly communication itself. Libraries and librarians have a particular and unique role in the system of scholarly communication because they are scholars themselves, and, more than scholars in other disciplines, they have an interest in and responsibility for organizing and, some would say, preserving scholarship and scholarly communication.

So, what has changed? The simple answer is everything and nothing. Nothing in the sense that scholars continue to produce new knowledge as they always have done; everything in the sense that this new knowledge is communicated, consumed, and preserved in new ways. First, scholars are communicating not only results, but also intermediate products of research (e.g., lab notebooks and raw data sets); in other words, "the research process is becoming visible on the Web."[15] This is, in turn, changing the ways in which information consumers—often the same people who are creating and communicating it—find, identify, select, obtain, navigate, and consume the information they seek. And, finally, changes and the rapidity of change in the formats in which information is communicated and consumed makes preserving that information—that is, preserving the scholarly record—tremendously difficult and complex.

Van de Sompel gives us another view of the problem of using technology to its fullest extent, not simply to make faster the activities and processes that old technology (e.g., print) made possible.[16] In the print world, if one finds a citation to an article or other publication of interest, one could generally go find a copy of that publication. In the digital world, and even the near-future digital worlds of linked data and the Semantic Web, it makes less sense to use a citation than to use a URI to obtain a copy of a publication. But the very same technology that makes URIs work also creates far greater challenges to archiving publications than were ever faced in print, things like link rot, content drift, temporal drift, and rapid obsolescence of hardware and software. This demonstrates, according to Van de Sompel, the need for Web-archiving URIs. Software exists to make these operations simple, but they are not being used.[17] Thus, a consequence of the digitization of scholarly output, journal articles, and other digital information resources for content users is that there is no longer a need for journal volumes and issues but rather only for a URI that reliably points to the digital information resource. A challenge for librarians and others who organize information is to organize such information resources for access and to preserve that access through archiving them.

The web of objects is what Van de Sompel calls the future incarnation of the system and record of scholarly communication. He envisions, in particular, three important characteristics of this new system: (1) the research process (not just the outcome) is becoming visible on the Web; (2) increased use of common Web platforms (Slideshare, githut, etc.); and (3) communicated objects are very different from those of the past (data, software, wikis, e-lab notebooks, papers, presentations, videos), not least in that they are born digital. In order to make these things part of the scholarly record of the future, they must be archived because they are susceptible to the challenges mentioned earlier.

For example, we cannot archive these new information resources like we archive journal articles because the relationships between the objects are just as necessary and important to the scholarly record as are the objects themselves. Another challenge will be deciding what will be archived: Things that are cited frequently? Things that "count" toward promotion and tenure for scholars? And who will do it? Scholarly communication librarians are using data loads from databases to record scholarly content created by professors at their institutions, for example, data crawls with Web of Science. Although faculty is encouraged to submit scholarly content to institutional repositories, they often do not. Research intelligence databases, such as ScieVal from Elsevier, offer these services to institutions that are becoming increasingly interested in tracking faculty research activity. Institutions are eager to disseminate, commercialize, and promote research conducted by faculty. But, as yet, there is little consensus on, let alone answers to, the challenges that digital information resources and scholarship present for libraries and other information agencies.

COMPETENCIES

The library and information professions have become more and more competency based in recent years. In 2009, the American Library Association (ALA) Executive Board approved the "Core Competences of Librarianship," which "defines the basic knowledge to be possessed by all persons graduating from an ALA-accredited master's program in library and information studies," as well as suggesting that "the Librarians working in school, academic, public, special, and governmental libraries, and in other contexts will need to possess specialized knowledge beyond that specified" in their document.[18] To that end, ALA has also posted on its Web site a list of "statements of knowledge and competencies developed by relevant professional organizations."[19] Of the eighteen sets of specialized competencies listed there as of this writing, thirteen include reference to organizing information, most notably the Medical Library Association's "Professional Competencies" and NASIG's "Core Competencies for Electronic Resources Librarians."[20]

The ALA "Core Competences of Librarianship" includes a set of competencies related to the organization of recorded knowledge (in section 3). These suggest that "a person graduating from an ALA-accredited master's program in library and information studies should know and, where appropriate, be able to employ":

- The principles involved in the organization and representation of recorded knowledge and information.

- The developmental, descriptive, and evaluative skills needed to organize recorded knowledge and information resources.
- The systems of cataloging, metadata, indexing, and classification standards and methods used to organize recorded knowledge and information.[21]

These should be taken by readers of this chapter to be the very most basic competencies required, the groundwork for becoming proficient in the organization of information in libraries and other information agencies.

Thus, the starting point for identifying and becoming competent in the organization of information should be the ALA core competences, presumably in the MLIS programs in which they earn their professional degrees. This lays the groundwork for but certainly does not create the be-all and end-all of developing and maintaining competence in organizing information. Competence in organizing information also requires developing an understanding of the information to be organized, of the customers for whom information is to be organized, and, perhaps most importantly, the tools and concepts to be used in order to do so.

The concepts for organizing information have changed little in the past fifty years. Anyone who has read Patrick Wilson's work from the 1960s will recognize ideas that are evident in more recent documents such as the *Functional Requirements for Bibliographic Records.*[22] More recently, scholars like Barbara Tillett, Christine Borgman, Elaine Svenonius, Karen Coyle, and Robert Glushko have extended the way that information professionals think about organizing information. Barbara Tillett was instrumental in the development of the *Functional Requirements for Bibliographic Records* (known as FRBR), a set of principles that forms the basis for the new North American cataloging standards, *Resource Description and Access: RDA*.[23] Christine Borgman asked and answered the question why online catalogs are hard to use.[24] Elaine Svenonius gave us *The Intellectual Foundations of Information Organization.*[25] Karen Coyle has taken the lead in writing about the potential that linked data and the Semantic Web have for organizing library catalogs and integrating them into the broader world of information resources using metadata.[26] Robert Glushko has asked the profession and the world to think about information organization as a cross-disciplinary activity in *The Discipline of Organizing.*[27]

What most of these preeminent authors on the topic of organizing information have in common is their focus on the new tools for organizing information provided by advances in technology. Several existing sets of competencies include technology competencies in their lists, notably not only ALA's "Core Competences for Librarianship," but also most notably the Medical Library Association's "Professional Competencies" and NASIG's "Core Competencies for Electronic Resources Librarians."[28] Thus, in addi-

tion to their competencies related to organizing information, at a minimum, ALA's core competences related to technology should also stand as prerequisites for becoming proficient in the organization of information in libraries and other information agencies. They are:

- 4A. Information, communication, assistive, and related technologies as they affect the resources, service delivery, and uses of libraries and other information agencies.
- 4B. The application of information, communication, assistive, and related technology and tools consistent with professional ethics and prevailing service norms and applications.
- 4C. The methods of assessing and evaluating the specifications, efficacy, and cost efficiency of technology-based products and services.
- 4D. The principles and techniques necessary to identify and analyze emerging technologies and innovations in order to recognize and implement relevant technological improvements.[29]

As should be evident from the earlier section on discovery, additional basic competencies for organizing information in libraries and information agencies include conceptual and practical knowledge of the following:

- computing hardware, operating systems, mobile technologies, and software;
- networking technologies;
- standards and protocols;
- database design; and
- markup languages.[30]

Future Competencies

Most of the existing sets of competencies are written broadly enough as to apply to the near future at least. In the near term, competencies related to both technology and organizing information—such as those promulgated by ALA, the Medical Library Association, and NASIG—should be combined with an abiding commitment to continuing professional development, lifelong learning, and maintaining their competence. It will be vital that librarians and other information professionals continue not only to use but to contribute to the maintenance of such competency documents.

Future librarians would do well to keep up with trends in technology because these are the changes and advances that will drive trends in information and knowledge organization. Technology will take over the simple tasks leaving librarians to apply their knowledge, education, and creativity to the more intricate and intriguing challenges of information organization. We

cannot remain tied to existing workflows simply because that is how we have always done things. Indeed, during the first decades of the twenty-first century, new skills have already made an appearance in the qualifications that employers seek in new professionals. In particular, twenty-first-century employers seek flexibility in the face of change and "a high level of tolerance for complexity and ambiguity" in their professional employees. But the focus will also be on the "customer."[31] What do customers need? Maybe more importantly, what do they want? More simply put than even Svenonius's five objectives for information organization, in the long run, customers get what they want.[32] Our customers' (and our own) wildest dreams may be the next big thing.

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Chapter Four

Communication Skills, Marketing, IT Skills, and Teamwork

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COMMUNICATION SKILLS

Librarians and their roles are evolving beyond that of information gatekeepers. Technological advances are dictating a change in the way that we serve patrons and their continuously changing needs. As librarianship seeks to not just survive, but also thrive in the twenty-first-century landscape, librarians must be able to ride the waves of such a vast sea of technological advancements and be able to adapt quickly to their environment. In the past, librarians created a niche based on a subject specialty and research abilities. Now as the field of librarianship moves forward, it is imperative for librarians to have a comprehensive set of skills, chameleon like, wherein they can adapt and change in accordance to whatever the situation dictates.[1] Library services and collections in the library are changing the functions of the library, which requires a different knowledge and skill set when providing services. Among the skills need to thrive is communication. Ashcroft identified communication as one of the basic skills needed for future librarians.[2]

Gerolimos and Konsta believe that with the rapid development of the Web and Web-based resources, communication is critical because of the increased number of ways and means that librarians communicate with each other and with patrons.[3] No longer is waiting for a phone call or for patrons to come into the library to speak with someone the norm. There are so many avenues available for communication such as chat, instant messaging, Skype, e-mail, and Google Hangouts. Librarians have to be attuned to the communication needs of patrons. Librarians at times have to play the role of educator,

trainer, coach, and facilitator in being able to coach others, explain complex responses to questions, and help the users to understand the best use of library technology and resources. Partridge, Lee, and Munro identified effective communication skills to include the ability to engage in written and oral communication via diverse formats and methods that also includes complex skills that incorporate marketing and instruction.[4]

Communication skills are more than just the ability to process and share information effectively; there is a component of knowing how to speak multiple languages. The concept of speaking multiple languages is not so much learning another language such as Spanish, German, or Mandarin, but learning to speak the language of your stakeholders. As new technologies change the way that resources are used, accessed, and shared, it is in the best interests of librarians to know how to speak the language of the IT department. It is important to know how to communicate the needs of patrons and librarians with IT departments so that they understand the agenda and mission of the library. Additionally, when technical issues arise with library resources, librarians are able to communicate those issues effectively with the IT team to assist in streamlining the troubleshooting process and to resolve the issue with minimal interruption to access and usage.

Along those same lines, patrons are more tech savvy, which requires librarians to be able to speak their language in regard to how they utilize technology. Since many library resources are available in many formats, librarians need to be able to educate and train users about how to best use the resource within the limitations of the device they are using. Youngok and Rasmussen identified understanding how software is interconnected, vocabulary to communicate with technical staff, programming and script languages, and Web design as some of the critical communication skills needed for twenty-first-century librarians.[5] Partridge, Lee, and Munro pointed out that librarians' communication skills should be adaptable to whatever the situation or environment commands, in that they need to be fluent in whatever "language" is needed to influence or persuade the target audience to their perspective.[6] This is very evident in how librarians cope with the changing agendas and perspectives of administration in regard to the relevance of the library, its impact on the community that they serve, and funding that allows the libraries to provide resources and programming. Partridge, Lee, and Munro proposed that the effective language needed to effectively navigate the political waters of administration and competing interest groups is negotiation and diplomacy.[7]

Beyond verbal language skills, other communication skills factor into the success of twenty-first-century librarians. Because the clientele of libraries is so diverse, being knowledgeable and aware of various forms of communication helps to ensure the preservation of interactions that are high in integrity and quality. Wang and Frank concluded that since a large percentage of

communication in reference interactions are conveyed in ways other than verbal—facial expressions, gestures, posture, eye contact, voice pitch and volume—active listening ranks high as important nonverbal communication elements.[8] Even with the cultural differences of a diverse library communication, active listening may be the one skill that is transferrable and can be applied regardless of the patron or interaction purpose. Amsberry lists specific elements to improve active listening skills:[9]

1. Attitude: The attitudes of the librarian and patron directly affect the active listening process. A positive attitude can foster clear comprehension and an effective interaction.
2. Listen for meaning: Interactions that involve patrons with differences in word pronunciation (international patrons) and limited or no library use experience (new patrons) can be difficult, but listening for the meaning or the essence of the patron request during the conversation can ease the tension of the situation.
3. Topic identification: When interacting with patrons, the reference interview is a critical component to knowing how to respond and what information to share based on their needs. Listening for the general topic, patching together the missing pieces, and asking questions that are effective in clarifying the topic may be beneficial in the active listening process.

During interactions where active listening is practiced, the role of the librarian is twofold. The librarian plays the role of problem solver by the patron and the role of listener. As librarians develop a greater understanding of the listener role in reference interactions, effective communication is possible, which leads to improvements in the way the library serves its community of users.[10]

Teaching Ability

Librarians that have effective communication skills recognize the communication needs of patrons with different learning styles, use communication and technology seamlessly for instruction, and have the ability to lead and facilitate discussion regarding library resources and services.[11] Library users gravitate toward Google because of the ease of use and the familiarity with the search engine. As research becomes "Googlized," the traditional role of librarians teaching users how to develop research skills is threatened and requires transformation of their role. Sproles, Johnson, and Farison proposed increased urgency in the collective ability of librarians to figure out a way to integrate library services and practices into the teaching and learning process.[12]

The twenty-first-century librarian will need to be proficient in pedagogy and instructional design, where many current librarians are deficient. They will need to have a well-founded understanding of how learning takes place, how to design effective structures for learning, and how to access learning outcomes.[13] Teaching skills for twenty-first-century librarians include the ability to adapt their approach to teaching using different styles and methods based on the needs of those being taught; to create an environment that is learner centered; and to practice reflection and personal assessment to improve one's teaching ability.[14]

Librarians have unique opportunities when it comes to providing instruction. It can be formal in a class setting, one-on-one consultations, informal discussion, database demonstrations for a small groups, or lifelong learning curriculum for the community. This is by no means an exhaustive list of teaching opportunities for librarians, but it demonstrates the diverse learners and learning situations with which librarians often find themselves. Teaching ability is a highly desirable skill moving forward. Understanding the learner and learning styles will be critical in ensuring that librarians are effectively communicating information regardless of the setting or learner. To gain a better understanding of learners, Misa Mi explained the differences in preferences of what and how they learn, particularly when it comes to learning that is perceived to be relevant or practical compared to content related to a particular interest or need.[15] When librarians are teaching in small groups or one-on-one settings, it is easier to meet the needs of the entire group based on how the individuals learn and what they want to learn. When teaching a large group or in a class setting, it can be more difficult to meet the needs of everyone. This challenge presents a great opportunity to create an asynchronous learning module that allows students to review and practice what is covered in the formal session, but also to allow those who have a different learning preference to study in a more self-directed format. This learning experience can be created with online tutorials that are on demand and available even when librarians are not. Additionally, the development of MOOCs (massive open online courses), or module-based curriculum, could be effective means of teaching and learning as well.

As librarians embrace their teaching role, it is important to keep in mind the qualities of effective teachers. Effective teachers generally use examples of personal experiences in their teaching to enrich the instruction. When librarians are able to make the information relevant with real-world application, it helps in learner interest and motivation, especially in adult learners according to Knowles's adult learning theory.[16] Another suggestion is for librarians to communicate clearly by being responsive to the students' needs dictated by the situation. This is done by actively listening to student questions and comments and allowing that feedback to guide the discussion and inquiry process. Furthermore, effective teacher librarians should use various

activities and teaching strategies to engage their learners and adjust the delivery as necessary in response to the learner. A number of variables such as class size, the needs of the learners, and the location of instruction can dictate teaching strategies and activities. Effective teaching uses a combination of flexibility, adaptation, and preparation so that instructors are able to meet the learning needs of patrons regardless of the situation.

MARKETING SKILLS

Marketing and communication skills work together as libraries face funding issues that threaten their ability to provide adequate services and collections. Librarians must hone their communication skills so that they are able to leverage every opportunity to lobby and advocate for programs and resources that are needed. Communication is the key strategy to effective marketing.[17] The role of libraries and librarians is changing and evolving. The local library is no longer the only source of information for patrons. There has been a long-standing belief that libraries are customer focused, relying heavily on great customer service. Kaur argued that library customer service is another form of library marketing, just renamed.[18] As libraries and librarians adapt to their changing roles, marketing is a critical component to the current success and continued existence of libraries now and in the future.[19]

There are many avenues online where people can acquire information easily. This is a direct challenge to the traditional ideas and notions that librarians and libraries are a primary source of information. Academic library primary users, university students, and faculty are at the forefront of this trend of consuming information through multiple means. The desire is to have this information as quickly and as seamlessly as possible. Google and other search sites have gained significant traction as a go-to source for searching for information. In order for libraries to stay competitive and relevant and to continue to attract the attention of current users and new users, libraries will have to proactively market their resources and services to its user community.[20]

Thinking further about library marketing, the strategy of simply informing the library user community of the various collections and services that are offered is not enough. Effective marketing strategy will involve building relationships, an understanding of user needs, and a clear concept of value-added services. As libraries and librarians redefine themselves, it is important for librarians to have the skills to be able to market the library through building relationships, whether through outreach projects, public relations, or liaisons. Building relationships is a necessity in order to promote the resources and services that are offered at the library.

Building relationships begins with librarians being visible and willing to step out from behind the desk or out of the office and engage in meaningful interactions with library users and stakeholders such as faculty, administrators, and other departments where collaboration is beneficial. Wang and Frank argue that collaborating with faculty in particular aids in creating meaningful learning experiences for students and increases their perspective of value-added services by the library.[21] Forming effective partner relationships with faculty to create programs and services that focus directly on enhancing the learning process of students ushers the library from the traditional perspective of keeper of information to a more value-added collaborative effort to make information available and personalized to match the needs of the user community. In a time where information is available in many different formats, libraries have to set themselves apart so that users see the value in using the library to access and use information.

One of the best ways to market the services and programs of the library is by word of mouth from users who have had positive experiences in the library and with the library staff. Customer service was mentioned earlier as a form of marketing. Direct positive interactions with patrons who then share their experiences with their colleagues, peers, and friends market the library and demonstrate the value that libraries have in fulfilling their needs by providing assistance and access to information when needed. Since there has been a decline in the number of people coming into the physical library to use resources, in-person marketing may be challenging. It is imperative that libraries use the Web to market, especially if this is how the majority of users are accessing information and making contact. Mi and Nesta stress that libraries use marketing initiatives focused on online traffic to validate the value of the library to its users and to embolden loyalty.[22] The library's Web site is the best option for making themselves visible. This initiative can be effective only if the site is focused not only on what the library has to offer, but also on what the user community needs. This retains the attention of users so that loyalty is built through relationship. Open channels of communication foster relationships with library users.[23] It is imperative that the user community is aware of what is happening in the library, of the addition of new collections, of the evolution of services based on the speed and convenience of digital resources, and of the library's commitment to listening and applying patron feedback. This will make great strides in giving patrons a sense of belonging and that the library is concerned about their needs.

IT SKILLS

Patron Privacy in Cloud Services

Patron privacy is one of the foundations of the librarian profession. Libraries across the country take steps to collect as little information about their patrons and their information habits as possible, going so far as not storing historical circulation data even when that data may be useful for the patron. Libraries and librarians will need to be just as vigilant about the protection of patron data that is stored on cloud servers as they are with data that is stored locally. Cloud services are popular with libraries that may not have the funds or the personnel to administer such services locally. There are cloud services that can host vital library software such as integrated library systems, content management systems, chat with a librarian services, and more. Each of these services can contain highly sensitive patron data. It is vital that librarians understand the privacy policies of the cloud services they use, what safeguards they have in place to protect that data, and who owns the data stored on those services.

Post-PC Device Experience

Patrons today access library resources using a wide variety of technology. It is no longer safe to assume that library patrons are using Microsoft Windows computers when they ask for assistance in their research. So-called post-PC devices are being used by more and more patrons. Patrons are just as likely to use mobile phones or tablets to access resources as they are standard desktop computers. Librarians need to be able to provide assistance with these post-PC users. Librarians will need to understand the capabilities and limitations of these devices. Some common characteristics are smaller screens, slower data connections, the inability to run multiple applications at the same time, and single-tabbed Web browsing. Learning how to provide assistance to these users will be a challenge.

Open Source Software

Open source software is software whose source code is freely available. This often, but not always, means that is possible to download the source code for a piece of software and to install and run it locally at no charge. There is a wide variety of open source software available for libraries, ranging from fully integrated library systems (Koha, www.koha.org/, and Evergreen, https://evergreen-ils.org/) to digital repositories (DSpace, www.dspace.org/, and Archivematica, www.archivematica.org/) to content management systems (Drupal, www.drupal.org, and Wordpress, https://wordpress.org), and more. Librarians should be familiar with what open source software is avail-

able for libraries when assessing their software needs. It is possible to save quite a bit of money by choosing an open source software package versus a closed source vendor software solution. Open source software is usually free, but that doesn't mean it is cheap. Almost all open source software requires local computing resources or personnel to maintain the software. If a library doesn't have those resources available, then it may need to go with a vendor solution. It is worth investigating if there are companies that provide support for the open source software that you choose. Sites like foss4lib.org provide a good reference for librarians looking for open source software.

Computer Programming Knowledge

The argument has been made that modern librarians need to know how to write software code. Although coding skills are helpful, they are not essential. Instead, modern librarians should be familiar with programming terminology and the technologies behind the software in use at their institutions. Librarians who learn the terminology are able to better communicate their needs to local IT staff. Libraries often have to modify vendor products to meet the needs of their patrons. If librarians understand the technology in use behind a vendor solution, then they will be able to determine how and to what extent those products can be modified without continually waiting on IT staff.

Multimedia Creation

Video is a highly effective form of communication for librarians assisting patrons with research. A well-designed screencast or video demonstrating how to use a library database can be very helpful to the beginning researcher. It has never been easier to create multimedia presentations (presentations that use video, audio, screencasts, images, etc.). Learning how to effectively communicate using this medium will be an important skill for librarians in the future. The days when a studio with expensive audiovisual software was needed to produce videos are long gone. Nearly every smartphone and tablet released today has the ability not only to record video and audio, but also to edit that material into an effective presentation. The resulting video can be uploaded to a cloud service so that it is available to a wide audience almost instantly.

