

Special report: symposium on transformational change in health sciences libraries: space, collections, and roles*

Valerie A. Lynn, MLS, MSIT, AHIP; Marie FitzSimmons, MS, AHIP;
Cynthia K. Robinson, MA, AHIP

See end of article for authors' affiliations.

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INTRODUCTION

In November 2003, the National Library of Medicine (NLM) and the Association of Academic Health Sciences Libraries (AAHSL) cosponsored a symposium, "The Library as Place: Building and Revitalizing Health Sciences Libraries in the Digital Age," focusing on the question: "What is the role of the library in the twenty-first century?" After two days of presentations and discussions, symposium participants concluded "that both the print and the virtual electronic library are here to stay." As Deanna Marcum observed, "The library will certainly change. And its need for space may significantly shrink. But the digital era, far from ending the physical library, may free it to facilitate learning rather than to house shelves—and may free those who work within the library spaces to do less book processing and more learning facilitation" [1].

In the summer of 2008, the National Network of Libraries of Medicine (NN/LM), Middle Atlantic Region (MAR), as a follow-up to the NLM/AAHSL symposium, announced their intention to fund a regional conference about library space planning and solicited applications for their Library Space and Its Impact Conference Award. In response to this solicitation, the George T. Harrell Health Sciences Library (Harrell HSL) applied for and received the award. The announcement proved to be timely: The Harrell HSL was in the process of repurposing 10,000 square feet of library space into the new Penn State Hershey Clinical Simulation Center [2, 3]. The Harrell HSL experience provided a firsthand, real-life example of the issues faced by libraries in a rapidly changing environment. The award funded a one-day library space planning conference, held in April 2009, which was offered to librarians both regionally and nationally.

PLANNING AND IMPLEMENTATION

Health sciences libraries' collections are becoming almost exclusively electronic, and issues surrounding the physical space, services, and librarian roles are emerging as areas of intense interest [4]. Libraries' physical space has been a topic of discussion for

decades [5–9]. The current dialogue focuses on repurposing the libraries' physical space [10, 11]. As libraries convert to digital collections, institutions are viewing library space as an asset that can be repurposed for other functions. In this changing physical landscape of decreasing physical space and budget allocations, librarians are left to grapple with providing quality services, creating state-of-the-art learning environments, and facilitating access to digital and print collections.

Because hospital and academic libraries are affected by loss of physical space, changing services, and new librarian roles, the conference planning group included two hospital library directors and three academic health sciences librarians, all from central Pennsylvania. The Penn State College of Medicine Harrell HSL reference librarian performed the literature review and selected websites. A bibliography (Appendix, online only) was created, shared, discussed, and revised. Following the conference, the *Journal of the Medical Library Association* published a series of articles about issues related to libraries' physical space. These articles were added to the bibliography. The planning group identified emerging library space concerns, services, and roles for librarians. The conference was organized around four major themes that emerged from this discussion:

- models or best practices in libraries' reduction of print collections
- models and best practices in libraries' reduction of space and/or repurposing of existing space
- emerging roles and identities of librarians in the changing physical environment
- models or best practices for adjusting traditional library roles and services

The target audience for the conference included health sciences librarians, both hospital and academic, from Region 1 (Delaware, New Jersey, New York, and Pennsylvania) of the National Network of Libraries of Medicine (NN/LM). The conference was advertised in the NN/LM MAR and nationally using a variety of venues, including the NN/LM MAR email discussion list, MEDLIB-L, Medical Library Association chapters and Hospital Libraries Section, and local consortia. Registration took place online and through a trifold flyer that was mailed to NN/LM MAR full and affiliate members. The registration announcement included information about 5 scholarships of up to \$1,000 each that were awarded to cover the conference fee, hotel, per diem, and travel costs. All 5 scholarships were awarded after a highly competitive application process that chose applicants based on their descriptions of financial need and identification of learning opportunities and expected outcomes.

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A supplemental appendix is available with the online version of this journal.

At registration, attendees received information packets that contained the agenda and library space planning resources, including the bibliography with article citations, web links, and a synopsis of the literature. A website with the conference presentations (including podcasts), goals, outcomes, summaries of key points, and conclusions resides on the NN/LM MAR website [3].

INVITED SPEAKERS

The one-day conference was structured around an opening presentation, followed by panel discussions, breakout sessions, and a closing presentation. Patricia L. Thibodeau, AHIP, FMLA, associate dean of library services, Medical Center Library, Duke University, presented the keynote address, which focused on changes in health sciences libraries in general and changes at the Duke University Medical Center Library in particular. She also discussed implications for librarian roles and the need to transform skill sets.

Two panel discussions addressed the conference themes in a question-and-answer format. Questions were developed from a shared understanding of the issues identified via the literature review. The panel was composed of four librarians, two from hospital libraries and two from academic libraries. The four panelists were: Christine Chastain-Warheit, AHIP, Lewis B. Flinn