Augmented Reality

Augmented reality is technology that allows the patron's perception or reality to be enhanced by computer-generated sound, video, and graphics data. This differs from virtual reality, wherein reality is simulated in a digital environment. Essentially, augmented reality allows for various types of information

to be superimposed on images and text. This technology is mainly being used through the camera of a tablet or smartphone. Spina shares examples of augmented reality in action in libraries:[24]

- ShelvAR: This app developed by Miami University Library shows how augmented reality can assist with inventory management and shelf reading by scanning tagged library materials and overlaying a red X on items that are out of place or a green check mark on items in the right location.
- Aurasma: The University of Houston has developed a library orientation that teaches about library services and finding information in the library.
- SCARLET Project: This organization is devoted to creating augmented reality applications to connect users to special collections materials.
- German Traces NYC: This mobile app connects users to New York City's German heritage through photographs, videos, and documents as they explore the city.[25]

According to Spina, augmented reality is a cutting-edge technology in which innovative and forward-thinking libraries are already taking steps to use to convey information to users in new and exciting ways and to engage new patrons and to connect them with information they would not have typically sought out.[26]

Google Classroom

Google Classroom is an education platform that utilizes Google Docs, Google Slides, Google Forms, and YouTube in the classroom. Izenstark and Leahy highlight some of the benefits of Google Classroom for librarians, which include providing a lighter load for embedded librarians, streamlining instruction for credit courses, and enhancing support for one-shot library sessions.[27] When the sessions or courses have ended, the information loaded into Google Classroom can be archived for continued use and future reference. This is an exciting tool to use for instruction since librarians do not have to be associated with a particular class to create a course; the flexibility allows librarians to create courses on the go and add students as needed, and the length of class does not matter, which enables librarians to create on-demand classes.[28] Google Classroom can create avenues for more faculty collaboration, for increased student interaction and engagement, and to provide preparatory information to students of librarians that utilized the flipped classroom model for library instruction sessions.

TEAMWORK AND COLLABORATION

The old stereotype of librarians is long gone. No longer do librarians sit at their desks and wait for clients to appear with questions. Librarians must meet the clients where they work and live. Instead of being passive recipients of questions, librarians must go out and meet their clientele. Librarians must see themselves as collaborators with an entrepreneurial mind-set. Creativity in meeting new clientele along with creative new programming is the key to future library and librarian success. Instead of a passive role on a campus, librarians must become more forward and outward in their approaches to library services for the constituents they serve. A library director once remarked that an outreach librarian position is one that begins with building relationships. Managing these new types of clientele relationships can be a challenge: "Building effective collaborative relationships is a complex and evolving process."[29] Collaboration and collegiality should be the new norm. Librarians and collaborators should make deliberate attempts to design new programs or resources as teams. Lister notes that librarians should "Shar[e] knowledge, collaborat[e], and [employ] practical tools that provide accurate, easily accessible information, all contribut[ing] to consistent reference service."[30] Although Lister is referring to more traditional reference services, it worth noting that the same could be said of all services both within and outside of the library.

Libraries are not easily pigeonholed. On college campuses, libraries do not fit into the traditional molds of departments within a discipline. At the K–12 level, libraries are an adjunct to classroom instruction. In either situation, libraries do not have a defined curriculum nor do they issue grades. For this reason, libraries must remain neutral players and collaborate with everyone. An anonymous author in *Information Outlook* notes: "I argue that the information we find is relevant to all the departments in the organization, and therefore we do not logically fit anywhere."[31] Even in corporate settings, libraries are difficult to classify and can be found in a myriad of different reporting structures. Furthermore, the writer notes: "In order to identify the information needs and information technology requirements of the organization, we must become vital players in project or information management teams."[32] What are libraries and librarians to do? In short, they should diversify. Librarians should look beyond the walls of the library to bring the library of the future to the clientele where they work. Librarians who conduct this kind of work ought to have the following qualities for success: "Foremost among these abilities are problem-solving skills, a high degree of flexibility, an ease with ambiguity, managerial and supervisory skills, and the capacity to operate continuously and creatively within a web of tensions."[33]

The phrase "thinking outside the box" has become passé, but in the context of the library, the phrase still has relevance today. When rethinking

library missions, libraries must be vigilant in order "to remain relevant and survive in this environment, [and] libraries must retool services and resources and align them with institutional priorities."[34] By extension, public libraries should consider aligning themselves with their constituent city, county, or regional partners. Academic libraries should seek to align themselves with other entities that mesh with the mission of the college or university they support. They should also see themselves as "*partners* and *collaborators*, not a *support service*."[35] Also important are liaison programs where librarians are assigned specific departments on campuses so that the needs of constituent departments have a representative to whom they can communicate on a regular basis. In this environment, "liaison team members are directly integrated into the health sciences schools and programs, providing curriculum instruction, creating online learning modules, conducting literature and systematic review searches, and collaborating on new and grant-funded initiatives."[36] Going further, working with other experts in the field cooperatively is key to expanding the role of librarians into areas that are new for both librarians and other information professionals. A recent trend of informationists who are embedded into clinical departments in hospitals and research entities has created new avenues for collaboration among librarians and research experts at institutions such as the University of Pittsburgh. A translational research liaison, such as one found at the University of Michigan, is extending the role of librarian into one who would "develop relationships with laboratories, clinical research groups, and policy scholars based at the research complex [University of Michigan, North Campus Research Complex]."[37] In that way, "Informationists and translational research liaisons facilitate research interactions between the library and the health sciences schools and programs in bioinformatics, human genetics, and the biological sciences, in addition to providing instruction on a variety of commercially and locally developed bioinformatics tools."[38] In an excellent article Roisin Gwyer uses the 2014 NMC (New Media Consortium) Horizon Report to outline what she calls "major trends" for future librarians to consider: "the changing higher education environment (possibly leading to a different role for the library); technological developments; and the changing nature of scholarly communication."[39] She also notes three minor trends: "changing user behavior; legal issues around ownership of information; and changes to physical space."[40] As physical formats evolve from print to electronic resources, the library as a warehouse of paper materials becomes less about the physical format and more about the skills or electronic resources that librarians can bring to research problems. Gwyer notes that collaboration, along with networking, influencing and negotiation, community building, cross-sector working, international working, and interoperability are keys for librarians of the future.[41]

In hospital libraries, the ability to collaborate as part of working teams is key to the library's future survival. Too often in the past twenty years, quite a number of hospital libraries have been closed for a myriad of reasons. The remainder of hospital libraries are subject to reduced physical facilities, smaller materials budgets, and attrition. Hospital administrators perceive the hospital library as a "cash burden" unrelated to patient care and tend to think that all resources are free and on the Internet. What has emerged are embedded hospital librarians who lead journal clubs, who teach evidence-based practice principles, who attend grand rounds, and who assist with grant applications.[42] In her article on hospital librarianship, Colleen Kenefick notes that "with the growing importance of evidence-based practice, there is greater emphasis on librarians working directly with health care providers in their workplace and not in the library."[43] Martin Kesselman and Sarah Watstein note that librarians must serve their constituents where they are: "embedded librarianship focuses on the user and brings the library and the librarian to the user, wherever they are—office, laboratory, home, or even on their mobile device."[44] One path for hospital librarians to take is to find a "champion" of the library, librarians, and library services.[45] These important officials, in any library context, are key to the future survival of the library now and into the future. Merging an interested outside party with a capable hospital librarian can make for a powerful team. Kenefick notes that "embedded librarianship is not a panacea for lack of funding, but if the service is done well, it provides evidence for the value of librarians within their institutions."[46] The ultimate goal for everyone in a hospital setting is to improve patient outcomes, reduce potentially costly medical errors, and reduce readmission rates.

Suggestions for Librarians in the Future

- Public libraries: Find new partners to work with for mutual support. These may be in city, county, or other arrangements where working together is beneficial. Public libraries have a natural ally in school media libraries. Sharing services and bookmobile resources could boost the circulation of reading materials. Also, public libraries can partner with school libraries to increase access to print and electronic resources, improving the education of students across a broader spectrum of public library districts and school library districts. Furthermore, public libraries can be resources for local day cares, homeless shelters, and nursing homes, bringing resources to the underserved. Bookmobiles historically have been tried-and-true methods of this type of outreach for many years.
- Academic libraries on the same campus must work together to serve their constituents and pool scarce resources to purchase or license what their clients need. Outreach services to on-campus and off-campus clientele should be explored with an eye to advancing the mission of the university

and assisting other libraries to pool resources, both human resources and library resources.

- Health science libraries should also find natural partners to collaborate with such as hospital libraries. Working with hospital libraries or state area health education centers (AHEC) to find common ground in which to enter into teaching agreements shares expertise and knowledge among partners in a coalition is vital. Also, where possible, agreements to share costs for electronic resources as part of a consortium could be beneficial to all parties. A project partnership between the Health Science Library at East Carolina University and Sheppard Memorial Library brings the expertise of the health science librarians to the public through a consumer health class called "Healthier U." The health science librarians provide a presentation outlining the best consumer health sites on the Internet to community public library users. The classes are free and open to the public. Public librarians benefit from the collaboration and sharing of information to assist their clientele after the health science libraries have left. Another partnership that has been beneficial is between the Health Science Library at East Carolina University and the local Service League of Greenville Inpatient Hospice. The nursing coordinator calls the outreach librarian at the Health Science Library for the resource needs of patients in hospice. Some of the materials used have been from the health science library, such as iPads to watch YouTube videos of old Western TV shows and large-print, easy to read books borrowed from the public library.
- School media libraries could partner with public libraries to share human resources and library resources. School libraries have successfully partnered with public libraries in Pitt County, North Carolina, to issue public library cards to all middle school and high school students. Although there is some overlap between the two library systems, students are able to access both the resources provided to public school libraries and public libraries. With minimum expenditures by both library systems, students are afforded more resources, both in print and online, without a high cost. Everyone in this scenario benefits.

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Chapter Five

Reference and User Services

Meghan Hupe, Susan Bridgers, and Lisa Blackwell

Reference and user services are an integral part of what all types of libraries have to offer their communities in the twenty-first century. Samuel Swett Green, a librarian at the Worcester Public Library, first implemented what we know as "reference services" in 1876. This chapter is an overview of the different aspects of reference and user services, the current trends, and future possibilities. Topics that are discussed in the first section include e-mail, chat services, phone, and texting as they are used to augment library services. This section also explores current technology trends being used in some libraries including texting or instant messaging and video conferencing tools.

The second section is a discussion of knowledge base development and Web site development. Various technologies and design considerations as they apply to library Web site development are examined. These include the developing concepts of connected, adaptive, and haptic learning, as well as the substantial impact of data collection and associated consequences. Social media modalities form the topic of the next section of this chapter. In step with contemporary communication preferences, librarians adapt and use social media in significant ways as part of reference and user services. Discussion of the various types of social media tools such as Facebook, Twitter, and Pinterest, among others, conclude the section.

The third and final section of this chapter paints a broad picture of user services provided within the walls of the library and explores future directions for reference services. Discussion includes an explanation of how societal changes have influenced library collections, librarian roles, and transformed user spaces and services. In addition, the role that cutting-edge technologies, virtual interactions, and the evolving nature of embedded librarianship will be considered.

E-MAIL

During the 1980s e-mail was invented as a technology and it subsequently facilitated a virtual extension of the reference desk. A survey conducted by Association of Research Libraries in 1988 indicated that 20 percent of responding libraries were offering e-mail reference services.[1] Early e-mail reference services were usually provided through e-mail systems linked to campus-wide information networks or online public access catalogs (OPACs). E-mail was the earliest form of technology adopted specifically as a method for providing digital/virtual reference. Virtual reference may be defined as

> reference service initiated electronically, often in real-time, where patrons employ computers or other Internet technology to communicate with reference staff without being physically present. Communication channels used frequently in virtual reference include chat, video conferencing, Voice over IP (VOIP), co-browsing, email and instant messaging.[2]

E-mail and chat services are the most frequently offered virtual reference service venues. E-mail reference is typically offered through a standardized Web form that users fill out and submit, whereas the link to chat services opens a connection to a library staff member in real time. Internet-based services commonly called "Ask a . . ." services have also emerged as alternative question/answer services for the general public and these are often not connected to a traditional library.[3] The freedom to ask questions where and when the user wishes without being constrained by the place or method is facilitated by adopting these technologies. Librarians are wise to recognize that users want that freedom given the growth in free access to the Internet through personal computers and other handheld devices.

E-mail is a primary venue used for personal and professional communication by a large percentage of adults. However, it is not the most frequently utilized method in the arsenal of communication tools embraced by most teens. In recent studies, only 14 percent of teens surveyed reported sending e-mails to their friends on a daily basis.[4] Of the methods listed (landline, mobile phone, in person, instant messaging [IM], text messaging, messaging over social networking sites, and e-mail), e-mail was clearly the least popular. Based on this and similar studies, it seems likely that libraries will need to rely on methods other than e-mail to effectively communicate with many users. E-mail may indeed fade away as newer communication technologies are developed and become popular.

CHAT

Chat is another technology that is being used extensively for digital/virtual reference services. Chat services in libraries emerged during the mid-1990s. They are described as "the predominant mode of online real-time interactive reference services in libraries."[5] This service mode enables synchronous communications between users and librarians, which also works well for conducting reference interviews. In the beginning, libraries typically used chat rooms, instant messaging software, or homegrown software to provide the service.

Toward the close of the 1990s, sophisticated chat software was developed for the retail industry.[6] This allowed retailers to chat with customers through their Web sites and direct them to other areas of the Web site. Libraries began to adopt these out-of-the-box solutions. And although Web-based solutions were easy to adopt, they were frequently expensive and difficult to maintain. Soon after the widespread adoption of chat services, libraries began to experiment with IM software, a natural progression based on popular use, particularly among the younger generation.

To date, librarians continue to employ a variety of technologies that allows the exchange of text-based messages in real time. It is now very common to see a "chat with me now" widget on a Web site. Additional examples of these technologies include multi-user domain object oriented (MOO) and Internet relay chat (IRC) technologies.[7]

The use of these technologies is usually based on one of three common service models. The first model is built on purchasing a subscription to Web-based software, the largest of which is OCLC's QuestionPoint. The service is staffed solely by the library employees and offers limited hours. An alternative model uses a commercial instant messaging service (e.g., AOL IM), sets up unique screen names, and monitors them during set times. The final model is based on sharing a subscription chat service and participating cooperatively so that services can be offered around the clock.[8]

The convergence of a variety of communication channels to provide service is an evolving trend. Reference transactions that begin in one channel may transition to completion using another channel. For example, a user who sent an inquiry using chat might subsequently be guided to allow the librarian to address the question via phone call. Interoperability and blending channels are increasingly common. Screensharing for user instruction during a chat session is one example.[9]

Another interesting example of where trends intersect has been initiated by creators of social networking sites such as Facebook. In August 2006, Facebook developers released an application program interface (API) publicly. This allows outside developers to create widgets that can be embedded in

Facebook profiles. Integrating the widget facilitates yet another direct connection between users and librarians.[10]

Mobile technologies are the next frontier likely to shape chat reference services. Smartphones, tablets, and e-readers have rapidly become ubiquitous in the lives of many library users. These devices are being used not only for communication or as a substitute for print books, but as a convenient interface to use for information searches. Web developers have designed interfaces that work seamlessly with these mobile devices. As library users increasingly rely on mobile devices to connect to library services, so too will librarians need to become more familiar with using mobile devices to connect to their users.

TELEPHONE

The volume of telephone service has increased as a result of patron cell phone usage. Widespread use of the Internet has also contributed to an increase in demand for in-depth and technical assistance. Patrons are frequently calling for guidance on how to use online resources or how to access databases. The growth in distance education is dramatically increasing the demands for such assistance on academic libraries. Ultimately, the telephone/cell phone remains an important tool for providing reference services to remote users and will likely remain so in the foreseeable future.

TEXTING

Some libraries offer texting as yet another communication method for providing reference services. At this time, there are two basic models for text reference services used by libraries. With the most basic model, a mobile device with a texting plan is shared among reference librarians. The mobile device is kept at a central location and librarians are individually scheduled for shifts to monitor and respond to user messages.

The second model is based on implementing a Web-based application that librarians access to send replies to the user's mobile device.[11] Types of questions sent through text tend to be short and can be answered with brief responses. Multiple and highly detailed messages are less likely to be sent using this method due to restrictions in text messaging plans and the awkwardness in engaging in multiple back-and-forth texts for clarification. Unique protocols and normative behaviors tend to be associated with text messaging. Texting lingo, emoticons, and humorous references can be difficult to interpret or to assess as professionally appropriate. It is yet to be determined just how widely text messaging will be integrated into reference services.

VIDEO CONFERENCING

Libraries began adopting video conferencing tools with the rise of satellite technology in the early 1980s. Video conferencing became a popular way to attend workshops and conferences without additional travel expenses. Participants interacted with the presenters through telephone technologies.

During the 1990s, a few libraries began experimenting with video conferencing applications to reference services. One such product called CU-SeeMe was developed by Tim Dorcey of Cornell University for a MacIntosh environment in 1992. It was further developed for Windows a few years later. The Science Library at the University of California, Irvine, experimented with using this tool to provide real-time reference. The hope was that an interactive video reference service might be integrated into the other modalities used at the reference desk to meet user preferences.[12]

With the wealth of video conferencing tools available, today's libraries have a broad selection to consider integrating into reference services. Adobe Connect, Skype, FaceTime, GoToMeeting, Zoom, and Google Hangouts are but a few of the latest to gain popularity. The ability to connect users to librarians with real-time audio and video presentation is enormously appealing to a population accustomed to instant responses. It is not hard to imagine an imminent future where holographic 3-D video conferencing becomes a common technology adopted by libraries to provide services. The technology allows individuals in separate locations to stand in video conferencing "pods" and interact with life-sized 3-D projections of individuals in separate pods for virtual face-to-face transactions.

KNOWLEDGE BASE

Reference librarians have a long tradition of sharing knowledge that helps each other to serve users effectively and efficiently. Card files and notebooks were commonly found at reference desks where librarians documented information sources and answers to frequently posed inquiries. This rudimentary form of a knowledge base served the profession well until the mid-1990s, when the technological tools to store such information in an electronic archive became widely available.[13]

One prominent example of a current knowledge base is the LibAnswers module available from SpringShare Corporation. Librarians use this to gather and post frequently asked questions on the Web site where patrons can search quickly using simple keyword queries. The beauty of the system is that it accurately captures statistics on the number and timing of transactions as well as how frequently users are seeking information on previously identified topics.[14]

Wikis are another form of knowledge base that library staff often utilize to categorize and document important information used for internal processes. It may be used to house training documentation, important contact information, and a wide variety of data that is not needed by the general public using the library services.

SOCIAL MEDIA TOOLS

The definition of "social media" continues to expand and evolve, but several venues used as platforms appear to be stable enough to continue maturing. Facebook, Twitter, YouTube, LinkedIn, Tumblr, Pinterest, Instagram, Snapchat, Vine, Google Plus, and Flickr are most representative in this category. Facebook is arguably the most popular social network among U.S. adults. As documented by the 2015 Pew Internet Project, "72 percent of online adults are Facebook users, amounting to 62 percent of all American adults. Those on Facebook remain highly engaged with 70 percent saying they log on daily, including 43 percent who do so several times a day."[15]

Libraries are using Facebook to engage patrons, provide library information and news, organize events, and share marketing media. Twitter, another popular social media tool, is being used to provide customer service, information, and news to patrons and to build connections between librarians, institutions, and researchers. Like many professionals, librarians use Linked In to connect with community members with related professional interests.

Pinterest is of particular interest to academic librarians. It is being used as a tool to assist with various interests like setting up repositories for patrons to pin references, to display book titles to promote browsing, and to promote unique archives and special collections.

YouTube lends itself well to creating instructional and marketing videos for targeted audiences. The audience that might not be inclined to review written information could well be the same audience that is able to more easily appreciate information conveyed in video format. Instagram is a good way to share bite-sized snapshots of "what's happening now in the library."

Tumblr is yet another outlet for providing content in a visual format. Snapchat is a popular venue for posting videos, publicity photos, and initiating conversations with patrons. Vine, Flickr, and Google Plus are other technology-enabled venues that librarians are actively using as tools for meaningful communication.

LIBRARY WEB SITE DEVELOPMENT

The Web site is the first face of the library, often even for in-person patrons. The 2013 Pew Internet Project survey notes that "39 percent of Americans

ages sixteen and older have gone to a library Web site at one time or another and, of them, 64 percent visited a library site in the previous 12 months. That translates into 25 percent of all Americans ages sixteen and older who visited a library Web site in the past year."[16]

Well-designed sites offer where, when, what, and whom information: location, hours, collections, events, and reference help in logical placement on the pages. These fundamentals take stage around the other main purposes of the site: the categorization and search functions for the collections. It is doubtful that these fundamentals and purposes will change in the libraries of the twenty-second century, but perhaps the operations or uses of the Web site will.

The shift to cloud-based tools and functions in the twenty-first century provided a seismic release of library collections and, in fact, of librarians' time. Library site and collection search tools have taken a cue from search field leaders; users currently benefit from broad reach and tight return times in search functions. Meanwhile, databases of collections have grown deeper and cheaper simultaneously. The search function and collections of the library Web site will only go faster and deeper in the future as search algorithms get better and collections continue to grow.

THE MAKER MOVEMENT

R. David Lankes, a professor and dean's scholar for the New Librarianship at Syracuse University's School of Information Studies and director of the Information Institute of Syracuse, has a memorable quote posted on his blog: "Bad libraries build collections; good libraries build services; great libraries build communities."[17]

The emergence of the maker movement is one of the most exciting societal trends of recent years that leverages the creativity of individuals in coming together to apply new ideas and technologies in a shared environment. Makerspaces are places where community users can make objects using 3-D printers, button makers coupled with the hardware and software of computer technology. As a result, libraries are creating communities wherever suitable space and shared interests can be found. The community works within a makerspace, sometimes called a hackerspace, and grows out of the desire to share the basic resources supporting do-it-yourself projects that began with the imagination.[18]

The first makerspace in a U.S. public library was built in the Fayetteville Free Library in New York State. It is an excellent example of the potential for a public library to recognize an important trend and use it to provide a valuable service for citizens. A recent report released by the American Library Association details the dissemination of 3-D technology in the library

world. Libraries of all kinds are adding access to 3-D printing to their spaces. The technology is wildly popular with students and community members of all ages. This technology also has the potential to drive education, innovation, and economic entrepreneurship.

It remains to be seen whether or not this is a passing fad along the lines of library-hosted Wii competitions where, at least for a short time, libraries also helped to nourish a passionately engaged community. Even while acknowledging the unpredictable nature of any societal change, there will always be value in positioning the library as a partner in nurturing a transformational community.

LOOKING TOWARD THE FUTURE

Librarians and library administrators will need to carefully consider the evolving technologies that have the potential to be adapted for use in reference and user services. Technology evolves rapidly. User preferences and expectations evolve and are shaped by technological advances. Librarians must be nimble and responsive if they are to ensure that reference and user services continue to meet the demands in a technology-mediated, continually evolving, and largely virtual environment.

KINETIC LEARNING AND ADAPTIVE LEARNING ARTIFICIAL INTELLIGENCE IN LIBRARIES

To address the different types of user learning styles—auditory, visual, kinesthetic—the most urgent development will come in addressing the needs of the kinetic-style user. Auditory learners learn by hearing. Visual learners learn by watching someone perform a task. Kinesthetic users learn by actually doing or performing part of a lesson, sometimes known as "learning by doing." Augmented reality experiences, the darling of the development crowd now, will bring new, blended presentations to attract the digital native second- and third-generation users. Gaming-style interfaces, walk-throughs of the blended realities, and inviting multidimensional sites will entice the library site users soon with novelty and then deep user adoption. Librarians will need to be early adopters and conversant user/managers.

Imagine the augmented realities world tethered to smart, adaptive learning. Personal search history will be hacked together with the depth of attached databases in a new combination of search history and database to create a new line of searching. This is the avatar that you, the search user, will be, which includes options you didn't know existed based on your search history. Now imagine walking through the book stacks of a library where books float from the shelves into your path for your consideration and the

floor tiles lighting up inviting you to step on a "smart search path." The library site interface will remember your levels and topics of research; it will recommend new options from browser-use data mining as it does now but with artificial intelligence proffering bibliographies.

The library site of the future will be an inevitable combination of inviting design using immersive experiences and high functioning searches, along with speedy and smart results. The librarian will need to be able to tutor, troubleshoot, and track users in these experiences in order to optimize the volume and quality of use.

LIBRARIES AS NEW TECHNOLOGIES PROVING GROUNDS AND CONNECTION SPACES

The Center for the Future of Libraries tracks emerging technologies and trends in library and library site use. For this discussion on Web site development, it is worth noting the following tools and uses profiled by the center: haptic technology, connected learning, and makerspaces. Haptic technologies convey sensory experiences from content. Site developers, inviting new connection points to the library, could embed sensor and feedback receptivity from personal "wearables." As the attributes of connected learning grow with new user exploitation and contributions, libraries will capitalize on their community center status. As the Library of the Future denotes it, "With a focus on production, connected learning could provide opportunities for libraries to engage communities in the production of new knowledge and resources that could further connect and integrate the community's role in the library."[19]

This means libraries are in the perfect position to be the marketplace where users can learn together and contribute to each other's learning, sharing experiences, and research. Springboarding from the idea of shared learning in shared spaces that libraries can provide, online makerspaces will become more commonplace in the future. Librarians will enjoy the eureka moments of the explorers who use the library Web site to discuss ideas, unearth new processes and products, and invent together. The best library Web sites will offer collaborative wikis and discussions where inventive users can meet. Librarians will need to be the shared space and discussion moderators and often the conversation instigators.

USER DATA INSIGHTS AND PROJECT REPOSITORY SPACE

New library Web site analytics stemming from the explosion of mega data collection ability will task the librarian with analysis and practical application of the knowledge from user data. From the innumerable sets of data that

are collected, the library site managers will themselves need to be highly adept, efficient in the capture, visualization, and use of the site data. The most nimble among library managers will adapt and morph their sites to changing user needs. Most developers know the tipping point of Web site design is where the site is changing to suit new uses yet unchanging enough so as to not be off-putting. Taking a large cue from the discipline of marketing, segmented user testing will reveal the next best Web site iteration.

The future's library Web site will also be a marketplace for information sharing on the data collected, perhaps allowing users mine from the pool. The library site itself will act as a repository for data projects. Librarians will need to be data managers and modelers proficient with data analytics and to be able to use data reports to drive and support strategic planning.

BENEFITS, CHALLENGES, AND THE FUTURE

Libraries with a social media presence are choosing to employ tools that are inexpensive, popular, and useful for fostering a sense of community between the library and users. The image conveyed is one that builds the perception that users are an integral building block of society that is connected to current trends. The tools necessary for promoting engagement are already familiar and easy to use by many library staff members and community users.

The thoughtful use of social media indicates that the library is engaged and connected to the communication preferences of a large percentage of potential patrons and is relevant in an age of ubiquitous virtual presence. This shows that the library is more than a physical building, collection, or Web site. By adopting and adapting popular social media tools as they emerge, libraries have the potential to further demonstrate their value as primary contributors to the fabric of contemporary society.

SETTING THE STAGE

Today, all libraries in the United States hold at least one common role. They exist as a locus of user services. Until very recently, the concept "reference services" has been viewed predominantly as the largest subset under the umbrella term "user services." This was logical when all library-initiated activities revolved around utilizing the contents of a known collection of materials. Absent the presumption of an owned, borrowed, or leased collection of materials, what do reference and user services look like? What are possible scenarios for how they will evolve? This an overview of basic aspects of reference and user services offered within a library facility as they have existed, what they look like in contemporary libraries, and intriguing possibilities for how they might look in the future. For the sake of brevity,

the libraries described fall broadly into the categories "public" and "academic." This is not to ignore the existence of special, government, and the myriad of libraries with unique user populations, but rather to focus on overarching trends that have implications for most libraries.

SHARED BEGINNINGS

The original Carnegie Public Library in Columbus, Ohio, bears a stirring inscription over the main entrance: "Bibliotheca Fons Eruditionis" roughly translates as "the library, the fount of learning."[20] The building was dedicated in 1907, and the sentiment aptly captured the library mission as well as beckoned users to access the resources upholding that mission. In the United States during the past century, all libraries—public, academic, and special—shared that same raison d'être.[21]

Services offered were based on the collections of resources contained within the walls of the building. User services provided by librarians were inevitably shaped by the demand for mediated access to the items curated in the collections. Acquisitions librarians added to the collections, catalogers and archivists worked to organize and preserve precious materials, and reference librarians specialized in helping users to identify, locate, and access items to meet their information needs. At that time, the collection development model was to add materials "just in case" a user might be seeking those very items. For example, if a user asked for a history of France, an appropriate book could be offered. Users curious about French villages could be offered historical maps. As technology progressed and audiovisual materials were added to the collection, users could find recordings in the collection to learn the French language or view a movie produced in France.

Demand for library services was also driven by significant societal changes. The evolving emphasis on public education as a societal norm meant an increase in the number of citizens who could read and actively pursue opportunities to learn.[22] Where once the library was deemed a temple of scholarly knowledge whose caretakers offered services to the privileged few, the doors were open to anyone interested in exploring the collections.

Today, slightly more than one hundred years beyond the date the inscription was etched on the facade of the Columbus Library, the meaning remains relevant. However, user services supporting that mission have evolved almost beyond recognition. For example, the presence of a large, prominent reference desk was (and still is in some libraries) ubiquitous. It was the first stop for a user wanting assistance from a librarian. Public libraries have only recently moved away from this model to a shared desk where circulation, reference, and technology inquiries are fielded by staff members and referred to librarians when necessary.

Academic libraries have also been experimenting with various types of tiered service models as a way to allow librarians to focus on complex questions while staff assisted users with more general questions. In some libraries, desks have been replaced by roving staff members or librarians who proactively offer assistance.

Well into the late 1990s, the underlying assumption was that users came to the library for help using the information resources owned and managed by the library inside the building. Unprecedented changes in communication technologies, escalating costs of acquiring and replacing resources that are rapidly outdated, and the accessibility of information sources freely available via the Internet have called traditional librarian competencies into question and made the service models built around those competencies sometimes irrelevant. As a result, collection development for most libraries is now a "just in time" model. Users can expect materials to be accessible, and they are often completely unaware of or do not care about ownership. User satisfaction with library service is achieved when what is requested is delivered in the format of preference. This drives a radical transformation from the librarian as caretaker paradigm to the librarian as service provider and access facilitator.

EVOLUTION/REVOLUTION

"The medium is the message" was famously coined by McLuhan in 1964.[23] One of the key points McLuhan made was that the medium itself, in addition to the content, plays a role in affecting comprehension and societal change. The intrinsic meaning of tasks changes as a result of expanded possibilities. Now that it is possible to read about baking a pie on your tablet, it is also possible to download and print not only the recipe, but also the coupons for the ingredients that need to be purchased to prepare the pie. The role of the service provider in helping the patron to find a recipe from among a collection of cookbooks has been completely transformed. The user has instead asked for help installing the appropriate software that will allow e-mailing the recipe to a friend hosting a party. Librarians are responding creatively, adapting or transforming existing services, as well as identifying new services to enhance user experiences in the library. In many libraries, shelves that once held cookbooks have disappeared.

COMMUNITY COLLABORATION

Organizations of all types operate within the financial constraints imposed by a wide variety of funding mechanisms and economic circumstances. Libraries, as agencies with heavy reliance on public funding through taxes and

levies, student enrollment, or the company bottom line, frequently face cuts that impact everything from staffing hours and available services to community programming.

Librarians are not alone in needing to maintain or increase services with fewer resources. One solution widely embraced is an emphasis on establishing partnerships with other organizations or departments promoting complementary service missions. One example could be early literacy promotion programs to children that may include opportunities to sign up for library cards and library story times in local pediatrician offices or at the local health department.

Libraries further promote dedication to lifelong learning by establishing working relationships with local schools. Homework help centers have emerged as valuable resources supporting primary education. Computers, tutors, and supportive learning resources are housed in the library and library staff assist students completing class assignments.

Libraries support lifelong learning by offering educational opportunities tailored to the needs of adults. For example, adult services initiatives in libraries often include job search centers. These centers collaborate with local employment recruiters. They allow community citizens to seek help with identifying potential employment opportunities, application materials, and resources to enhance skills required by employers. Employees in organizations of all stripes often find local librarians participating in business meetings with clients, meeting regularly with accrediting bodies, or as members of the Institutional Review Board (IRB). Any type of close collaboration, as librarians coordinating services with other clients, can impact how the library is maintained or funded now and into the future.

Over the past decade, an interest in genealogy has grown with the availability of online resources such as Ancestry.com. The aging population in particular frequently requests assistance in locating obituaries, birth announcements, and other items that may be located only in local newspapers either stored in dusty boxes or digitized as a part of a local history project. Local history agencies are often small and scarcely funded and are usually volunteer driven. These agencies often lack the digital technologies and expertise to convert old printed records into accessible media. With assistance from librarians in obtaining grant monies, the necessary digitizing equipment is obtained and housed in the library. Library staff skilled in handling, organizing, indexing, and digitizing historical documents become partners to local history agencies. These irreplaceable artifacts become a permanent testimony to the library's pivotal role in preserving and providing access to genealogical and historical documents.

There is an emerging trend for incorporating the public library into a larger community center. Adjacent areas to the library space might include a community theater, college course classrooms, recreation centers, health

clinics, or senior citizen support services. Services offered within the library itself supplement and build upon the services offered in related facilities. For example, librarians create programming events that allow senior citizens, a population that often lacks computer skills, to learn how to use e-book technologies on popular handheld devices like smartphones and tablets.

Reader's advisory services are another service long associated with librarian tasks. With the advent of reading material availability in audio, e-book, or streaming format, a reader's advisory service has become even more valued. Users not only seek advice on how to wade through the enormous body of reading material to find what interests them, but also on how to select the medium desired.

Academic librarians provide a similar advisory service for scholars by identifying and connecting scholars to resources based on the librarian's personal knowledge of the scholar's interests. Librarians in other types of libraries proactively sift through information sources and proactively disseminate the relevant findings to their users, many of whom may have never set foot in a physical library.

Community advocates recognize the wide range of both access to computer technologies as well as the disadvantages for citizens without computer literacy skills. Librarians in all settings consciously craft programs that are designed to help bridge the "digital divide." Rather than emphasizing the role of the library as a point of mediated access to resources, the emphasis is on teaching the mechanics of how to access resources by teaching skills required by various computer technologies. The availability of public access computers, copiers, and similar technologies within public libraries especially provides access to these resources for economically disadvantaged populations. Employees of companies who have no daily need for computer access as part of their work responsibilities visit the company library to take advantage of computers available to all employees. They may also ask for librarian assistance in using computers to help to find the information they desire for non-work-related activities.

Librarians in a variety of libraries respond to community issues impacting their users by adding programs featuring expert speakers. Such programs promote opportunities for public dialogue surrounding pressing societal issues like food insecurity, infant immunization, or human trafficking. Tutoring classes for English as a second language fits easily into public library programs that can take advantage of existing library collection materials that support reading skills at all levels. All libraries have, as a core mission, support for user services by providing pragmatic, unbiased, and versatile user education program services to clients.

EMBEDDED LIBRARIES

Several public libraries have partnered with higher education libraries to provide expanded access to resources not included in their own collections. The public library is "embedded" on the college campus or vice versa.[24] Students enrolled in college classes can easily access recreational and leisure resources. Public citizens can readily obtain scholarly materials for private study and learning. Librarians specializing in both higher education and public services librarianship bring separate yet complementary skill sets to the shared environment to the benefit of all users.

Within the past decade, some communities have embraced a model of social services outreach that coordinates related services within the confines of one building. Emergency health care, legal assistance, victim advocacy, mental health services, and other related community services are housed together to facilitate access to resources that support vulnerable populations. It is not hard to imagine a similar scenario in the future whereby educational institutions, performing and visual arts venues, and community support services such as food banks and health care clinics are all connected to and anchored by an embedded public library, thus promoting complementary service missions.

OWNERSHIP

Corporate librarians are often charged with managing company assets such as proprietary information and routinely help users with legal questions regarding ownership, rights management, and related inquiries. Academic librarians have taken a visible lead in higher education in providing user assistance with complex queries surrounding copyright, authorship, usage rights, and licensing restrictions. They have also assumed leadership roles in providing discoverability and accessibility of intellectual outputs of researchers within their institutions.

Lending and borrowing library materials are fundamental to the role that librarians play in sharing information. Interlibrary loan librarians know very well the legal requirements for documenting those activities and the perils of neglecting or ignoring the requirements. Legal questions arising in a primarily digital environment magnify an already complicated arena. The open access movement has served to further muddy the waters. Responding to an increasingly litigious society means that most academic institutions now employ librarians who are part of a dedicated department charged with assisting scholars, educators, and students in legally utilizing intellectual property in a published format. The librarians are also responsible for protecting the authorship rights of individuals as well as any institutional rights to ownership

and distribution. Licensing and copyright are some of the most challenging areas for librarians to interpret and apply. The Georgia State Library copyright lawsuit is one of the highest profile cases in recent memory.[25] Although a discussion of the case is outside the scope of this chapter, even a cursory review of the court actions is ample proof that interpreting and applying law to library operations is potentially a very costly endeavor.

FUTURE DIRECTIONS

"Libraries are sustained by people through institutions and society in general because they believe, feel, intuit or think that libraries are important to them because they have a positive perception of them."[26] Librarians in every type of setting are engaged in a fight to validate services the library as an institution provides to community members. Humanity is now largely a globalized community that is digitally connected, broadly networked, and composed of inhabitants who, given the appropriate technological tools, may freely access an entire universe of free information. In this environment, librarians are no longer conservators and gatekeepers of recorded knowledge. The value of the library must be based on how librarians assist with information in any format. Service must transcend any dependencies on physical location, owned or accessible resources, and societal advantages or disadvantages. "In-house user services" is a distinction that only makes sense by expanding the definition of "in-house." Library users are unlikely to be defined by geographic location, educational attainment, community affiliation, gender, or any other arbitrary categories. Library users will be defined by their shared appreciation for the value of the services provided. They will likely use the services of several types of libraries during their lifetime. They will recognize that the library is not confined to a physical location. They will feel that they own their libraries and that all members of society have a stake in that ownership and what it contributes to their lives. They will feel a connection to the library that cannot be replaced by another institution dedicated to providing services for the common good.

As people increasingly interact in virtual environments more than they do face-to-face, there is a craving for human physical connections. It may be that a library, a place that provides a secure physical environment to bring people together, will continue to find ways to foster those connections. Consider that most libraries have long abandoned restrictions on bringing food into the library. Coffee shops and cafés have become common in all sorts of libraries. In the future, could the library evolve into a mecca that users visit for entertainment, dining, cultural arts, meeting spaces, and on-site access to community resources? Could future librarians become skilled community cultural navigators as well as expert guides in the complex world of informa-

tion, regardless of access technology, format availability, or ownership? Under those circumstances, the library is no longer a place. It has been completely transformed and is now the community commons.

FUTURE COMPETENCIES

One point is clear: the future of reference and user services is evolving and in a constant state of change. What we imagine even today could be wild guess, right on the mark, or slightly behind actual development. What we do know is that library directors and supervisors must be at the forefront of preparing their libraries and, in fact, their users for great and small changes. Changes will follow technologies' advances and the preferences of the user public. Even the smartest advance in technology is not the wisest investment of capital and man-hours for a library if it is not widely adopted. Still, as the common ground and gathering space for disparate user groups, libraries must also be leaders in investigating, understanding, and promoting new technologies. Librarians will do well to think of themselves as change makers and change promoters. For as much as libraries must move forward technologically in their service of providing information, they still must act as wise gatekeepers of information and institutional history. Libraries' reference and user services departments will remain the touch points, the access points, and the public faces of their institutions. Reference and user services will remain the relevant and highly dynamic service department at the core of the library mission.

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Chapter Six

Research Skills and Competencies Necessary for Librarians in the Digital Age

Kerry Dhakal, Karen Stanley Grigg,
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> Our job is not to build a better library—it's to figure out how best to use our skills and talents to advance the goals of our communities. Sometimes that means we'll be doing the kinds of things people associate with libraries. Sometimes it means we'll stop doing those sorts of things. And sometimes it means we'll be doing things that nobody ever associated with a library before.—T. Scott Plutchak, 2012, Janet Doe Lecturer at the Medical Library Association (MLA) annual meeting in Minneapolis, Minnesota

This chapter discusses the research life cycle and where librarians fit within each stage. Over the years, literature searching has evolved from a comprehensive review of the literature to the need for systematic reviews. A comprehensive review gathers information and provides an overview of the available information for a certain issue. A systematic review provides a more in-depth review of available information by also searching for theses, dissertations, conference proceedings, and similar grey literature sources of information.

Librarians are becoming increasingly involved with data management planning, manuscript planning, and selection and creation of academic productivity reports. The next section discusses noteworthy barriers for professional librarians engaging in research such as insufficient training and research skills; institutional support, whether budgetary or in release time; and one's overall time. Administrators who are familiar with research and who have conducted it—though not necessarily within library and information

science—are more likely to provide understanding and support to their librarians. The last section discusses how librarians can gain research skills within the field and overcome the barriers.

Changes in Libraries

Change in libraries and the impact of technology has been discussed heavily throughout the literature of the 1980s. When change occurs, librarians fall away from the previous emphasis on specific subject expertise, becoming generalists who navigate toward becoming experts in the use of technology and the training of others.[1] A shift happens gradually over time through a series of small steps and can be navigated successfully by having a clear vision and creating partnerships with the people they serve.

Role of the Librarian

As the field of librarianship has evolved over time, job descriptions and duties have changed. A recent listing of librarians' job titles could include:

- clinical librarian
- consumer health librarian
- continuing medical education librarian
- clinical medical librarian
- data management librarian
- digital librarian
- embedded librarian
- emerging technologies librarian
- grants development librarian
- informationist
- instruction librarian
- metadata librarian
- outreach librarian
- scholarly communications librarian
- subject bibliographer
- subject liaison
- systematic review librarian
- translational research librarian[2]

Though the role and approach of a librarian may vary from one institution to another, at the most basic level it has not changed significantly, as "what has changed is the environment in which the role is carried out and the tools used to accomplish the tasks."[3] The University of Texas Southwestern Medical

Center located in Dallas, Texas, defined the goals of their library liaison program to include:

- establishing a point of contact across various departments
- establishing the needs of the departments
- facilitating access to resources and services—thus saving time[4]

Librarians are valued in their specific roles—no matter their specific title—for their:

- expertise in both library and information science and subject areas;
- ability to anticipate questions;
- ability to access information from various sources;
- skills in information retrieval;
- ability to evaluate and analyze information; and
- skills in offering tailored information services and ability to meet the user where they are.[5]

The service model has moved from librarians obtaining items, if they are needed, to preparing and creating access to all available data with a specific user in mind, thereby meeting a demonstrated need.

EMBEDDED LIBRARIANSHIP

Though a relatively new term, the concept of embedded librarianship and of offering specialized services has existed in branch libraries since the late nineteenth century through the management of library resources and assisting with research.[6] For example, hospital librarians have been providing information to those they serve within the hospital for years. Clinical medical librarians were first known as medical literature specialists and would accompany "physicians and medical students on rounds" then come back to the library to search for articles on patient care.[7] Studies have shown that information acquired through the library has made a difference in the diagnoses, tests, and drugs and has contributed to a reduction in the length of stay and surgeries.[8]

As physical space decreases and technology continues to change, patrons are requesting quality information that is personally relevant and filtered, enabling them to exchange ideas via social media and to be connected twenty-four hours a day, seven days a week, and to thereby collaborate easily with others. "There is no question that the what, when, where, and how of the information paradigms have changed and will continue to change. One thing

that stands out clearly in any discussion of identity and roles is the basic underlying concepts of information and service."[9]

LIBRARIANS AS RESEARCHERS

Conducting research within one's field of work is essential. Research and knowledge about it creates an environment rich in personal growth by new learning, which works to create awareness and curiosity, successful mentorship, career advancement, and advancement of the profession. In the 1980s, academic librarianship began to change by redefining roles. A research study from 1985 by Jule Neway focused on how librarians could go from "providers of literature into a more integrative role as proactive members of research groups with special responsibility for information provision and publication strategies."[10]

Librarians have completed their formal education by obtaining their degree in library and information science at the master's level. What then are the best options available for a librarian "who seeks to become a practitioner-researcher but lacks the necessary skills or knowledge to conduct research"? How does the librarian "become a practitioner-researcher capable of producing reliable and valid research"?[11] The remainder of this chapter seeks to assist the professional by addressing both the issue of providing assistance throughout the life cycle and discussing original librarian research.

Research Life Cycle—Where Do Librarians Fit In?

> The librarian will have to become an expert in the communication structure of science and the behavior of scientists in this structure.[12]

What is the research life cycle? The research life cycle is the cycle of steps taken by research to move the process of research forward.

1. Turning your topic into a question that can be tested;
2. Designing a project to test your question;
3. Performing a literature review;
4. Identifying and applying for grant opportunities;
5. Identifying research partners, if needed;
6. Gathering data;
7. Managing data;
8. Analyzing data;
9. Reporting results in written format;
10. Reporting results verbally;
11. Determining appropriate format for disseminating results (poster/presentation/article);

12. Identifying appropriate places to disseminate results (publication/conference);
13. Determining appropriate format and place to archive data and publications.[13]

If you Google the phrase "research life cycle," images of what the research life cycle looks like are graphically represented in many different ways. In the literature, as well, you will find other librarians inquiring what the research life cycle entails and what role librarians have in supporting researchers on the continuum of the research life cycle or in other representations, such as Kennedy and Brancolini's list of steps or the University of Central Florida Libraries' circular visual representation.[14] The list above illustrates the basic steps of the process as provided by Kennedy and Brancolini with some additions from the authors.[15] Within each step, one will find more detail. For example, in the dissemination step, one could find a step for developing manuscripts for publications, including citation management, creating posters for conferences, and sharing news about new research findings in association newsletters, blogs, or other social media activities. For the purposes of this chapter, the steps in the research life cycle above will be referred to in order to discuss how librarians are supporting faculty and student researchers in their institutions as well as conducting research themselves. This section also discusses, how, as librarians, we need to not only be aware of the steps in the research life cycle, but also to meet researchers in each of these steps to collaborate on research activities.

Librarians have for a long time assisted researchers with developing research questions, conducting literature reviews, and managing citations. Librarians have worked with faculty and students to develop appropriate search strategies for their research questions and have helped them to find articles relevant to their areas of interest at the beginning of their research projects and to update those literature searches prior to publication. One might think of this as a "bookend" approach to research support.[16] Librarians help at the beginning and at the end. However, the future of librarianship is moving toward filling in the middle. That is, librarians are becoming more and more involved in other aspects of the research life cycle.

FILLING IN THE MIDDLE

Grant Assistance

Grant writing and proposal development support are an area where some librarians are offering their assistance. Many libraries have created Subject Guides or LibGuides about grant funding, resources, and support. Most of these guides provide general grant information and a few are discipline spe-

cific. Creating guides about grant writing resources is a great first step for librarians to support researchers in this stage of the research life cycle. However, other librarians are going even further. For example, a research informationist at UCLA initiated grant-seeking and proposal-writing activities as a way to collaborate with researchers at her institution.[17] The outcome of this initiative led to the head librarian and her research team being awarded three grants at UCLA, for the researchers of those teams to recognize that the librarians can assist in this role, and for additional opportunities for collaborations, including a request from the researchers for the librarian to create a data management plan.[18] Other libraries are moving toward dedicating a librarian to grant development. For example, Cooper and Crum state that "health sciences librarians have the opportunity to become resources for information about available grants and can use their expertise in the grant-writing process."[19] Another library system in Illinois created a grant information service to promote the grant-writing expertise of librarians, particularly hospital librarians.[20] Lastly, it is also likely that these models could serve to inform grant information services outside of the health sciences as well.

Systematic Reviews

"Systematic reviews and meta-analyses . . . can help practitioners and decision makers keep abreast of the medical literature because the reviews summarize large bodies of evidence and help to explain apparently different results among studies addressing the same question."[21] Health sciences librarians are becoming more involved in systematic reviews in academic and hospital settings, and some have librarians who have taken continuing education courses or receive specialized training to conduct systematic reviews. For example, the mid-Atlantic chapter of the Medical Library Association (MAC-MLA) offered two systematic review continuing education classes at 2015's annual conference in Asheville, North Carolina. Both of these classes were sold out. The Medical Library Association has offered limited training at its conferences and perhaps one of the most well-known courses is offered at the University of Pittsburgh.

Librarians, in particular, can offer valuable support to researchers thinking about conducting systematic reviews versus a traditional comprehensive review of the literature. According to McGowan and Sampson, librarians are particularly equipped to collaborate with health care researchers and practitioners in conducting systematic reviews because they are expert searchers and have a skilled understanding of how information is organized.[22] Librarians are not only collaborating with research teams on conducting systematic reviews, but some are training research teams about the models and frameworks that can be used to conduct well-developed systematic reviews. Some examples include "communicating methods of the review process, collabora-

tively formulating the research question and exclusion criteria, formulating the search strategy for a variety of databases, documenting the searches, record keeping, and writing the search methodology."[23] Some studies suggest that systematic reviews done without librarians could result in searching errors and therefore could be considered faulty.[24]

Data Management Planning and Archiving

It is a requirement for researchers applying to the National Science Foundation for grants that they submit a research data management plan. Librarians have begun to collaborate with researchers to learn about what is involved in creating data management plans and to facilitate a data management planning service. According to Henderson and Knott, "the role of librarians and libraries (in providing data management services) varies from providing long-term storage and preservation to providing guidance on finding data for reuse and helping with data management plans."[25] Therefore, there are different data management service models and approaches being explored by librarians. For example, University of North Carolina Libraries created a multidisciplinary committee of librarians from different campus libraries to create a data management plan training program.[26] This type of training program not only opens a door for librarians to participate in the conversation of data management at their institutions, but also promotes librarians as experts in the data management planning process, which could include but is not limited to data management plans, data sharing, and data and publication archiving. Virginia Commonwealth University Libraries (VCUL) created a new position focused solely on research data management.[27] Having a librarian or library department focus on data management is another model that could be developed.

A question that arises in providing data management or data sharing services to researchers that librarians will want to consider going forward is if the library will provide a full range of data management services or focus on one aspect of the data management process. Librarian training in data management planning and librarians' ability to promote and help researchers understand librarians' roles in that process and collaborate with research faculty is essential.[28] One potential strategy that librarians could explore would be to implement a data management plan and process in their own research projects. This would provide librarians with direct experience of applying data management principles in their own research. It would also demonstrate to the researchers that librarians "practice what they preach," and therefore are familiar and knowledgeable in working with research data and data management strategies.

Collecting and Analyzing Data

According to Janke and Rush, "Aside from small-scale qualitative studies very little research has been performed regarding librarians working on research teams."[29] However, Carlson and Kneale discuss how librarians who are working as embedded librarians at research institutions have been recognized as important research team members.[30] Librarians who fulfill the role of research informationist will have the potential to collaborate more directly on research projects than librarians in traditional roles; however, this may change in the future. Research informationists at the National Institutes of Health (NIH) Library were initially providing traditional library services such a literature searching, but in time researchers began to ask for assistance with data analysis software and research informationists were becoming more involved with the other research tasks.[31]

Journal Selection and Manuscript Review

Librarians in academic and special libraries help faculty researchers manage citations for research projects as part of the literature search step in research projects, whether they are involved only in this stage of a project or are full contributing members of a research team. The theme of librarian expertise in finding, managing, and organizing information leads to roles that promote this strength in research activities, and this is where librarians should confidently promote their role in research. Both in academic and special library settings, research support for faculty researchers who are publishing articles and research studies comes from a variety of places. Often the task of editing manuscripts and ensuring citations are appropriately placed in the text prior to manuscript submission are relegated to the available graduate student or staff research coordinators. There is not typically a subject expert editor readily available in these settings, and it is sometimes difficult to know what editing activities the authors are responsible for, what ones are those of a manuscript or copyeditor, or even if editing services exist in-house or contractually in many institutions. There also seems to be a lack of consistency in the level of training in this process across research institutions.[32] However, librarians are also participating in this process when requested.[33] However, not all researchers are aware that these services exist in libraries. At the Medical Librarian Association annual conference in Austin, Texas, in 2015, presenters of a poster demonstrated how librarians participated in the manuscript review process as part of a writing club program.[34] Some universities offer certification programs in medical editing and manuscript review, and there are programs such as the certification program offered by the Board of Editors in the Life Sciences.[35]

Librarians today are partnering with research faculty and clinical researchers to provide more realistic options for publishing their scholarly works and research findings. Librarians have been involved and have encouraged researchers to consider open access sources as their choice for where to publish. The idea behind open access policies and the open access movement is to provide easy access to research findings. One example of this is the National Institutes of Health's Public Access Policy.[36] The National Institutes of Health (NIH) Public Access Policy states that any biomedical research conducted with the aid of NIH funding should have its results available to the public since the NIH funding is sourced from the American taxpayers.[37] Other agencies may follow the lead of the NIH to ensure that publicly funded research are made publicly available as well. Librarians working in the health sciences should familiarize themselves with the NIH Public Access Policy and the steps to submit manuscripts to PubMed Central.

There are also many open access journals that researchers can submit their manuscripts to that make it possible for research to be published more quickly and to provide more direct access to potential readers. Librarians can provide open access journal selection guidance to researchers. They may guide researchers to the Directory of Open Access Journals (DOAJ) or the Web site of the Open Access Scholarly Publishers' Association (OASPA), as well as steer researchers away from open access publishers that are considered predatory. Librarians can learn about the open access journal titles in their subjects of expertise and share that information with faculty, researchers, and administrators that they serve through subject guides, workshops, or presentations. Open access databases, such as institutional repositories, are another option for publishing scholarly works. These repositories are typically associated with the faculty's or researchers' institutions and provide an avenue for researchers to partake in the history of the institution by depositing their publication into a database of scholarly works developed at the institution. Some institutional repositories are also linked directly to popular search engines, such as Google or Google Scholar. This allows anyone searching Google to find citations, links to full-text articles, and, if permitted, full-text articles, without the searcher having to know that the original location of that submission is an institutional repository. By promoting the use and value of institutional repositories to faculty, researchers, and administrators, librarians can play a larger role in the dynamic discussion of scholarly publishing, journal metrics, and altmetrics, and in the promotion of open access initiatives locally at their own institutions and more broadly.

A discussion about how librarians can increase involvement in the academic productivity of faculty and students can be found in a 2016 essay from the Roundtable on Technology and Change in Academic Libraries by the Association of College and Research Libraries (ACRL). One way librarians can do that is to learn about how faculty and researchers report their academ-

ic productivity via the tenure-seeking process or other productivity reports. Librarians can create databases using citation management software, such as RefWorks, Endnote, Zotero, and Mendeley, among others, to collect, manage, and analyze their own scholarly works for academic productivity reporting, but they also can apply this approach to managing scholarly works for faculty and researchers they serve. These citations can then be exported from RefWorks to other databases, such as institutional repositories, tenure portfolios, annual reports, or updated curricula vitae (CVs). Librarians are particularly skilled in collecting and managing these citations. They are also experienced literature searchers and experts in developing processes for finding scholarly works among the varied databases where scholarly works are indexed or collected.

Another way librarians are helping faculty and researchers is by making them aware of and helping them to complete author agreements. The importance of author agreements in the publishing process is that researchers become aware that they may have the right to keep control of their intellectual property, such as the results of their research studies, images or graphics created based on their study findings, author manuscripts, or the full text of their journal articles. Oftentimes, researchers who would like to publish their results and studies in the journal literature are unaware that they have choices when selecting journals in which to publish and that they have varying degrees of author rights when publishing. For example, some journals provide the option for authors to keep the rights to share their results data but to transfer the copyright of the published articles to the publisher itself. Other journals limit or completely prohibit the use of any results or journal article without their permission. Many faculty and researchers are unaware of their rights in publishing.[38] Some librarians are already working in this area to educate authors about their rights in publishing. For example, Oakley, Pittman, and Rudnick discuss how the librarians at the University of Connecticut Libraries developed a brochure to inform authors about copyright and their own rights as authors.[39] Other libraries have created subject guides on copyright, author's rights, and open access initiatives. Yet others may incorporate lessons about copyright and author agreements into new services provided to researchers at different stages of the research life cycle.

It is apparent that librarian roles are changing and evolving as librarians become more knowledgeable about, familiar with, and involved in the unique steps of the research life cycle at their institutions both in conducting their own research and in supporting faculty, researchers, and students. In the past, librarians have supported faculty, researchers, and students at the beginning and at the end of the research process, but now and going forward, librarians will likely continue to offer traditional services to faculty, researchers, and students, but will also start to "fill in the middle" of the research life cycle

with new and innovative strategies to engage faculty, researchers, and students.

Overall, academic librarians have seen their roles evolve from that of practitioner to partner in the research life cycle. Increasingly, librarians will be encouraged and expected to align themselves with campus faculty by embedding themselves into the research life cycle, as well as by engaging in primary research, publishing, and by delivering presentations at professional meetings. Though librarians are increasingly embracing their alignment with scholarly research, they also face many barriers and constraints in doing so.

BARRIERS AND CHALLENGES LIBRARIANS FACE IN OFFERING RESEARCH SERVICES

Librarians already engage with researchers and students in literature searching but are increasingly finding ways to participate in all stages of the research life cycle. Due to the unique organizational skills librarians learn and hone, research assistance can be a logical and strategic outgrowth of the organizational skills librarians already possess. Some of these services include assisting with systematic reviews, data management planning support, grant writing, funding agency compliance assistance, metadata assistance, and data archival services. Although many libraries are offering a wider breadth of services to researchers, there are distinct challenges that must be overcome before significant engagement can occur.

Some organizations have one or more positions dedicated to providing research support, while others are still grappling with what services they can or want to offer. A 2011 Association of College and Research Libraries (ACRL) survey of members in the United States and Canada about their current state and future plans for offering research data services found that only a small minority of libraries offered these services, though a quarter to a third stated that they were planning to offer these services within the next two years.[40] The libraries that did offer these services were more likely to have many researchers who received National Science Foundation (NSF) funding, which requires the submission of a data management plan with all grant applications.[41]

So why are many libraries slow to adopt these research services? An online questionnaire of libraries in Australia, New Zealand, and Ireland suggests that the main obstacles identified in constraining research support services were a lack of knowledge and skill among library staff, as well as a lack of confidence in engaging in such services as research data management and bibliometrics. Other constraints identified were the differing levels of demand, differing specialist needs, and the view that these services were not a priority.[42] Most practicing librarians did not learn research service skills

during library school, and although many library directors believe they offer their librarians sufficient opportunities to learn these skills, "there appears to be somewhat of a mismatch between what academic research library directors believe they offer to their librarians and what the librarians themselves perceive to be available to them in the way of RDS [research data services] training opportunities."[43]

Additionally, a lack of funding can be a significant barrier. Larger academic research libraries might have the funding to offer one or more positions dedicated to providing research and data management services, but other libraries do not have the ability to have dedicated staff and thus must have existing staff add additional duties to their already crowded schedules. Some universities consider providing research services outside of the realm of the academic library, while others have existing staff elsewhere on campus doing this work. And in a setting where librarians have not fostered and maintained close alliances with their faculty, it may be difficult to convince researchers that librarians have important skills they can offer to assist in the research process beyond "finding some articles."

Barriers for Librarians Engaging in Research

In addition to offering researchers services throughout the research life cycle, librarians will also be increasingly expected to align themselves with faculty by doing original research. However, there are many barriers that librarians experience in engaging in primary research. First, librarians often cite a lack of training and research skills as a barrier in undertaking research projects. Though taking a research methods course prepares librarians for engaging in research throughout their careers, only 61 percent of the forty-nine examined accredited MLS (master of library science) programs list research methods as a required course in their curricula.[44] In a survey of academic librarians disseminated to e-mail mailing lists, only 26 percent of the respondents stated that their library school curriculum prepared them to conduct original research.[45] Further, research skills are uneven, as many academic librarians with a second master's degree do have instruction in research methods, but from another discipline, and even those librarians who had sound research training in graduate school find their skill set diminishes in their professional career due to the time lag between graduate school and beginning to do research.[46]

The experience of writing a master's thesis can often provide the opportunity to put one's research skills to practice, both in conducting original research and in structured research writing. And yet in a 2010 study of library school curricula, of sixty-eight schools surveyed, only nine required a master's thesis. Thirty-three of these schools did have a master's paper option, but twenty-six of them did not even offer the opportunity.[47]

Despite the growing expectations that academic librarians engage in original research, there are still those who believe that librarians should focus on their roles as practitioners. In fact, there are librarians who have published dissenting opinions as to whether or not librarians should engage in original research. Hoggan argues against faculty status for librarians, as it creates pressure to research and publish, which then takes time from traditional librarianship duties.[48] Hoggan adds that economists believe an increased emphasis on librarians' research will eventually lead to a decreased demand for librarians, who have been driven from their traditional skill areas.[49] Ferguson states that many librarian-authored articles exist only to help gain tenure.[50]

One of the reasons that many librarians have shied away from research and publication is because they do not perceive that there is support for this work at their organization. In fact, Fenske and Dalrymple's secondary analysis of data collected from members of the Medical Library Association found that institutional support for research, even more than tenure, was "the best relative predictor of research productivity among librarians working in academic health sciences settings."[51]

Often, budgetary concerns are one of the main constraints affecting the level of research in which librarians engage. During the economic downturn, academic librarians have had to grapple with continuing budget cuts; even flat budgets require cutbacks due to inflationary increases in collections. Vacant positions are often left unfilled, layoffs take place, and monetary support to librarians to travel and present original research has been slashed. Budget cuts also affect the ability of librarians to do research, as shrinking staff sizes force many to take a greater workload, thus leaving less time for research and publication.

Rayman and Goudy conducted a survey of ninety-four ARL (Association of Research Libraries) libraries to determine the research and publishing requirements in university libraries and found that only 15 percent of the libraries surveyed required librarians to publish.[52] Slightly less than half of the institutions encouraged, but did not require, librarians to publish, and seventeen libraries neither required librarians to publish nor gave publication any special emphasis. Additionally, thirty-three of these libraries reported that no release time was allowed, and twenty of the libraries offered no kind of travel funding. This survey, of course, is rather dated.

More recently, Smigielski and colleagues surveyed librarians to determine what kind of support was most useful to foster an environment of research.[53] Though 86.2 percent of respondents stated that release time or time dedicated to research had a positive impact on librarian research, only 70.8 percent of tenured institutions represented in the survey offered this kind of support, as did only 66.7 percent of institutions that did not offer tenure.[54]

A similar study of ARL libraries found that "faculty status and tenure eligibility were key elements in establishing publication as a requirement for librarians. Of the entire group of responding libraries, only ten replied that librarians were required to publish, all of which were institutions where librarians held faculty status and were eligible for tenure."[55]

One of the factors that influences an organization's support for librarian research is the background of the administrators. Montelongo et al. found that the most supportive administrators themselves have conducted research in the library or another field and are more likely to provide time and financial support.[56] Interestingly, perceptions of university librarians differ from those of other academic librarians.[57] Berg, Jacobs, and Cornwall and others surveyed twenty-eight Canadian Association of Research Libraries (CARL) members about their expectations for and level of scholarly research for their librarians, as well as support provided to these librarians. The university librarians "perceived that librarians overestimate the barriers of lack of time, lack of funds, and lack of support and underestimate the barriers related to lack of skills and lack of motivation."[58]

Time constraints are consistently cited as one of the most pressing barriers to conducting and publishing original research. Pennsylvania State University (PSU) is often among the top five institutions for research productivity in library and information studies. In a study, librarians at PSU were interviewed to determine the factors that contribute to their research productivity. Though these are prolific researchers and authors, almost all the librarians interviewed stated that they felt they lacked the time to write and were hindered in their research efforts.[59] Other articles discuss librarian frustration at not being able to find time during their day to devote to writing or publishing due to their workloads.[60]

Despite the barriers that librarians face or perceive in terms of doing primary research or offering research services, librarians will be increasingly expected to take on these roles as the profession evolves. There are a number of ways for fellow librarians to overcome many of the barriers and become more familiar with the research life cycle, to engage in research, and to mentor others throughout the entire process.

HOW CAN LIBRARIANS GAIN THESE SKILLS?

Librarians learn research skills from many sources. Formal education in library school and in the workplace is one way that librarians gain research skills. A second way that librarians gain research skills is through education programs in the form of work experience and other experiences that occur after graduating from library school. These opportunities range from webinars to organized research teaching programs such as the Institute of Re-

search Design in Librarianship's (IRDL) nine-day research design boot camp at Loyola Marymount University. In the workplace, institutional support is very important for librarians to gain research skills. Different institutions provide a variety of support to their librarians to enable them to learn and enhance their research skills.[61] Librarians write a proposal for a research project that they work on during the nine days. The IRDL teaches both quantitative and qualitative research methods so librarians will have the option of choosing which method is best for their research question.

Some librarians learn to conduct research in library school by taking research methods classes where they learn different ways of conducting research such as quantitative, qualitative, and mixed methods research.[62] Turcios, Agarwal, and Watkins found that librarians tend to gravitate toward quantitative research methods, distributing surveys to collect their data in spite of learning different research methods.[63] Unfortunately, not all library schools classify research methods as a required class. Luo found that only 61 percent of library schools have a research methods class as a requirement, making continuing education an important method for librarians to acquire research skills.[64]

Programs such as the IRDL program can be further enhanced by mentoring programs similar to the inaugural faculty-member-in-residence (FMIR) program implemented at McMaster University Library as reported by Detlor and Lewis.[65] The FMIR program is a research mentoring program geared toward fostering research skills. In this program, an in-house research expert familiar with and interested in libraries acts as an "in residence mentor" for librarians involved with research. The FMIR provides expert guidance and support for librarians' research and motivated librarians to embark on research activities. In some cases, librarians just need to delve into the research in order to improve their research skills. Mentorship and support in these cases are crucial.

ADDITIONAL RESOURCES FOR LIBRARIANS TO ACQUIRE RESEARCH SKILLS WHILE ON THE JOB

Systematic Review Courses

For librarians wanting to gain more hands-on and practical experience in understanding, working through, and completing systematic reviews, there are a number of workshops available. "The Systematic Review Workshop: The Nuts and Bolts for Librarians" offered by the University of Pittsburgh Health Sciences Library System is a two-and-a-half-day seminar, and upon completion, students obtain twenty continuing education credits from the MLA. The course provides a framework for and discussion about the librarian's role in the process and covers topics on systematic reviews structure

and purpose, communication issues and approaches to the reference interview, comprehensive literature searching, and project organization. The University of Michigan Taubman Health Sciences Library in partnership with the National Library of Medicine in the Greater Midwest Region also offers a systematic reviews workshop that may be of interest.

Evidence-Based Practice Workshops

For librarians interested in learning more about evidence-based practice, the workshop "Supporting Clinical Care: An Institute in Evidence-Based Practice for Medical Librarians" is available from the University of Colorado Anschutz Medical Campus Health Sciences Library in Aurora, Colorado. This is a three-day course to aid participants in gaining evidence-based clinical practice (EBCP) concepts to support and teach EBCP. Upon completion, students receive twenty MLA continuing education credits.

Biomedical Informatics

The Robert B. Greenblatt MD Library at Georgia Regents University in Augusta, Georgia, hosts the National Library of Medicine (NLM) Georgia Biomedical Informatics course funded by the NLM. This course is a week long and provides attendees with the knowledge of informatics to apply to health care challenges.

Grant Writing

The Foundation Center is the most authoritative source of private funding in the United States; there are five locations across the country—Atlanta, Cleveland, New York, San Francisco, and Washington, D.C.—and more than 470 organizations provide their resources for free. Its Web site offers training courses and tips and tricks on the grant-seeking process, fundraising skills, proposal writing, and nonprofit management.

Online Courses

There are a number of massive open online courses (MOOCs) available to users through various providers. Through one provider, Coursera, courses are available from Vanderbilt on data management for clinical research, from Johns Hopkins University on reproducible research, and a few on research methods both qualitative and quantitative. Coursera also has eighty-two specializations available, allowing the attendee to master a skill by completing a set of courses, gaining application through a capstone project, and earning a certificate. Interestingly, Coursera's Web site notes that it now has more than sixteen million learners, 1,556 courses, and 140 partners.

Institutional Support

As important as formal education is in acquiring research skills, the availability of institutional support cannot be overemphasized. Librarians need a supportive work environment where management allows time for training. This can be as simple as time away from reference or customer service desk duties, time away from work to travel for training, time off during work hours to pursue credit research courses, or dedicated work time for research purposes. Additionally, institutional support can mean availability of webinars at work and time to watch the webinars as well as support for librarians to undertake research projects at work and publish or present them at conferences.

The majority of library associations endorse and encourage research skills in librarians through the creation of research agendas. The ACRL has had a research agenda for library instruction and information literacy that has evolved to reflect the changing librarian profession. The MLA and its regional chapters also emphasize a research agenda. ACRL, MLA, and other library associations have been working hard to encouraging librarians to undertake more research projects that they can share with others at annual meetings and publications. The MAC-MLA has a research and assessment section that encourages members to undertake research projects and present them at their fall annual conference, where the best research projects are rewarded with prizes. ACRL's science and technology section (STS) unveiled its research agenda in 2015, providing STS members with recommended areas for exploration in science and technology library research.

Many of the research skills that librarians need are skills necessary for supporting other researchers. They need to know primary data sources and keep up to date with the variety of data sets that researchers in their disciplines use.[66] Librarians also use these skills to support data management and curation services for the disciplines that they support and hopefully advance the goals of their communities.[67] This is one of the nontraditional library functions that requires research skills that a librarian in the digital age needs to have. Most of these skills are learned on the job and through courses provided by data management organizations such as the Interuniversity Consortium of Political and Social Research (ICPSR) at the University of Michigan. The ICPSR offers research summer courses for potential researchers as well as biennial data courses for official representatives of member organizations and other data courses for data personnel.

FUTURE COMPETENCIES

In order for librarianship to continue as a viable profession, librarians must continually reevaluate and expand upon their skill sets and roles, while also

discontinuing services and roles that are no longer valued. As librarians move away from spending the bulk of their day passively staffing the reference desk waiting for queries, they are finding new roles that are natural outgrowths of their organizational skills. Rather than limiting themselves to assisting researchers at the beginning and end of the research life cycle, they are embedding themselves in all of the steps, such as in systematic reviews, data management, collecting, analyzing, and archiving data, and bibliometrics. Additionally, librarians are increasingly expected to participate in scholarship, and although research skills are often not emphasized in library school curricula, more research skill programs, such as boot camps, will rise to meet these needs. Ultimately, library school curricula should and will evolve to emphasize the skill sets that will be increasingly needed in the profession.

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Chapter Seven

Current and Future Trends for Supporting Online and Distance Education

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In the past, distance education and online instruction were not always synonymous; however, the terms are now often used interchangeably.[1] In this chapter, the term "distance education" is used to refer to coursework that is completed mostly online. Online instruction is used to refer to any activity that takes place online but is not exclusively meant for students taking courses from a distance. Distance education continues to become more prevalent in higher education in the United States. The estimated number of students taking at least one online course reached 7.1 million during the fall of 2012, and all public institutions of higher learning report having at least one online course.[2]

In the health sciences, the trend toward distance education is most widely discussed in nursing literature. For example, the American Association of Colleges of Nursing (AACN) has recognized distance education as a way to deal with projected nursing shortages and the limitations on enrollment for existing programs.[3] Although accredited distance education programs for medicine do not exist in the United States, medical schools are using online instruction as part of their instructional tool kit. In fact, the Liaison Committee on Medical Education (LCME) has created a white paper titled "Accreditation Issues Related to Spatial and Temporal Distance Learning."[4] In this document, they have separate definitions for synchronous and asynchronous events, which they define as

> *Spatial Distance Learning*: There is video conferencing of lectures or discussions linking students and faculty across dispersed instructional sites. In this case, there is separation but the interaction between teacher and student is synchronous

and

> *Temporal Distance Learning*: Online instructional materials (e.g., independent study modules, pre-recorded lectures) are used by students to learn content independently within a given course. In this case, learning is asynchronous, in that the learning materials were developed prior to their use by students and there is no simultaneous teacher-student or student-student interaction.

A current topic of discussion within the medical education communities is self-directed learning. According to the LCME, self-directed learning involves students' self-assessment of learning needs, independent identification, analysis, and synthesis of relevant information, and appraisal of the credibility of information sources.[5] Although these qualifications do not necessitate the use of online instructional methods, the activities could be set up through course management systems and could incorporate online videos or tutorials.

Another recent development in higher education with a number of potential advantages is the flipped classroom model. Flipped classroom refers to a model of learning that rearranges how time is spent both in and out of class; this shifts the ownership of learning from the educators to the students.[6] To increase student-teacher interaction, students are given pre-class assignments to build the framework of knowledge, which allows class time to be spent on active learning sessions and more in-depth discussions. These pre-class assignments can be delivered in the form of textbook readings or instructional videos, and class time is freed up for active learning exercises to "embed the knowledge in an interactive, compelling, and engaging format."[7] Innovative health sciences faculty are researching the effectiveness of the flipped classroom model and how it can be successfully implemented in a medical education setting. One interesting flipped classroom study conducted within the obstetrics and gynecological clerkship at the University of Michigan aimed to improve the educational experience for third-year medical students and reduce three hours of didactic lecture down to one hour.[8] For this particular case, the pre-class assignments were designed as short videos to stay within the parameters of the online attention span. In addition to standardizing video length, clerkship faculty also employed another best practice by using a combination of educational materials in the videos created for their flipped classroom experiment. The instructional videos used in this study contained annotated drawings, procedural videos, and narrated PowerPoint slides.[9] In class, the students participated in active learning exercises in the form of

simulated cases in which they anonymously replied to prompts regarding differential diagnosis, laboratory evaluation, and management of the case.[10] Ongoing research efforts are in place to investigate how the effectiveness of the flipped classroom model compares to the effectiveness of a traditional lecture format. Ultimately, the flipped classroom model has the potential to benefit health sciences education by fostering a more individualized educational experience in order to adapt instructional approaches to match each student's pace and style of learning.

TOOLS FOR SUPPORTING DISTANCE EDUCATION AND ONLINE INSTRUCTION

The library can be seen as an integral part of the higher education activities occurring at colleges and universities today, as students are required to write research papers, discover and analyze statistical information, and learn new literacies. Nearly everyone is familiar with the brick-and-mortar library building on campus, but what happens when students do not come to campus? How can instructional librarians create the feeling of "being there" when their students are at a distance? Even when students are on campus, how does the library meet the needs of students who are looking for information or studying at all hours of the day and evening? The answer may be using online instructional tools to design asynchronous learning materials.

When considering any new learning activity, many librarians find it useful to follow instructional design principles. A generic instructional design process is ADDIE, which stands for analysis, design, development, implementation, and evaluation.[11] The first step is to analyze the situation by determining who the learners are, what they know, and what they need to know. The second step includes designing the learning activity or activities. It may be helpful to consider using Bloom's taxonomy to develop learning objectives. The taxonomy "classifies cognitive learning from simple to complex, from concrete to abstract."[12] There are many wonderful tools available to help people use Bloom's taxonomy to develop useful learning objectives.[13] Once a plan is in place with well-defined learning objectives, the next step is to figure out which tools are best suited to deliver the information to the learners.

Screencasting

For many years, librarians have been using screencasting software to create a wide variety of videos. Video tutorials can be used to create learning materials for distance education, blended learning, and flipped classrooms. They can also be used to supplement in-person instruction and to support self-directed or independent learning. In order to determine the best software to

use, consider the type of video desired. There are three categories for video tutorial creation. Formal or polished tutorials typically take more time to create. These tutorials may require captioning, heavy editing, the use of images in addition to video files, branding considerations, table of contents, and so on. Informal video tutorials or point-of-need tutorials could include videos done quickly to answer e-mail or chat reference questions, or videos intended for a very small or specific audience. In most cases, these videos tend to be less than five minutes in length and do not need to be as polished, so editing is not a requirement. The third category is lecture capture. In many cases, lecture capture is used to record or stream a live, in-person class to participants in other areas or for the in-class participants to view later.[14]

There are a wide variety of programs for formal, informal, or lecture capture needs.[15] Before choosing a product, consider the principles of ADDIE. What do you want the finished project to look like? What features are important to you? Can your target audience open or stream a large video file? Next, figure out what types of programs are available at your institution. For example, many institutions already have licenses for programs like Mediasite or Panopto, which may be cost prohibitive for libraries or individuals. Of course, there are a lot of great free products that you can use as well. Screencast-O-Matic (https://screencast-o-matic.com/home) offers free screen capturing and Web hosting services. It also provides the option of updating videos while retaining the same URL in the free version. It offers a subscription version for a small annual fee that has a few more bells and whistles. Jing (www.techsmith.com/jing.html) is another free screencast software that allows users to record up to five minutes of content per video clip. If you need to record longer videos, TechSmith offers another product called SnagIt that has advanced features. None of these programs provides editing options, so they are most useful for informal or point-of-need tutorials.

Once the video tutorials have been created, the next step is to figure out where to host the materials and how to market them to the appropriate students. One option would be to place the tutorials on your library's Web site. Another option is to host the tutorials at the students' point of need or in their learning management system.

Learning Management System Modules

Online learning is becoming more prevalent than ever before; as such, many universities are using online course management systems (CMS) or learning management systems (LMS) to create a class environment in an online setting. An LMS is essentially a Web site that allows faculty to interact with students through the posting of lectures, assignments, grades, and other course content.[16]

By becoming involved in an LMS, librarians have the opportunity to place content at the student's point of need.[17] There are multiple ways to become involved in an LMS: librarians can insert database tutorials, course reserves, subject guides, or other trustworthy Web sites. They can also embed themselves in the course or create interactive content to be placed in the learning management system. A couple of examples of interactive content would be creating a discussion board related to an information literacy assignment or an evening chat where students can get their library questions answered.

It is beneficial for librarians who have not been exposed to learning management systems to attend a training session.[18] Oftentimes these types of sessions are offered by an institution's IT department or from a center for teaching excellence. These types of classes can help to provide information on what is specifically available at a particular institution, as well as the appropriate contact for assistance in using the programs.

Following this, librarians can work with teaching faculty members to acquire information about the target audience and the goals for librarian involvement. After the librarian has obtained that information, it is then important to determine how much time can be dedicated to becoming involved in individual courses. It may turn out that a higher level of involvement, such as embedded librarianship, would be appropriate.

Embedded Librarianship

Embedded librarianship is a term that takes its cue from the embedded journalists that accompany soldiers to war. It is a method of providing library resources and services to students in a specific class in a method that is hands on, with the librarian serving either as a coteacher, collaborator, or even as a student in the course. The concept of an embedded librarian has been around since the mid-2000s. Barbara Dewey, dean of libraries at the University of Tennessee at Knoxville, first used the phrase "embedded librarian" in a call to arms that urged librarians to become embedded in all facets of student, faculty, and researcher life. In her work, she defines embedding as such:

> The concept of embedding implies a more comprehensive integration of one group with another to the extent that the group seeking to integrate is experiencing and observing, as nearly as possible, the daily life of the primary group. Embedding requires more direct and purposeful interaction than acting in parallel with another person, group, or activity. Overt purposefulness makes embedding an appropriate definition of the most comprehensive collaborations for librarians in the higher education community.[19]

Since that time, the concept of embedded librarianship has taken on the meaning of an instruction or liaison librarian taking part in a course to offer

instructional resources and just-in-time help to students conducting research and using the library, which is only part of the embedding and services that Dewey posited in her seminal article. Due to the benefits, embedded librarianship likely sounds like a practice that should be adopted by every academic library; there are, however, reasons why it may not work at some institutions. The National Center for Education Statistics (NCES) reports that libraries at public postsecondary institutions had, on average, one librarian for every 275 full-time equivalent students at the school in 2011.[20] This shows a marked increase since 1981, when there were 154 students per librarian in the academic library.[21] When reviewing these numbers (and keeping in mind that not all of the library staff counted are instruction librarians), it is clear that the number of students far outnumbers the librarians hired to serve them. In their article "Is Embedded Librarianship Right for Your Institution?" Muir and Heller-Ross consider questions that should be considered by institutions hoping to adopt an embedded librarianship program, including:

- Do the outcomes of embedded librarianship fit the academic program or general education goals of the institution?
- Can these outcomes be achieved within the university culture?
- Does the institution have the required elements of college-wide and library organizational structures?
- Does the institution have the right combination of librarian skill and experience?
- Is the institution looking for a refocused and enhanced library contribution to student learning?[22]

These questions can be helpful to consider when thinking of the impact that an embedded librarianship program would have on an institution, but other questions remain, including whether there are enough librarians to conduct this type of work and how deeply the librarian is expected to be embedded in the course.

The literature shows that embedded librarianship is an effective way to deliver information literacy instruction to students in distance education and hybrid courses.[23] The methods of providing embedded librarianship consist of hands-on support of students during the research process through partnering with faculty to design a research assignment, providing a folder of learning objects, teaching asynchronous course sessions, and monitoring a discussion forum for students to ask questions. The scalability for offering a rigorous across-the-board program featuring embedded librarianship at larger institutions with fewer librarians per full-time equivalent students can still be called into question. In sum, perfecting the practice of providing effective embedded librarianship is something for librarians to aspire to due to its

benefits for students in distance education programs. Embedded librarianship can bridge the gap felt by students who cannot "be there."

Massive Open Online Courses

The term "MOOC" stands for massive open online course. To dissect the name further: *massive* means that there is a large cadre of students taking the course, *open* means that the course is free of charge, and *online* means that the class takes place completely in cyberspace. Although MOOCs have been a buzzword in academia since 2008, libraries have been relatively slow to see their role in supporting MOOCs and even slower in the realization that librarians can also be content creators for MOOCs. Most of the existing literature is expository in nature or serves to point out areas of weakness for libraries' current structures and services in supporting MOOCs.

The first MOOC was created in 2007 by David Wiley at Utah State University on the topic of open education. Fifty people, including graduate students of Utah State, took part in the course. The MOOC moniker was coined in 2008 by the University of Manitoba when twenty-three hundred students took part in the course "Connectivism and Connective Knowledge."[24] In just a few short years, MOOCs have become a widely accepted and widely used method for providing free-of-charge educational opportunities via the Internet. Data on MOOCs is starting to be collected in order to study the phenomenon in greater detail. Severance reports a low completion rate for his MOOC participants (12 percent), which seems to be the norm for most MOOCs, with completion rates of around 10 percent.[25] The majority of MOOC creators have been institutions of higher learning, including Harvard and MIT.[26] The 2012 Sloan survey tracked data gleaned from responses from administrators of twenty-eight hundred colleges and universities. In 2012, only 2.6 percent of universities were engaged in the creation of MOOCs, and nearly 10 percent more were planning one.[27] More than 88 percent are either undecided about MOOCs or did not plan to create a MOOC at that time. At many institutions where MOOCs are being developed, librarians are being asked for help to navigate new issues, especially those concerning course readings, which may be copyrighted.

The current library literature on MOOCs has mainly focused on the impact of this new learning format on copyright, licensing, and library services. Butler's issue brief on the topic, released in late 2012 by the Association for Research Libraries (ARL), raises a number of legal questions surrounding the issues of copyright of supplemental course readings, accessibility for students with disabilities, and scholarly publishing issues for faculty.[28] Becker suggests that the sheer number of attendees of a MOOC make offering traditional library services difficult since on-demand support for such a large group without access to library resources could prove problematic for refer-

ence librarians.[29] Becker states that the literature in this area of study is still sparse. In her charge to librarians, who provide MOOC support, the editor of portal, Bernd Becker, states, "Information specialists should start now to design studies that will give us solid findings demonstrating successes or failures of contrasting approaches to providing curricular support and research instruction."[30] It is clear that there is a hole in the library literature where MOOCs are concerned, and opportunities abound for continuing education, library support activities, and scholarly research endeavors on the topic. Support from librarians who have prior experience in supporting online researchers will be vital to increasing the completion rate of MOOCs.

CONTINUING EDUCATION OPTIONS FOR SUPPORTING DISTANCE EDUCATION AND ONLINE LEARNING

Whether a person is new to supporting distance education (DE) initiatives or the person has been working with DE for years, there is always something to learn. The next two sections of this chapter covers formal and informal opportunities to build and strengthen instructional skills.

Formal Training

Webinars

There are a wide variety of webinars that allow librarians to learn from the comfort of their own office or couch. In addition, although many of these webinars come with a small fee, some are available for free. Webinars may start off as synchronous learning opportunities, but many are also available on demand after the event date.

A good way to start looking for webinars is by checking with associations known for offering webinars on online instruction. Here are a few to get you started.

- Medical Library Association professional development page: www.mlanet.org/p/cm/ld/fid=412
- Association of College and Research Libraries e-learning webcasts: www.ala.org/acrl/webcasts
- American Library Association, Library and Information Technology Association: www.ala.org/onlinelearning/unit/lita
- American Library Association, Reference, User Services, and Library Instruction: www.ala.org/onlinelearning/servicedelivery/reference

What if you do not find what you need from organizations like those listed above? One option is to create your own learning opportunities. For example,

within the Medical Library Association, there's a group called the Educational Media and Technologies Section (EMTS). A couple of years ago, the section started looking at ways to add value for their members, and it began offering free online webinars. Members provided topics of interest or volunteered to share their expertise with the group. In this way, an informal conversation resulted in formal learning opportunities. These webinars can be found on the EMTS YouTube channel (www.mlanet.org/p/cm/ld/fid=371) and are often promoted through the EMTS Twitter hashtag #mlaemts.

Traditional Coursework—Instructional Design Classes

Many libraries offer some method of obtaining additional formal education to their employees, whether through tuition remission or a payback method. Tuition remission occurs when employees take coursework through the college or university system where they are employed. Depending on the institution, tuition and fees may be completely waived or the employee may be required to pay student fees. Using the payback method or tuition waiver method, employees may have the option to take courses at institutions other than the one where they are employed. The payback method entails the employees first paying for the course and then receiving a check for the cost of tuition once they have finished the course. The tuition waiver method means that the costs of taking classes are free or greatly discounted for the student through an arranged formal program or agreement. Free book rentals and other additional benefits may also be available. East Carolina University (ECU) has a tuition waiver program that allows both staff and faculty librarians to take up to three classes per year at no charge, including textbook rentals. The tuition waiver applies to classes that are offered at any institution in the North Carolina system. Numerous employees at ECU have used the credits to complete master of library and information science degrees while employed in staff positions. Several librarians in instruction roles have taken part in programs that teach instructional design and distance education concepts through the College of Education, either by obtaining the full master of science in information technology degree or by working toward a graduate certificate in distance learning and administration. Although the methods for obtaining free or discounted college classes may vary from institution to institution, this can be a vital way to ameliorate the cost of formalized continuing education.

MOOCs for Library Continuing Education

All MOOCs do not need to be deliberately massive; it is possible and perhaps preferred to have an open online course that is directed to a specific group of interested professionals. Smaller MOOCs can play a great role in continuing education by giving librarians in the workforce who are finished with school

a method to build upon their skills. In their article in *Library Journal*, Ian Chant and his colleagues explore this concept when they write, "one place where MOOCs have the potential to serve is as small, particularly focused social networks, rather than traditional courses."[31] Dr. Charles Severance at the University of Michigan uses MOOCs as a format for content delivery in his for-credit university courses on computer programming, but he also opens them to the public. He suggests that capturing the college experience is not what MOOC participants outside of universities want. Severance was surprised to learn that many MOOC participants already held four-year degrees but wanted to learn something new or delve into new subject matter.[32] As the creator of a continuing education MOOC for librarians, Michael Stephens said, "Reaching isolated librarians with this type of learning will probably be one of the biggest impact factors of this MOOC."[33] Although the *M* in MOOC stands for massive, it is likely that a smaller format with an already established occupational group serving as social support in completing a specified project can be successful due to the focused attempt at career development. Many librarians are unable to travel to conferences or pay for continuing education, but the need to learn new skills or expand their knowledge base is still present. MOOCs are one way to fill that need.

In 2013, nearly eight years after the first MOOC was offered, three library-related MOOCs were released to the public. Two of these MOOCs were aimed at continuing education for librarians. The first was "New Librarian Master Class," offered in May by Syracuse University's iSchool, followed closely by San Jose State University's "Hyperlinked Library MOOC" in September.[34] Other MOOCs produced in libraries or aimed at librarians have followed these initial offerings. Future MOOCs should focus on disseminating information on topics such as scholarly communication, instructional or institutional assessment, and instructional design. Since MOOCs are modularized and take place over many weeks, the information imparted in a MOOC could be much more in depth than an hour-long presentation at a conference or a short webinar. By making use of features like discussion boards, librarians may be able to make connections with other professionals in the field.

Informal Training

Independent Learning

In order to keep up with changes in technology and curricular trends, librarians must become lifelong learners. Not all job-related learning must be formalized learning; in fact, most learning is likely to be independent. Independent learning requires initiative and planning, but it can be more easily fit into the schedule of a working librarian. This kind of independent learning

can take the form of reading a book, watching a webinar, or joining a journal club.

In the section on webinars, we mentioned that one section of the Medical Library Association had created free webinars for their members. At the 2015 Iowa Library Association (ILA) Conference, a panel presented a talk titled "Collaborative Professional Development: Creating Your Own Opportunities."[35] During this session, the panelists shared their experiences with creating their own learning opportunities. Anne Marie Gruber discussed creating an informal group of librarians who supported physician assistant programs in Iowa. The group met via teleconferences to share information and teaching materials. This particular group was facilitated by the Iowa Library Association (ILA), though not all of the members belonged to ILA.

Lynda.com

Lynda.com is a subscription database that contains tutorial videos. Many of these videos can be incorporated into an independent learning plan or annual goals in order to learn how to use a particular software program in depth, such as Microsoft Access, Camtasia, or Adobe Illustrator. Other videos can help to inform on topics such as photography or even 3-D printing. For new managers, there are tutorials on project management and a weekly management tips video that is two to three minutes long. If there is not an institutional license for this product at your institution, free trials are available. There are also individual personal accounts available for a fee.

Journal Clubs

If you have a group of librarians interested in online instruction, consider establishing a journal club. This can be done formally through an organization like the Medical Library Association (for example, through a discussion group, www.mlanet.org/p/cm/ld/fid=381, or through an independent reading program, www.mlanet.org/p/cm/ld/fid=395) or informally with colleagues in an institution or colleagues identified through e-mail listservs, social media, and so forth. At the minimum, all that is needed to start a journal club is a group of interested individuals and access to articles related to a topic of shared interest. In most journal clubs, the members take turns selecting an article and then leading a discussion about the key points.

DISCUSSION AND FUTURE COMPETENCIES

The technology adoption life cycle is a well-known model that predicts the process by which a technology is diffused into formal acceptance in our culture. A relatively unknown fact about this model and the bell curve chart

that accompanies it is that it was developed to shed light on the adoption rates of new technologies for farmers. Over time, the model has been applied more widely and thus these concepts can be applied to instructional technology. In researching their seminal work, *The Diffusion Process*, Bohlen and Beal discovered that a new technology will be adopted first by innovators, followed by early adopters, an early majority, and a majority, leading to widespread social acceptance and knowledge of the technology over time.[36] The stages an individual experiences during the technology diffusion process, as it was called in the late 1950s, are awareness, interest, evaluation, trial, and adoption. In this chapter, we have discussed many accepted instructional methods and technologies that have reached the critical mass of acceptance in Western culture. What about the future technologies that are only now being accepted by innovators?

In addition to tracking MOOC creation, the Sloan survey focuses in part on attitudes toward MOOCs. A significant statistic for the purposes of continuing education for librarians is the breakdown of the administrators' answers to the statement "MOOC instruction will not be accepted in the workplace." The statistics show that only 18.6 percent of respondents felt that MOOCs will not be accepted in the workplace as continuing education, and more than 45 percent were neutral on this statement.[37] This data can be seen as a promising step in the right direction toward acceptance of MOOCs for work-related learning. It is yet unclear if MOOCs are here to stay or are simply an academic flash in the pan. Despite the hype, the medium appears to be a good way to provide guided independent learning. Professional associations such as the American Library Association (ALA) or the Medical Library Association (MLA) could leverage MOOCs for their ability to bring interested parties together. Future MOOC creators should consider that their participants are likely to be working in addition to their studies and tailor the information in the course to professionals. Reducing the time necessary to complete the lessons to a manageable amount could increase the completion rate for MOOC participants.

Looking forward to future directions, the "NMC Horizon Report: 2015 Higher Education Edition"[38] discusses several important developments in educational technology for higher education, and two of these notable developments are wearable technologies and adaptive learning technologies. Higher education is only just beginning to experiment with wearable technologies, but these convenient tools are worth exploring.[39] According to the Horizon Report, "the global wearable technology market as a whole is expected to grow at a compound annual rate of 35% over the next five years."[40] Furthermore, the largest populations of wearable technology users are college-aged students, which makes it even more important for librarians to begin investigating this up-and-coming development.[41] One tool with great potential to impact higher education is the Oculus Rift, which is already

being used to provide more than one thousand virtual reality college tours through goggles. Institutions are also utilizing the Oculus Rift headset to simulate potentially dangerous situations from the safety of the classroom. A University of Southern California project focuses on medical training under simulated battlefield conditions.[42] With these kinds of tools, medical schools can take advantage of wearable technologies to provide the students with an unprecedented first-person perspective to learn medical procedures from a faculty member.

Another interesting application of wearable technology in higher education comes from the University of Wisconsin–Madison. A professor used a virtual reality device to record himself verbally grading assignments to give students personal feedback that would otherwise not be available.[43] While Google Glass has been discontinued, there will likely be similar products emerging in the future. Librarians can expect universities to continue to experiment with wearable technologies and can look forward to integrating these tools into education settings.

Another future development discussed in the Horizon Report that may be a "game changer" that has "potential for transforming traditional learning paradigms" is adaptive learning technologies. Adaptive learning is a "sophisticated, data-driven, and in some cases, non-linear approach to instruction and remediation, adjusting to a learner's interactions and demonstrated performance level, and subsequently anticipating what types of content and resources learners need at a specific point in time to make progress."[44] Individual student needs can be adjusted using adaptive learning technology software and online platforms. Adaptive learning technologies react to individual user data to adapt the instructional material as needed. The user's behavioral data is collected and can be monitored by instructors to evaluate the effectiveness of course design and the students themselves to understand what activities help them learn more effectively. According to the Horizon Report, Arizona State University is using an adaptive learning technology to collect the students' successes and failures and to provide tailored content to further student knowledge.[45] There is no one-size-fits-all approach to education, so this movement toward customized learning experiences with adaptive learning technologies is a welcome one.

DATA VISUALIZATION AND AUGMENTED/VIRTUAL REALITY

The NMC Horizon Report: 2015 Higher Education Edition also discusses "The Internet of Things (IoT)" as something that will start gaining in prominence within the next four or five years. The IoT is a network of connected objects that link the physical world with the world of information through the Web."[46] As of now, IoT is being used to monitor processes and machine

statuses remotely. One example is the ability to see which computers are available in the library or which washers and dryers are currently available in a university dorm.[47] It is possible that IoT may lead to interactive educational opportunities in history-rich locations around the world or that it could be used to create adaptive learning environments.[48] To gain a better understanding of IoT, you might consider checking out a visual representation of Information Is Beautiful.[49] Wearable technologies like Oculus Rift or Google Glass may soon be able to interact with IoT in ways that have not yet been imagined. In other words, these wearables have the potential to create augmented realities within historical sites, surgical suites, and so on.

Academic environments are seeing a growing trend toward using high-end imaging software programs to provide users with advanced data visualization options. Some of these newer software programs are focused on creating 3-D images using MRI scans for both learning anatomy to planning surgical procedures (www.bodyviz.com/index.cfm?nodeID=19289). Other visualization programs are hoping to augment cadaver dissections in anatomy classes with high-end touch tables like those offered by www.anatomage.com. Though 3-D imaging has been around for a while, the release of more accessible headsets like Oculus Rift during 2016 are promising to bring a resurgence of virtual reality that could revolutionize the way that anatomy and visualization instruction are done in the future.[50]

Predicting the future is a tricky proposition, but there are tools such as the Horizon Report and the technology adoption life cycle that can help us make decisions about which trends to keep an eye on, which to sunset, and which ones to start adopting at our institutions. Whether your library is on the cutting edge, the bleeding edge, or taking a more tentative approach to trends, it is still useful to keep a finger on the pulse of upcoming changes. Online instruction and distance education appear to be here to stay for the foreseeable future, but the ways in which they are actualized will continue to change and evolve as new technologies emerge. It is an exciting time to be a librarian, and by embracing lifelong learning and continuing education opportunities, the future possibilities are endless.

FURTHER READING

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Chapter Eight

Strategic and Innovative

Health Sciences Library Leadership, Management, and Administration

Jean Shipman and M. J. Tooey

A search of the Internet regarding the future of library leadership reveals hundreds of thousands of articles related to the topic. Some are focused on attributes of leaders; others are focused on programs for training leaders, and on and on.[1] Though these are very important things to consider, this chapter focuses on the strategic thinking, positioning, and alignment necessary for future library administrators to envision directions for programmatic success. By necessity, the chapter discusses the three key themes of personnel, economics, and space. Those discussions expand with examinations of the environment in which the library exists; internal and external politics; technology impacts; responsiveness and change management; the difference between administration, management, and leadership; and the professional and personal attributes critical for the twenty-first-century health sciences library administrator's success. Although it is tempting to believe libraries will look the same and be supported as they have in the past, change is constant, and future success and survival will belong to the agile, the creative, the collaborative, and those who can prove their value.

What is our value proposition? This is the question health science library administrators of the future are going to have to continually consider and address. What is it that we do as librarians and within our libraries that adds value to the shifting challenges, directions, and missions of our institutions? What is it that sets us apart from other professionals employed by the university—what are our unique contributions? What problems are we helping to solve for our customers, our users? What pain are they feeling that they come

to us for assistance in reducing? Why is coming to us worth their time and effort? What is it that they desire will result from collaborating with us? Providing answers to these questions will provide the rationale for the future existence and success of health sciences libraries and for the allocation of increasingly limited financial resources.

THE ENVIRONMENT AND CULTURE

Each health sciences library lives within an institutional ecology and culture. Perhaps these are the most enduring elements to monitor and study to ensure future survival. No matter the type of institution in which the library is located—hospital, university, stand-alone health sciences library, or one that reports to the university library—every organization has a culture and people who determine institutional values and establish the vision for how the institution will function. These cultures and values can be deeply embedded institutionally or can change abruptly with the arrival of a new president or CEO. One of the most valuable things library administrators can learn is what is important to their institution, how the library fits into and supports that culture and vision, and how it can be responsive to user needs and the institutional mission. This might mean change, stepping outside of a comfort zone, or moving away from a long-established practice.

Politics

Former Speaker of the U.S. House of Representatives Thomas "Tip" O'Neill frequently used the phrase "all politics is local" to capture the idea that success is directly related to someone's ability to understand and respond to the issues of his or her constituents.[2] If that is true, then all library administrators need to be consummate politicians, tied into the conversations, priorities, and needs of their users. Politics is not a dirty word. It is the way you understand your institution. It is knowing your friends and supporters. It is knowing the competition, whether competing for space, staff, or funding. It is knowing the decision makers and having an awareness of their priorities. It is knowing the pressure points within your institution. As much as we don't like to think this, there are people within our institutions who see the library as a big money pit. After all, everything is on the Internet, which is free, and it will only become freer with time. For those with this mind-set, making a case for valuing the knowledge management capabilities and expertise of the library team is critical. In the future, it will be just as important for a library director to be embedded in the administrative dealings of an institution as a partner, advocate, and promoter as it may be for library staff to be embedded in departments. It is essential to see and be seen. Follow institutional leaders ideas through their newsletters, blog posts, and other communication ave-

nues. Volunteering for committees, getting out of the library, and attending state-of-the-institution talks show an interest in institutional rather than library success. This expands the perception of the library and the library team and provides strategic talking points and ideas for projects and services. All of us have heard about an "elevator speech," which is a "clear, brief message or 'commercial' about you."[3] At no more than thirty seconds, there is no reason they cannot be crafted in advance to talk about your library. Create several versions that are tailored for your various audiences. Advocating for the library and telling its story must be intentional. It will become increasingly strategic to know the needs, interests, and priorities of your constituents.

Strategic Listening, Planning, and Positioning

How do library administrators learn about user and university information and knowledge needs? How do library administrators convey important information about strategic directions for the future? Strategic planning. Although there are multitudes of books, articles, videos, reports, white papers, and suggestions for successful strategic planning within libraries, in the future it will be imperative to consistently ask those who are using your services, resources, space, and expertise for their opinions. This is foundational for a solid strategic plan and for daily living. Ask often and differently, as many users aren't going to be able to easily articulate their needs. Many experts would advocate a three-year or five-year strategic plan. In the rapidly changing world of health information and knowledge management, this is not a sustainable idea. It is far better to develop sound vision and mission statements, which are less likely to change. Contemplate, discuss, and articulate your library's values. As Tim Cook of Apple said in an interview offering great insights into Apple's strategic philosophy in the March 18, 2015, issue of *Fast Company*, "Everything can change, except the values."[4] Review your progress and revise the plan annually, if necessary, as part of your commitment to strategy.

As you start your planning process, consider writing your plan from the outside in. Instead of writing it through a series of navel-gazing exercises within the library, use staff expertise to identify a list of people you need to "listen" to. Develop open-ended questions encouraging conversation. Don't ask what the library should be doing or you will get the same answer—more resources, longer hours, and so on. Try questions such as, "Describe what success looks like in your [school, department, unit]." "Tell me about your greatest challenges." "What are some of the knowledge- or information-based challenges you are facing?" Always ask for suggestions regarding additional people you should be talking to, and talk to them. Find the heat seekers, entrepreneurs, and successful researchers. If you have tied yourself into institutional information needs as suggested earlier in the chapter, you

will have ideas. Review the input you receive. Organize it. Validate it against your institution's strategic plan. Share and engage with staff so they can provide input, react, understand, and internalize the plan. Develop aligned internal plans and ensure individual performance plans also reflect the strategic plan. The 2015–2020 plan "Expertise, Resources, Place," at the Health Sciences and Human Services Library at the University of Maryland, Baltimore, was developed using this method.[5] Promote, discuss, and distribute the plan to everyone, and then live it. Base strategic decisions on it. Change your strategic plan whenever you need to—incrementally or completely.

Managing Up

Everyone reports to someone, and that will not change in the future. The critical nature of your relationship with your supervisor cannot be understated. This is called "managing up" and is as simple as developing a productive relationship. It does not necessarily mean liking your supervisor or "sucking up." An article in the *Harvard Business Review* (HBR) provides a summary of the concept and issues with links to a series of articles appearing in HBR over the past few years that included strategies for working with all types of bosses.[6] Although there is no need to be best friends, there is a need for good communication and respect in order to advance your priorities. This can only happen if your boss's priorities are being advanced by yours. Determining where these intersect can be advantageous. And remember, at a library director's level, often your boss is not a librarian, so speak to your boss with this in mind: explain trends, don't use library jargon, and don't expect that he or she will take the time to do research about libraries. "Elevator speech" type presentations of your meeting agenda items are often very effective, as bosses need to be able to quickly grasp the key issues you are facing; skip the details that may dilute your message.

ECONOMIC REALITIES AND STRATEGIES

Budget

One of the primary responsibilities of health sciences library administrators, now and in the future, is budgeting and obtaining funds to ensure the financial viability of the library. Some universities have adopted cost recovery expectations for their libraries; others still provide central support. Library funds have historically come from central university sources, service fees, grants and contracts, and from entities served by the library such as other health sciences schools or colleges and the affiliated hospital(s) or through endowments and donor contributions. In the future, although these sources will probably continue in some combination, library administrators will be

expected to be creative with their funding income, creatively managing collections, finding and tapping into new sources as well becoming more entrepreneurial, generating new services that create income, and new products and alliances that contribute funding. These new alliances may involve split funding for positions and sharing of personnel or fees for service. These could include performing projects for a cost (e.g., creating a patient education document repository for a hospital), offering "one-off" products or services directly to users, or creating products that generate revenue for the university.[7]

Professional associations and societies are potential partners for health sciences libraries, and such partnerships can include funding for completing special projects or for assisting with documenting the associations' outputs and products. For example, the North American Neuro-Ophthalmology Society (NANOS) has financially supported the Eccles Health Sciences Library to develop and maintain the Neuro-Ophthalmology Virtual Education Library (NOVEL; http://novel.utah.edu/). This unique partnership has provided benefits to both entities as well as to many users across the globe and has funded staffing and travel support within the Eccles Health Sciences Library. This type of entrepreneurial activity provides relief to library budgets and expands the view and appreciation of the expertise and capabilities of the knowledge workforce within the library.

Funding—Budget Reductions

A common understanding among library administrators is that there is not going to be a lot of new funding given to the library in the future, and that doing more with less will become the norm. Efficiency and effectiveness are key, as well as seeking new ways of still doing what is necessary. Adding new services and programs may require a close examination of what can be eliminated. Institutional priorities and the library's strategic plan may inform these decisions. Some repurposing of existing funding can be achieved if there are changes in library space or reductions in personnel. If there is not a library building to maintain, central service points do not exist, and thus don't require staffing or funds to maintain the physical plant. Some libraries have already readjusted their staffing levels to accommodate funding reductions and have explored new ways of being available when needed other than waiting at a service point.[8]

Creative Collection Management

Library collections, including the provision of access to key databases, journals, books, and other information-rich resources, have always constituted a large percentage of health sciences library budgets. As inflation for these

resources has exceeded the consumer price index, this proportion of the budget has increased over the years, often representing more than half of library expenditures. The current and future reality is that, increasingly, libraries will not be able to maintain the breadth of collections needed or provide access to resources that support all of the educational, research, clinical, and entrepreneurial activities of their institutions. Many libraries have opted to free space within their buildings by the one-time purchase, sometimes with access charges, of digital back files of journals.

On-Demand Article Services

Libraries are exploring alternatives to licensing resources and interlibrary loan with on-demand services. Examples include the Copyright Clearance Center's Get It Now service (www.copyright.com/academia/get-it-now) and ReadCube by Labtiva (www.readcube.com). In time, more articles will become freely available through public and open access and repositories like PubMed Central. Consortial organizations such as RAPID (www.rapidill.org) can help ameliorate some of the costs of resource sharing. In response to these pressures and initiatives, libraries are allocating part of their collection budgets to support these on-demand article purchases or to help authors cover article publication payment charges. The library often manages these publication payment charges with financial support from offices of research.

Sharing Information Resource Costs

Libraries often share the costs for information resources—owned, accessed, or on-demand—with other university entities. Up-to-Date is a resource frequently co-licensed between hospitals and health sciences libraries. The advantage to this type of arrangement is that there may be subject-specific resources that could benefit the entire institution. Instead of simply licensing it for one school or unit, the library can license it for the entire institution. Another model is where the library coordinates and manages a site license for an information resource funded by contributions from all institutional units.

Fiscal Responsibility—Getting Lean

The Lean method is a tool for identifying waste and highlighting value for users. Lean offers a set of tools to examine processes for unneeded steps and focuses on performing actions that add value to users. Lean has been widely reported in the literature, and several health care institutions are leaders in Lean, including Virginia Mason Hospital and Medical Center (Seattle, Washington), ThedaCare Center for Healthcare Value (Appleton, Wisconsin), and

the University of Utah Health Sciences. University of Utah's version of Lean is called Value University (http://healthsciences.utah.edu/value-university/). Several health sciences libraries have applied Lean principles to their processes such as interlibrary loan billing, patient education, and clinical literature review assistance.[9]

External Funding—Grants and Contracts

When external funding needs to be obtained, it can be achieved through a variety of methods, including extramural grants and contracts. The best strategy for this kind of funding is to seek extramural funding to meet identified needs. Ensure the funding is adequate to cover the costs. There is a tendency to underestimate the amount of personnel effort required for successful completion of a project. Simply chasing dollars may result in obtaining funding for something that isn't within the library's scope, is unnecessary, or can't be incorporated logically into your library's experience.

Funding can also be obtained through university research cores that have established service fees and structures for collecting funds. One example is systematic review services that can be offered as part of clinical and translational science cores. Recharging for services enables personnel costs to be recovered.

Fundraising

Fundraising in libraries is challenging and specific to the institution. Many large libraries employ their own development teams that support annual, endowment, or campaign giving. Others rely on institutional support for fundraising, especially during major campaigns where libraries are included or showcased. Still others are not permitted to raise funds at all, with libraries being seen as competitors for other institutional needs. One might believe that raising funds for libraries would be easy since they serve everyone, and everyone is their alumnus. However, unless the institution has designated the library as an institutional priority or faculty members, students, or staff members have a personal relationship with or interest in the library, it is very difficult to identify prospects. This exposes one of the basic tenets of fundraising—people give to people. Therefore, when starting a fundraising program, a logical starting point is with the identification of friends.

Make no mistake about it—fundraising is challenging, requiring time and attention. It is a profession unto itself. However, as funding gets more scarce, fundraising becomes more attractive and may even be required. Begin by articulating your needs. Write them down. Develop a case. Have it vetted within whatever fundraising structure exists. Do you need an unrestricted gift to accomplish a major project? Or do you need an endowment providing

annual income? Is there a naming or sponsorship opportunity? Does the establishment of a "friends" group make sense? Be prepared to devote a significant amount of time to making your case, to "friendraising," to fundraising, which includes "the ask," and then ongoing stewardship of gifts and donors. Fortunately, there is a large quantity of literature on the subject of library fundraising. Simply searching the Internet for "library fundraising" yields books, articles, spec kits, and case studies. The American Library Association (www.ala.org/advocacy/advleg/frontlinefundraising/welcome) has Web pages dedicated to fundraising and development. Although primarily focused on public libraries, there is plenty of information that can be applied to a health sciences library. The Academic Library Advancement and Development Network (ALADN) is a group of library fundraising professionals that meets annually to share innovative ideas and success stories (www.uflib.ufl.edu/aladn/). They also host the Libdev listserv.

PERSONNEL

Personnel are the most valuable asset of any library. In order to receive continued funding, health science library administrators will benefit by continually examining the relevance of the library to user and institutional information needs and issues. Library organizational cultures need to be nimble to identify where information and knowledge management can aid in reducing pressure points of library users to contribute to their success. Library staff are at the intersection of the library and the user experience. Creating productive and disruptive cultures by hiring individuals with diverse viewpoints, experience, and knowledge is one way to promote this kind of nimble inquisition and organizational posture. Library personnel of the future will not simply be librarians and library technicians. Personnel will be enhanced and enriched by a mixture of professional backgrounds, with the inclusion of individuals without library degrees. This new cadre of library professionals will offer diverse insights into problem solving that will be beneficial and that will extend the reach of the library in their institutions. Hiring subject specialists with a concurrent background in information management, the informationist model, may become more commonplace.[10] Encouraging either permanent or temporary co-location with other professionals on campus is another way to engage diverse minds toward a common goal. There are many examples of health science professionals being invited into library space with differing degrees of success; the right match makes all the difference, and this will be unique to each environment.

In *New Roles for New Times: Transforming Liaison Roles in Research Libraries* an examination of the changing roles of liaison librarians within research libraries is provided.[11] The authors encourage library organizational

cultures to exhibit flexibility with their personnel. Scenarios outlining new roles and hybrid models of research liaison and functional specialists are given. Collaboration is stressed as being a crucial component of future libraries, and the transformation of existing library faculty needs to be handled with sensitivity. New skill acquisition should be supported via professional development and training. As liaisons serve as advisors and advocates, they need the confidence to be influencers and true partners with other university colleagues.

Hiring for the Project

With the need for nimbleness and the ability to recruit different kinds of talent that is often outside the typical library staff cohort, the future will hold more "hiring for the project" than ever before. There's quite a bit of workplace research under way exploring how people will be identified, recruited, and hired to do a project, and then released and how to create work spaces that can accommodate such temporary grouping of individuals, both in person and virtual, that are outfitted to enable successful collaborations. Managing temporary project teams requires a new set of administrative skills. Budgeting impacts need to be considered, as often benefits need to be covered for temporary employees in addition to salaries. How these temporary employees compare to permanent employees needs to be considered for sustainability and for equity. For libraries with faculty status, the fit with recruitment, promotion, tenure, and retention policies and procedures needs to be considered.

To Embed or Not to Embed? That Is the Question!

By working daily with users in their contexts, opportunities for information seeking and application needs can be more quickly identified and support offered. Being within the environment where work is transpiring is one of the reasons for success with the embedded librarian or informationist. These library professionals are able to see directly where questions surface that need data or factual support; they see where questions go unanswered due to lack of knowledge-focused research time; and they understand the pressures being experienced by the users as they perform their responsibilities. A summary of experiences of informationists in different universities has been published that can provide insight into the value of this kind of information professional.[12] An additional strategy is the inclusion of library staff effort within a grant or contract; having them embedded with other individuals working on the grant is advantageous.

Beyond Traditional Library Staff

As was discussed earlier in the chapter, future staffing needs of health sciences libraries will be dependent on institutional and library programmatic needs. Not every professional library staff member will have an master's in library science nor will there necessarily be a need for large numbers of library technicians. And although there may be a continued increase in the use of informationists who have subject-specialized degrees, there are other professionals who may have homes in health sciences libraries. Many libraries have employed new and emerging technology librarians, but libraries may need to move beyond that to hire informaticists, programmers, app developers, researchers, gamers, and multimedia designers. Statisticians and geographic information analysis experts may be housed in the library. Support for teaching and learning could inform the hiring of learning analytics experts, instructional designers, health educators, and experts in the development of instructional resources. There is no reason these types of professionals could not be employees of a library.

Fostering the Possible—Empowering the Staff

As the library personnel picture becomes more complex, it will be increasingly important to focus on staff development and empowerment. On a macro level, it may be advantageous to do a gap analysis to assess areas necessary for staff development in support of the library and institutional programs and strategic goals and to determine strength and weaknesses. What new skills are needed?

On a micro level, it is often a good idea to know more about individual goals. Where do staff members see themselves growing and going? What are their interests? What are their ambitions? Where do they see needs? How do they see themselves fitting into the library's project and goals? Do they have ideas about future directions or projects? A library administrator needs to encourage growth and foster the possible while ensuring alignment with goals of the library. Consider it an investment in the future.

With the wide variety of webinars, programs, publications, and other learning opportunities available, developing a plan for staff growth and achievement can be an affordable undertaking. Encourage sharing of knowledge gotten at continuing education courses and meetings. Investigate institutional staff development options. An internal staff education committee can identify broad topics supporting staff needs and determine core competencies for all staff. Not every person aspires to be a director, but every person should be able to lead a project team. Provide opportunities for participation through internal and external committees and task forces.

Professional Associations

Historically, the professional association has been the touchstone or the professional home for library staff. In health sciences libraries, that role has been traditionally filled by the Medical Library Association (www.mlanet.org), which provides continuing education, accreditation standards, subject and regional focus through sections and chapters, and annual meetings, or by the Association of Academic Health Sciences Libraries (AAHSL; www.aahsl.org) for academic health sciences library directors. Increasingly, our work is demanding other outlets for our growth and development. Rather than a professional home, we may need to spend our professional affiliation dollars to attend programming based on specific skill needs. Attending relevant programming from other organizations is a great way to expand horizons and to view issues from different perspectives. Such relevant associations include the American Medical Informatics Association (AMIA; www.amia.org), Educause (www.educause.edu), the Society for Scholarly Publishing (SSP; www.sspnet.org), the Coalition for Networked Information (CNI; www.cni.org), and VentureWell (venturewell.org), among others. Government entities, such as the National Library of Medicine's National Network of Libraries of Medicine program (https://nnlm.gov), offer a wide variety of educational programs and training—all for free.

NEW SERVICES

Innovation and Information

These two words that start with "I" really are closely related and highly dependent upon each other. Innovation is becoming a fourth mission or pillar, along with education, research, and patient care, for many health sciences universities. It is a way to generate revenue while research and clinical care incomes decline. Entrepreneurship training is being incorporated into health sciences students' curricula along with special competitions and seed grants encouraging student and faculty partnerships supporting the creation of patentable inventions and medical devices. Innovations in education are also being mandated to assist with reducing educational costs and to distribute learning to more individuals, including those at a distance.

Providing information to innovators and entrepreneurs requires working with them directly to understand the kind of issues they face. They can be voracious consumers of information. They need information to help formulate their value propositions; they need to identify prior work to be sure that their invention or product is unique or a variation of an existing one; they need to understand the context of the environment for which they are developing a medical device or game; they need to know what is already available

within their market and where a gap still exists that can be filled by their product. Student gamers in the Eccles Health Sciences Library work on a semester basis and were leaving with their game designs and work plans. To prevent the loss of this intellectual property to the university, the generated content is captured and housed on an innovation-themed platform operated by the library, e-channel (library.med.utah.edu/e-channel/). These innovations are made available through e-channel to other students and gamers, while e-channel simultaneously documents the contributions made by the students for their professional resumes. Students learn to record the evidence used to create the game or app so that users understand the integrity of the instructions and the medical efficacy of the information. Library staff provide guidance on how to write abstracts for professional conferences, how to create posters, and how to write journal articles and book chapters. Help identifying the best venue and conferences for showcasing the students' work is also provided. Librarians are teaching seminars with gaming faculty about topics such as virtual reality and serious gaming. They also are teaching software that is used by innovators to plan their products and business models for such. Librarians continually identify new areas where information management skills are needed, adding value to student and faculty learning experiences.

Knowledge Management

Another relatively new service for health sciences libraries is that of knowledge management. There are many definitions of knowledge management, but for the purposes of this chapter, knowledge management "is the process of capturing, developing, sharing, and effectively using organizational knowledge. It refers to a multi-disciplinary approach to achieving organizational objectives by making the best use of knowledge."[13] Health sciences librarians are capturing their organization's knowledge through a variety of approaches including establishing and maintaining institutional repositories, creating collections of objects produced by their institutions, and by partnering with units to collect student project outputs and content. The Web-based platform for capturing innovation-related content, e-channel, is one example of how a health sciences library is attempting to gather the intellectual processes that accompany the creation of products, games, apps, and medical devices. Capturing, storing, and making accessible consensus reports, practice protocols, project results, or systemic review results generated within healthcare institutions is another example of how health sciences librarians are working as knowledge managers for their organizations. In the future, when rooms will be equipped with sensors in order to uptake conversations and synthesize group deliberations in real time—true "living rooms" in other words—librarians can be organizers of this captured content and provide

discovery points for easy access to such proceedings. Librarians are part of teams producing deliverables for their institutions and contributing organizational skills to managing the knowledge being generated daily within universities. Their ability to sort through masses of information to identify what should be preserved is of value. They can lead the self-publication of the future, as individuals will share research results in different means than just journal publications. Multimedia formats will be common, and a means of producing, describing, storing, and making this content readily discoverable will be needed at local levels. Finding the financial resources to create these knowledge repositories will be a key responsibility of future health sciences library administrators.

A "digital archive" or "institutional repository" in its simplest form can provide an institution with a valuable resource for capturing historical materials, gray literature, oral histories, publications, and so on. The collection, organization, and dissemination of such information is absolutely within the expertise of health sciences librarians.

Womb to Tomb Research Support

The research enterprise is often the economic engine of the institution. Alignment with and support for this by the library increases visibility and increases opportunities for collaboration and synergy. One such program, Research Connection (www.hshsl.umaryland.edu/services/researchconnection.cfm), with its tagline, "expertise to advance your success," leverages a wide variety of expertise available within the library in support of research. All the expertise is co-located in one marketable package so a researcher can pick from a menu of services, from question formulation through research dissemination, including systematic reviews, metadata analysis, and publication strategies. The beauty of this type of service is that it exposes all expertise within the library, not only that within the traditional public service areas, with partnerships frequently being formed.

LIBRARY SPACE

In any institution, real estate and space is a most desired commodity. In the knowledge infrastructure of the future is space really needed?

To Have or Not to Hold?

Should all staff be embedded throughout the university, and should physical library space be given away? Should a library be maintained as a place for contemplation, collaboration, or even as a cultural icon? How much space constitutes a library? Should personnel resources be totally distributed, with

no physical plant to maintain or resource? These are very real questions that health sciences library administrators will have to continually address and rationalize in the future. New libraries have started with only a virtual presence; libraries have become fully digital; library spaces have been transformed to serve different purposes and to be shared with other cohabitants. In the article "2015—The Future of Medical Libraries," the library was still envisioned to be a place, even with digital information.[14] Physical libraries would be used individually for study space, for temporary work spaces, or by groups to collaborate. The library would be a place where analyzing large sets of linked data from multiple origins would transpire in concert with librarians who would "adapt information services to new realities."[15] What's the best answer? The answer lies within individual institutions and institutional climates. This key challenge will require creativity and an open mind to all possibilities.

Administrating distributed staff presents additional challenges. How does one instill loyalty with the library as the home unit if staff are distributed throughout schools or other divisions of a university? How do you easily consult with your professional colleagues if they are located in multiple spaces and places? How do you conduct meetings—and where? Where do you meet with users if you are assisting ones outside of your embedded unit? Where do you teach? How and where do you host exhibits? What is the cultural identity of the library? On the positive side, librarians can share what they know by being directly located with their users. Librarians can offer ideas for assistance and problem solving, anticipating user needs through observation.

To Share or Not to Share?

Keeping a physical place managed by the library has many advantages. First, space can be purposed and used as fits the needs of library users without a lot of deliberation with others who may not understand physical library needs. Library staff know how to address the public use of library space and have a history of sharing it with others. We know about security, disaster preparedness, and space issues such as temperature fluctuations, facility maintenance, space planning, and remodeling. Library administrators have more control over how much effort they wish to assign to space when it is under their complete jurisdiction. This also means that the library has responsibility for facility maintenance and development. In some cases that involves financial responsibility as well. In other cases, the physical library building is supported centrally through indirect cost recovery.

When sharing space with other units, unless the library has oversight responsibility and central support, facilities management can become more complex regarding the inclusion of others in decisions and outcomes regard-

ing physical operations. Others may share in the operational costs as well as provide improvement expenses. Successful space partnerships have figured out how to manage and balance joint ownership and governance. Discussions among all units are required to ensure and maintain trust and to resolve issues that arise. Below are some examples of issues that need to be considered when sharing space.

- Hours of operation and security: Library tenants may need access after library hours. Agreements need to be reached about levels of security, payment for additional security features such as card readers, security doors, cameras, and keys. Who is responsible for providing access rights and managing security breaches? Who reports physical plant issues?
- Furnishings, equipment, and infrastructure: Are new cohabitants providing their own furnishings or expecting to use existing furnishings? Who will arrange and pay for telecom and data needs? Does any equipment produce smells or noise? Are there additional power requirements? Who pays for new signage, directories, or wayfinding tools?
- Reception and conference rooms: Who provides wayfinding information to visitors? Who is responsible for establishing policies and scheduling conference rooms? Who is responsible for supporting high- and low-end technology in conference rooms, such as markers, supplies, phone lines, and videoconferencing equipment?
- Space remodels: Agreements need to be reached regarding costs, noise, debris, and construction scheduling.

Many of these issues can be mitigated with the assignment or hiring of a building manager or coordinator, preferably under the control of the library, although sometimes this manager is assigned by an institutional facilities management group. This person can address day-to-day issues, such as room reservations, temperature and restroom problems; coordinate construction projects; mediate building issues; and represent all building issues and concerns up to the institutional level. Institutional project managers can also be assigned for larger remodeling or construction projects to coordinate and communicate between the library and tenants.

TECHNOLOGY IMPACT

No discussion of administration is complete without addressing the universal impact of technology on health sciences libraries. For administrators, it affects operational costs and services provision, impacts personnel as it permits telecommuting and distance employment, and offers alternative approaches to recruitment. Personnel can utilize technology, if institutional policies per-

mit, to work from a distance, from home, or as part of project teams with other institutions. Social media can publicize your library's events, services, personnel, and key messages, as well as showcase your library to encourage applicants for open positions. Technology enables new services and transforms how current services are delivered. Robots can offer wayfinding assistance, after-hours reference assistance, and deliver materials. They can also assist with security by scanning the building prior to closing. Chapter 3 provides more examples of emerging technologies that administrators may want to incorporate into their libraries.

MOVING FROM MANAGEMENT TO LEADERSHIP

Much of what has been focused on in this chapter has been management rather than leadership. Management is the art of getting things done, finding ways to move things forward on a regular basis. It's the economics, space, and personnel issues. Leadership, on the other hand, connotes vision, passion, and the ability to motivate, empower, and inspire others. As Grace Murray Hopper, U.S. Navy rear admiral, said, "You manage things; you lead people."[16]

If you think of the greatest boss you ever had, do you think that he was great because he approved time sheets in a professional manner? Probably not. But you may have been struck by her enthusiasm and passion; concern for the team, including the success of the individual with knowledge of strengths and weaknesses; the ability to empower and mentor; her sense of humor and perspective; her humanity. In the book *The Leadership Challenge*, five practices of exemplary leadership are named: (1) Model the way, (2) Inspire a shared vision, (3) Challenge the process, (4) Enable others to act, and (5) Encourage the heart.[17]

How do you become a leader? Are leaders born or made? Some people want to be leaders. Others have leadership thrust upon them. Take a personal inventory. Identify your strengths and weaknesses. Create a professional plan addressing areas for development and sources for acquiring them. Find a mentor. A mentor doesn't have to be a librarian. A mentor doesn't have to be for life. You will probably have many mentors on your leadership journey. Some may be as a result of formal mentoring relationships, others more casual. Read widely. Don't just read the library literature; read items in health care, business, education, technology, culture, economics, and world news. Think globally. Talk to interesting people including thought leaders and heat seekers at your institution. You will begin to see synergies and trends. All the while you should be thinking, "How can this be applied to what we are and what we could or should be doing?"

Anyone can be a leader. You don't have to be an extrovert. You don't have to have charisma. Leadership roles come and go. A good leader knows how and when to be a good follower. The leader is not always the one at the head of the table. If you consider yourself an introvert, there are a number of books focused on the strengths of introverted leaders such as *The Introverted Leader: Building on Your Quiet Strength* and *Quiet: The Power of Introverts in a World That Can't Stop Talking*.[18]

FUTURE COMPETENCIES

No one really knows what health sciences library administrators are going to face in the future, as there are so many variables. Change is constant and increasingly evident in our profession. We both began our careers prior to the existence of personal computers, and we know from experience that we can shape the future, adapt to what is required, and survive with finesse and a sense of humor. Our key professional arsenal is information and knowledge. We are the experts at locating, curating, creating, and applying relevant content and creating value for our institutions. As leaders in knowledge management, we need to understand our environment and boldly stake our claim, advocating for and proving our worth in our institutions.

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Chapter Nine

Core Competencies across the Profession

Beverly Murphy and Shannon D. Jones

In 1887, Melville Dewey started the first library school in response to the demand for formally trained personnel to staff the growing number of libraries and to process the accumulating collections. This formalized structure of how librarians should be trained was shaped by library association members consisting of new and mature professionals as well as employers. They offered what they thought should be included in the curriculum—some theory based, some skills based. In 1925, the first standards were approved by the Board of Librarianship as an initial step toward ensuring the quality of library education as an integral part of the profession.[1] At the request of their members, much work to develop comprehensive competency statements continued in the various associations to assist students and employers in identifying needed competencies, designing job descriptions, and selecting appropriate staff for their positions.

Today's library, however, is not your mama's library. Although this characterization sounds cliché, it is an accurate description of contemporary libraries. Technology has revolutionized how library patrons access, discover, and retrieve information. It has required libraries and librarians to change the way they conduct business. While print books and journals and reference desks are disappearing gradually, card catalogs and librarians who spend the majority of their workdays sitting in the library are long gone. In fact, the new normal for many librarians is increased engagement with patrons in settings outside the library. Whether serving on a curriculum committee, as a member of a research team, or accompanying students on mission and outreach trips, librarians flourish in external settings. They forge partnerships and alliances that support the library's role in initiatives on campus.

Librarians' roles have evolved to keep pace with the new demands of their positions. Much of this evolution reflects external trends, issues, and forces impacting our respective campuses and higher education at large. According to Jaguszewski and Williams, these forces include new and rapidly changing technologies, an abundance of digital information in a myriad of formats, an increased understanding of how students learn, evolving research methods, and changing practices in how scholars communicate and disseminate their research and creative work.[2] The goal for many librarians is to work in roles that are the most impactful for the users they serve. To impact teaching and research in 2016, librarians must assume new roles, learn new knowledge, and manage larger expectations. Many traditional roles that have sustained libraries in the past will not suffice for the contemporary library and its users.

Librarians must be prepared to adapt to changing forces to meet the evolving needs and expectations of faculty, staff, and students. This requires that librarians take a hard look at the competencies, knowledge, and skills needed for work in contemporary libraries. This raises the question, what knowledge and skills do librarians need to assist them in making meaningful and impactful contributions to high-profile challenges and initiatives at their institutions and to the profession at large? In response to this question, we explore and examine professional competencies in general, as well as those outlined by associations such as the Medical Library Association (MLA), the American Library Association (ALA), and the Special Libraries Association (SLA).

Similar to many academic and professional disciplines, librarians have competencies, knowledge, and skills that professional associations deem requisite for success. This chapter presents a review of the literature that explores how competencies have been defined by our profession, their relevance and importance today, and what gaps must be addressed to ensure the creation of standardized core competencies that unify our profession.

LITERATURE REVIEW

A search in Library, Information Science, and Technology Abstracts with full text for the subject "core competencies," limited to English and published in the last ten years, yielded 199 references. Although there was a substantial amount of information about competencies across the profession in general, there was very little as outlined by professional associations. Of the 199 articles, 35 were indexed to terms related to associations, organizations, and so on. A simple search for "competency or competencies" in library and information science research from 1994 retrieved ninety-one articles, three of which were indexed to library organizations.

Despite the minimal information in the literature about core competencies as outlined specifically by professional associations, there is clearly a "unified effort by educators to prepare graduates for what their professions demand and by associations to provide carefully crafted competency statements aligned with specific specializations which provide parameters for a successful professional career."[3]

The literature reveals that core competency is a relatively new concept, which originated in a 1990 *Harvard Business Review* article titled "The Core Competence of the Corporation" by C. K. Prahalad and Gary Hamel. The authors define core competence as "collective learning in the organization, especially the capacity to coordinate diverse production skills and integrate streams of technologies."[4] They suggest that organizing around core competencies requires a radical change in corporate organization and a commitment to working across organizational boundaries. At a basic level, all professions are built upon shared knowledge and competencies that have been identified over time.[5] In addition to the impact in the business arena, the work by Prahalad and Hamel inspired the development of core competencies by other professions and organizations.

Though the literature indicates there is a general understanding in the profession of what is meant by competencies, there is no standard or universally accepted definition, which often creates ambiguity and confusion.[6] Clarity in terms of what needs to be included in a set of competencies is dependent on the stakeholder, whether it be an employer, job seeker, library school, or association. Terms of accreditation, certification, qualifications, standards, skills or skill sets, training, and competencies are relational and often assumed interchangeable. But as more similar terms are added to the equation, this clarity may become even more muddled.[7]

Christine Mackenzie stated in 2007 that "libraries are no longer about books or even information. Instead, libraries are about facilitating people to participate, interact and create, to provide the means for that to happen."[8] The transition of libraries from conventional to digital facilities in their use of databases, search engines, e-journals and e-books, Web sites, social networking tools, virtual reference, chat services, and so forth to disseminate knowledge and information has established the need for an ever-changing skill set.[9] Much of the discussion in the literature is centered on the challenges and opportunities of supporting a technological infrastructure that drives a lot of what we do.[10] It is very clear that "technology competency is not an option, it is critical for all librarians and staff."[11]

Even with the paradigm shift to a technocentric environment, several studies indicate that there is an increased demand in the professional job market for interpersonal and communication skills.[12] The MLA and the SLA have devoted specific attention to personal skills in their competency statements; however, there is no mention of them in the *ALA's Final Core Com-*

petences Statement. MLA states, "beyond mastering core information knowledge and competencies, the librarian will achieve optimal success when formal education is complemented by other skills and an array of personal characteristics and traits."[13] SLA provides a list of personal competencies that "every information professional" should have, representing "a set of attitudes, skills and values that enable practitioners to work effectively and contribute positively to their organizations, clients, and profession."[14]

According to Lynch and Smith, personal competencies began to appear in job advertisements for reference librarians in the early 1990s, emphasizing oral and written communication skills.[15] A study published by White covering announcements from 1990 to 1998 indicated that interpersonal and behavioral characteristics were the most frequently mentioned qualification in job advertisements.[16] Partridge, Menzies, Lee, and Munro determined that professionals around the world have begun to develop lists of core competencies for librarian 2.0 that focus more on interpersonal skills and less on technological competencies. Participants in their study expressed "the general belief that personality traits, not just qualifications, were critical to being a successful librarian or information worker."[17] According to Pellack, "developing and using personal competencies is essential to provide quality information services and to improve and create interpersonal relations with coworkers that foster a successful working environment."[18]

Although personal competencies may be sought after and valued by employers, educational curricula may not be keeping pace with addressing this need. Data collected from course descriptions in a study by Jenny Bronstein suggested that library and information studies (LIS) departments prepared students to work in advanced technological environments, but they did not develop their personal competencies.[19] Bryson takes it a step further by stating that the SLA document "Competencies for Information Professionals of the 21st Century," though thoughtful and well meaning, fails to recognize or to mention the word "humor," an intangible yet essential ingredient for fostering a long-term relationship with one's colleagues and community. She sums up her support for personal competencies with a quote from the Warrior Librarian Web site, which stated, "A smiling librarian is an awesome sight; it challenges the stereotypes, creates an atmosphere of change, and frightens the heck out of 95 percent of the borrowers."[20]

Even though there are some common services shared across libraries of all disciplines, specific competencies are as varied as the librarians and institutions involved, many of which have established their own competencies outside of associational purview. Even with a general consensus and similarity among the associations as to what competencies should be mastered, the literature contains many lists of competencies (by all kinds of typologies, thematic clusters, and categorizations). However, "it is in those areas refer-

ring to the expertise needed for particular specializations where the competency statements become more specific to a specialization."[21]

The literature also reveals that there still seems to be a sizable gap between theory and practice that needs to be bridged in measuring competencies.[22] Whether a skills-based or theory-based curriculum should be taught has been an ongoing debate from the inception of LIS education.[23] Paralleling this issue is whether professional librarians are achieving or adopting core competencies, and, if so, how they are integrating them into their overall performance management systems.[24] Results of such performance evaluations could help identify those competencies in which individuals need additional development or training. Despite the need, few studies analyze the relationship between investments in core competencies and corporate performance. Results from a 2013 study concluded that firms with managers who affirm their investment in intangible resources, which the study defines as core competencies, have better overall growth and sustained economic development.[25] Since core competencies affect all librarians, the tighter we can close the gap between theory and practice, the better our performance will be as practitioners.

With increasing global interconnectivity, opportunities for librarians to interact with all types of patrons and colleagues from different cultures, backgrounds, and languages have dictated the need to develop cultural competencies. This is a not a new concept, as many authors called on librarians to develop cultural competencies in the 1980s.[26] However, Overall reported in 2009 that "despite enormous efforts within the LIS profession to promote a greater understanding of culture as a key to providing adequate library services to a changing population, a lack of cultural competence continues to be evident within the profession."[27] Development of cognitive, interpersonal, and environmental cultural competencies is necessary to take advantage of collaborative opportunities and help students compete in the global job market, as well as avoid miscommunications and potentially awkward situations.[28] Saunders and her colleagues suggest that we might increase our cultural competencies by first becoming aware of our own cultural perspectives and inherent biases and by then seeking and creating opportunities to learn more about other cultures.[29]

COMPETENCY STATEMENTS DEVELOPED BY RELEVANT PROFESSIONAL ASSOCIATIONS

American Library Association (ALA)

Approved in 2009, the "ALA's Core Competences of Librarianship" defines the knowledge to be possessed by all persons graduating from ALA-accredit-

ed master's programs in library and information studies.[30] The competences are divided into the following eight content areas:

1. Foundations of the profession
2. Information resources
3. Organization of recorded knowledge and information
4. Technological knowledge and skills
5. Reference and user services
6. Research
7. Continuing education and lifelong learning
8. Administration and management

Medical Library Association (MLA)

In 1993, the Medical Library Association adopted "Platform for Change: The Educational Policy Statement of the Medical Library Association," a broad statement of intent defining competencies for the roles of professional associations, employers, academia, colleagues, mentors, and other resources for personal professional growth.[31] This statement was superseded in 2007 by the adoption of "Competencies for Lifelong Learning and Professional Success," which includes seven professional competency areas needed by health sciences librarians throughout their careers.[32] These competency areas are:

1. Health sciences environment and information policies—Understand the health sciences and health care environment and the policies, issues, and trends that impact that environment.
2. Leadership and management—Know and understand the application of leadership, finance, communication, and management theory and techniques.
3. Health sciences information services—Understand the principles and practices related to providing information services to meet users' needs.
4. Health sciences resource management—Have the ability to manage health information resources in a broad range of formats.
5. Information systems and technology—Understand and use technology and systems to manage all forms of information.
6. Curricular design and instruction—Understand curricular design and instruction and have the ability to teach ways to access, organize, and use information.
7. Research, analysis, and interpretation—Understand scientific research methods and have the ability to critically examine and filter research literature from many related disciplines.

Also included are recommendations for actions that individuals and professional organizations, health sciences librarians, the MLA, employers of health sciences librarians, library and information science educators, and the National Library of Medicine can take to promote professional development and lifelong learning.[33] Additional MLA statements of competencies for professional success include health sciences librarianship in context, continuum of learning, and personal attributes that contribute to success.[34] The competencies are updated periodically, with the next update to occur in May 2016 by the Task Force to Review MLA's Competencies for Lifelong Learning and Professional Success.

In addition to its competencies, MLA has established the Academy of Health Information Professionals (AHIP), a peer-reviewed professional development and career recognition program.[35] Academy admission is based on academic preparation, professional work experience, and individual professional accomplishments reflecting an investment of time and effort required for exemplary professional performance.

Special Libraries Association (SLA)

SLA's "Competencies for Information Professionals of the 21st Century," revised in 2003, is a set of tools for professional growth, recruitment, and assessment.[36] The statement provides definitions for information professionals and organizations, as well as competencies in three areas. SLA's competencies place emphasis on evidence-based practice and suggest that information professions require two types of competencies: professional and personal. Professional competencies include managing information organizations, managing information resources, managing information services, and applying information tools and technologies. Personal competencies include being strong communicators, demonstrating the value added by their contributions, and remaining flexible and positive in an ever-changing environment.

SLA's competencies include two core competencies that it states are absolutely essential for every information professional.[37] Those competencies are:

1. Information professionals contribute to the knowledge base of the profession by sharing best practices and experiences and continue to learn about information products, services, and management practices throughout the life of his/her career.
2. Information professionals commit to professional excellence and ethics and to the values and principles of the profession.

Though they will not be discussed in detail in this chapter, a list of competency statements from other relevant associations and organizations may be found on ALA's Web site.[38]

FUTURE COMPETENCIES

Competencies form the very foundation of a profession and are also the basis for professional growth and performance measures.[39] Although considerable effort has been paid to developing competencies, it is questionable whether librarians actually use them in their practice to assess their strengths and weaknesses and to evaluate the alignment of the professional standards with personal objectives and outcomes. If core competencies are adopted as part of the performance appraisal process, staff may be reminded of them during the annual evaluation. Even if competency development and implementation are not a consistent part of a librarian's personal agenda, competencies can still be used to identify, recruit, hire, train, and retain valuable employees.

Although the essential motivation of the librarian has not changed in terms of the desire to provide information, resources, and services at the point of need, the environment in which we teach, do research, answer questions, and acquire, collect, and preserve materials has drastically changed. Transformative technologies and the behaviors they engender have radically changed the creation and distribution of scholarly journals, data, and other research outputs.[40] Emerging technologies require that we up our game to embrace the transition of our roles, expertise, and opportunities as we evolve to meet the challenges of the digital age. This may involve the need to reassess, revamp, and revise our personal, professional, and educational competencies on a more regular basis to help us to sustain growth, distinguish our uniqueness, add value, and remain viable in the marketplace.

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Chapter Ten

The Library of the Future

Patrons' View of the Library

Anna Ercoli Schnitzer and Merle Rosenzweig

Libraries, both public and academic, have changed with the times and needs of the diverse populations that they serve. The collection of the Royal Library of Alexandria, or Ancient Library of Alexandria, founded in 228 BC in Alexandria, Egypt, consisted of 700,000 scrolls.[1] During the intervening years, since the time of the invention of the printing press and movable type by Johannes Gutenberg in 1439, millions of books have been produced, and a multitude of libraries has been constructed worldwide to house them. Today, library collections often consist of cutting-edge technology with vast collections of both online and offline resources. The library is no longer just a place for books. In fact, rapid advances in technology are transforming libraries into the electronic information centers of our communities.

A library, be it public or academic, is a collection of sources of information and similar resources made accessible to a defined community for reference or borrowing.[2] It provides physical or digital access to material and may be a physical building or room, a virtual space, or both.[3]

A collection of library resources can be in a "variety of formats . . . (1) organized by information professionals or other experts, who (2) provide convenient physical, digital, bibliographic, or intellectual access and (3) offer targeted services and programs (4) with the mission of educating, informing, or entertaining a variety of audiences (5) and the goal of stimulating individual learning and advancing society as a whole."[4]

PATRONS' VIEW OF THE LIBRARY OF THE FUTURE

What do patrons want to see in their library of the future? Perhaps they don't even want to see a library, just the results that they are looking for delivered to their mobile devices. Or, in a more futuristic mode, perhaps library patrons would really like to have data delivered straight to their brain cells. Or perhaps they have become tired of looking down at their own computers and scanning for results, and prefer to sit in a comfortable chair in a stately room with the availability of experts nearby to help them search and find precisely what they need, while being surrounded by other patrons who are also interested in discovering specific new information. The library of the future as envisioned by current library patrons can assume many different iterations, encompassing both concrete (bricks and mortar) and more intangible (electronic) formats. And, of course, an essential consideration when envisioning the library of the future depends on which patrons are being considered: Serious biomedical researchers? Public school children? Their parents? Adult learners? Adults seeking employment? Teenagers seeking entertainment? There are as many different types of patrons as there are types of individuals with their own specific interests, thus one size or shape of library most definitely does not fit all.

Public Libraries

Turning to the important topic of public libraries, a blog post titled "The Library Future Resides in Users' Perception" by John N. Berry quotes Wayne A.Wiegand, who said: "The history of the public library in America has just been rewritten, and the result provides crucial new tools to help guarantee its future."[5] This new history comes from Wayne A.Wiegand's book *Part of Our Lives: A People's History of the American Public Library*.[6] Wiegand looks at that chronicle through the eyes of users. The evidence he found proved that despite our belief that the public library was defined by library leaders, "it was really created, shaped, and given its purpose and mission by its patrons." They demanded services, collections, and the kind of place they wanted and needed. In an article in *Library Quarterly*, Wiegand asserts that "Americans have loved their public libraries for three reasons: for the useful information they made accessible, for the public space they provided, and for the reading materials they circulated that helped users make sense of the world around them."[7] *Part of Our Lives* sees the "library as [a] place . . . [with] the power of commonplace reading to transform lives."[8] The library community consistently encouraged its users to adhere to the moral authority of the learned profession," asserts Wiegand. "But users had other ideas. Because they did not have to use public libraries, users automatically applied pressures public library managers could not ignore. By force of de-

mand—*vox populi*—users insisted that their public libraries acquire particular kinds of stories. As a result, they effectively shaped the library into a popular place that addressed their literary tastes."

In 2013, the Pew Research Center issued a report summarizing a number of surveys and the results of focus groups in order to establish the important factors that library users appreciate right now and would like to continue to see in libraries in the future. This report is a wonderfully rich resource for the library of the future because it is carefully done, detailed, and includes statistics, along with a variety of opinions. The report concludes that person-to-person assistance by librarians, when needed, is very important, as are the following: borrowing books; free access to the Internet and to computers; quiet study spaces for adults and children; increasing availability of e-books; programs and classes for children and teens; research resources such as free databases; jobs, employment, and career resources; free events and activities such as classes and cultural events for people of all ages; free public meeting spaces; public priorities for libraries; closer coordination with schools locally to provide more resources for students; free literary programs for very young children preparing for school; separate spaces for different services; more comfortable spaces for reading, working, and relaxing; a broader selection of e-books; more interactive learning experiences similar to those in museums; help with digitizing patrons' historical personal material; remote, online library services online; automating more services; moving some print books and stacks out of public locations to free up more space; plus a broad spectrum of possible new services.

Some of the more visionary services, according to the same Pew report, include cell phone applications (apps) that allow patrons to access and use library services from their phones in order to see what programs the library offers; library kiosks located throughout the community where people can check out books, movies, or music without having to go to the library itself; cell phone apps that help users locate material within the library by guiding them with a global positioning system (GPS); a digital media lab where patrons could create and upload new digital content, such as movies or the user's own e-books; and classes on how to download library e-books and other digital content to handheld devices. For instance, the report reveals: "Overall, 63 percent of respondents say they would be likely to use a cell phone app that would allow them to access and use library services from their phone; some 35 percent say they would be 'very likely' to use such an app, including 45 percent of smartphone owners and 41 percent of tablet owners."[9]

In a keynote presentation at a library conference, Lee Rainie, director of the Pew Research Center's Internet and American Life Project, addressed the project's new research about characteristics of patrons, both those who are library users and those who do not ordinarily frequent libraries—who they

are and what they need in the way of information and the means to achieve it. He mentioned, among other goals, the necessity for libraries to foster closer ties with the local school systems, providing courses for adults to improve their technical skills as well as offering English as a foreign language, and also filling in the gaps in credentialing competency by providing lifelong learning opportunities.[10]

Sophisticated library patrons are looking for speed, currency, efficiency, and integrated systems in the future. A director of business development for Swets noted: "end users want their content on every possible device and they want a unified discovery solution so that they can have that content at their fingertips."[11] However, although some individuals yearn for such forward-looking techniques and devices, there are others who reject these very same ideas.

The digital gap between the generations is a major factor in different levels of patron preferences for the future. This division will undoubtedly be much less pronounced in years to come. The *New York Times*, on October 23, 2015, published an article titled "To Reach Seniors, Tech Start-Ups Must First Relate to Them." The author calls these efforts to reach older people "silvertech." She goes on to say, "during this interim period—with rafts of supposedly transformative gizmos, most doomed like many new products to fail—I suspect older people and their caregivers will continue to find it difficult to distinguish useful technology from that which simply produces frustration."[12]

For advanced researchers in the humanities, biomedical sciences, and the hard sciences, ease of use and efficient incorporation of data are paramount. Often, these experts must rely on library vendors' products to provide simple but efficient workflows. These users want currency and flexibility, especially in the structure of such databases, since they may want to use the information for a variety of purposes. Therefore, suppliers must understand library users' needs and evolve their services to match them.[13]

Another realm in which the public is demanding more of libraries is as a provider of a multitude of physical items in addition to intellectual information. Public libraries, among other functions, now lend art prints, microscopes, tools, umbrellas, games, fishing poles, museum passes, musical instruments, winter sports equipment, seeds, "book clubs in a box," and even pet companions. In one visionary library, one can actually check out people. The "Human Library" originated in Denmark in 2000 as part of a youth organization called Stop the Violence. The idea is straightforward: library guests can choose a volunteer whom they would like to "check out" based on "titles," or descriptions, that the human books assign themselves. Past titles have included "Olympic Athlete," "Biking Agoraphobic," "Fat Woman," and "A Questioning Christian." Visitors then sit down with their "books" for a half hour or so to listen to them share their personal stories.[14]

Academic, Hospital, and Consumer Health Libraries

In an article published in the *Journal of the Medical Library Association*, Tammy Brawn writes about the wishes of her patrons in an attempt to meet their information needs. She focuses specifically on consumer health libraries. Her list includes

> information on disease conditions; information on navigating the health care (provider) systems; miscellaneous, nonmedical, ready reference information including travel directions, yellow pages access, etc.; a quiet place to escape; printed material to share with a patient and the rest of the family; computer access for e-mail or research; information about medical tests; and recommendations and evaluations of doctors (something a librarian cannot ethically answer). The following are lacking in libraries, all of which could be incorporated into the library of the future: focus on health promotion and wellness information; follow-up and evaluation as to how the information impacted a health behavior or treatment decision; knowledge of where the library is located and that it is available for their use; comprehension of what the doctor or nurse told them; understanding of basic human anatomy and medical terminology.[15]

In summary, what consumer health library patrons prefer, according to this author, would be access to free brochures of health information that they can quickly grab and take with them.

As far as academic libraries are concerned, both students and faculty may need quiet space for study as well as larger spaces for collaborative efforts; they require that data retrieved from online resources be downloadable across a broad spectrum of mobile devices; they may opt for instant printouts of needed articles or book chapters; plus, they are eager to avail themselves of the online version of informational lectures.

In view of the downsizing or closing of libraries and the reduction of library budgets, conditions that probably will only intensify in the future, and due to the rapidly changing technological landscape, John Palfrey's book *BiblioTech: Why Libraries Matter More Than Ever in the Age of Google* sheds considerable light on the universality of patron needs both now and in the future. The author acknowledges that although Google is now everybody's easy access in their quest for immediate answers to questions, not every former library role should be usurped by such resources as Google. The basic question remains: Can patrons trust for-profit companies to be fair and impartial in providing essential information? Palfrey responds: "Libraries can offer important alternatives to the services provided by the corporate sector, which will always have incentives to offer biased, limited and costly access to knowledge."[16] He maintains that librarians will have to be trustworthy stewards rather than mere collectors and archivists of information.

Videos are an important component of classroom learning because students in higher education are now oriented to learning using this medium and because their professors use this method liberally. However, only 32 percent of students look to a library Web site for their educational video viewing, according to *The Chronicle of Higher Education*. Most students admittedly prefer YouTube. This statistic may be misleading because as a comment following this article pointed out:

> While only 32 percent said they searched the library Web site for video, another 43 percent said they link to video through their courseware site. I would think that many faculty who do use library streaming video services for feature and educational film are creating links to the library content for the students. If that's the case, then it may be that as many as 75 percent of students are using video provided by the library—and students may not even be aware the streaming video is acquired by the library. But it was surprising to read that more college students go to the public library for video than their own college library. That may be for personal recreational viewing because the public library may have a somewhat better feature film selection. [17]

An extremely important function of the library of the future is focusing on the adult learner. As Helene E. Gold writes in her article "Engaging the Adult Learner: Creating Effective Library Instruction, "adult learners have unique developmental and social characteristics as compared to their traditional counterparts in higher education."[18] Gold believes that because of differences in technological literacy, past life experiences, and current life responsibilities, the adult learner requires special pedagogical design and delivery of content, not only in the classroom, but also in the library. She thinks that traditional instruction modules are often not particularly effective when delivered to the adult learner.

In *Lifelong Education for Adults: An International Handbook*, the author notes that

> the high costs of formal education, the need for adults to retrain and adapt to change, and the emphasis on lifelong learning have resulted in alternative and more flexible learning systems. New teaching methods in secondary schools have trained people in independent study skills. All learning resource centers, often integrated with libraries, are under great pressure. College libraries are asked to allow adult independent learners access to their collections. Public libraries are expected to support broadcast learning. Professional training for librarians incorporates "user needs" in general and sometimes the needs of adult learners in particular. [19]

The author emphasizes that adult learners also need encouragement, clarification, motivation, and review.

Because an important objective for academic libraries is assisting adult students in furthering their educational goals and advancing their careers, such an activity, which serves as a model, has been instituted by the College of New Rochelle in New York. The program is called MURAL, or "Mentoring, Undergraduate Research, and Augmented Libraries." This initiative, "which is focused on moving full-time adult learners in the college's School of New Resources through college in four years or less with a bachelor of arts degree in liberal arts . . . will create a network of support through an enhanced research-rich core course each semester, enhanced mentoring, and the creation of a library learning commons."[20] Included in this multifaceted approach are these key elements:

- A librarian will be embedded in each research core course to assist students in an outside class in completing their "life arts projects" (focused on real-world research experiences) each semester.
- The College of New Rochelle is establishing a peer-reviewed journal, *Serviam*, in which students can publish their research, along with an institutional repository for completed projects and faculty research.
- Students who publish their research will receive an additional college credit at no cost to them, and students who publish six of their eight "life arts projects" could graduate a semester early.

Thus, MURAL has as its goal to change academic culture through a library-driven impetus, enriching concomitant library activities and collaborating with faculty by providing all necessary assistance to adult students so that they can achieve professional positions through learning real-world skills.

An important and controversial issue is in regard to the format for conveying literary content in the future. Will paper books still be available for library patrons? Will they continue to be an alternative to the growing popularity and pervasiveness of e-books and similar online media? Do any patrons still crave actual books? There have been numerous and varied opinion pieces written on this topic. The online journal *Slate* published an article whose title tells a story in itself: "Will Paper Books Exist in the Future? How Their Design Will Evolve in the Age of the Kindle." The conclusion is:

> Luddites can take comfort in the persistence of vinyl records, postcards, and photographic film. The paper book will likewise survive, but its place in the culture will change significantly. As it loses its traditional value as an efficient vessel for text, the paper book's other qualities—from its role in literary history to its inimitable design possibilities to its potential for physical beauty—will take on more importance. The future is yet to be written, but a few possibilities for the fate of the paper book are already on display on bookshelves near you.[21]

Jonathan Gunson, whose article titled "Will Printed Books Disappear? Stephen King on the Future of the Traditional Paper Book," reports that Stephen King stated in an interview that there will be no more novels in paper format for patrons to borrow in the future library, but that these works will be replaced by e-books.[22] However, Tim Waterstone, the founder of a chain of bookstores in the United Kingdom, writes: "The product is so strong, the interest in reading is so deeply rooted in the culture and human soul of this country that it is immovable. The traditional, physical book is hanging on. I'm absolutely sure we will be here in 40 years' time."[23]

A compromise about the types of format available for patrons in the future is in "Why the Smart Reading Device in the Future May Be . . . Paper," an article that appeared in *Wired.* Some researchers have found that reading via paper format differs from reading the same content on a screen, though other experts hold opposing views. The article notes:

> Rakefet Ackerman at the Technion-Israel Institute of Technology has found that students reading on paper and screen may think differently about their own learning processes. When reading on paper, Ackerman's students seemed to have a better sense of their own understanding. When reading on screen, they thought they absorbed information readily, but tests showed otherwise. Screens seemed to foster overconfidence. With practice, this could be corrected, said Ackerman, but "the natural learning process on paper is more thorough than on screen." A study by psychologist Sara Margolin of Brockport University found no difference in reading comprehension in students reading paper, computer screens, and e-readers. "It's really a matter of personal preference," said Margolin.[24]

Another important aspect of the future reading format not to be overlooked is the impact on education and socioeconomic status of generations of children being exposed to books. An extensive research study by Mariah Evans, Jonathan Kelley, Joanna Sikora, and Donald J. Treiman was published in the journal *Research in Social Stratification and Mobility* and was described in this way:

> The study by Evans and her colleagues at Nevada, UCLA and Australian National University is one of the largest and most comprehensive studies ever conducted on what influences the level of education a child will attain. The researchers were struck by the strong effect having books in the home had on children's educational attainment even above and beyond such factors as education level of the parents, the country's GDP, the father's occupation or the political system of the country.[25]

An article in the *New York Times* reports a counterintuitive initiative about patron preference along with the physical and psychological comfort of

books. Small libraries with books are being installed in guests' rooms in a number of hotels. For example,

> The St. Regis New York has digitally remastered fifty-eight titles from the original collection of its founder, John Jacob Astor IV, which have been housed behind glass at the hotel for over a century. They are available to guests on a Kindle encased in a custom-made Thornwillow Press leather-bound cover and include such titles as *The Adventures of Sherlock Holmes* and *Oliver Twist*. "These libraries help guests make meaningful connections with their hotel," said Bobby Zur, who owns Travel Artistry, a consultancy in Franklin Lakes, N.J. "Books in your room are a counterrevolution to technology overload and are almost comforting for guests," he said. "They also give properties a unique identity."[26]

James Gleick, in "What Libraries Can Still (Do)," published in the *New York Review of Books*, writes:

> The library has no future as yet another Internet node, but neither will it relax into retirement as an antiquarian warehouse. Until our digital souls depart our bodies for good and float away into the cloud, we retain part citizenship in the physical world, where we still need books, microfilm, diaries and letters, maps and manuscripts, and the experts who know how to find, organize and share them.

He concludes,

> A transition to the digital can't mean shrugging off the worldly embodiments of knowledge, delicate manuscripts and fading photographs and old-fashioned books of paper and glue. To treat those as quaint objects of nostalgia is the technocrats' folly. The masters of Internet commerce—Google, Facebook, Amazon, Apple—sometimes talk as though they're building a new society, where knowledge is light-speed and fungible, but a marketplace is not a society.[27]

Neil Gaiman, a dedicated educator and lover of books, in his lecture for the Reading Agency, emphasizes the value of reading in engaging the imagination as well as the continuation of libraries, which are the storehouses of books and information, by listing the obligations that citizens have for the future of the world. He says that among other obligations to our children and to the adults that they will become: "We have an obligation to support libraries. To use libraries, to encourage others to use libraries, to protest the closure of libraries. If you do not value libraries then you do not value information or culture or wisdom. You are silencing the voices of the past and you are damaging the future."[28]

Future Competencies

In view of the diversity of future patrons and the individuality of their needs, goals, and wishes, librarians must remain flexible and be prepared for constant change. In order to remain relevant, they must become familiar with a broad swath of both information resources and retrieval options. In addition, they must continue to adhere to the ALA's core competences.[29] With the advent of innovative technology coming online on a continuous basis and at a more rapid pace every year, librarians will have to work diligently to remain the authoritative providers of current information, which is their goal. To continue to be of the utmost value to their patrons and to serve as a go-to resource, they must be alert and aware of the latest trends; however, they also should be not unduly eager to abandon the traditional modes of librarianship, because there certainly will still be those patrons who are comfortable with older resources and methods. By being engaged with patrons, looking forward and engaging with early adopting individuals, and yet not being averse to remaining in place and providing traditional materials for others, librarians will be in a position to know how to best meet all of their users' needs.

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Appendix

The following are a few of the Web sites where you can find more information about librarian competencies.

American Library Association (ALA), Core Competences (2009): www.ala.org/educationcareers/careers/corecomp/corecompetences

Note: The American Association of School Librarians (AASL) Web site redirects to the ALA Web site.

Medical Library Association (MLA), Professional Development, Professional Competencies: www.mlanet.org/p/cm/ld/fid=39

Note: These competencies are under revision and are anticipated to be updated in 2016 or 2017.

Special Library Association (SLA), Competencies (June 2003): www.sla.org/about-sla/competencies/

Note: These competencies are under revision and are anticipated to be updated in 2016 or 2017.

Federal Library and Information Center's Committee (FLICC), Competencies for Federal Librarians (2011): www.loc.gov/flicc/publications/Lib_Compt/2011/2011Competencies.pdf

North American Serials Interest Group (NASIG), Core Competencies: www.loc.gov/flicc/publications/Lib_Compt/2011/2011Competencies.pdf

Note: This page includes core competencies for electronic resources librarians and core competencies for print serials management.

American Association of Law Libraries, Competencies of Law Librarianship: www.aallnet.org/mm/Leadership-Governance/policies/PublicPolicies/competencies.html

Music Library Association, Core Competencies and Music Librarians: https://c.ymcdn.com/sites/www.musiclibraryassoc.org/resource/resmgr/docs/core_competencies.pdf

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About the Editors

Jeffrey G. Coghill has been at Laupus Library, East Carolina University, for fifteen years serving first as the collection development librarian and later becoming the outreach librarian and director, Eastern AHEC (Area Health Education Center) Library Services. He has a BA in English from Methodist University, an MA in English from Western Carolina University, an MLIS from the University of Alabama, and a certificate of advanced study in Health Science Libraries from the University of Pittsburgh.

Roger G. Russell, MLS, has been a librarian at Laupus Library, East Carolina University, since 2000. He has worked as a liaison librarian, outreach librarian, head of reference and circulation, and is presently the assistant director for user services. He received his BA in history from East Carolina University and his MLS from North Carolina Central University. His research interests include user experiences, building ownership among academic library patrons, and interdisciplinary collaboration.

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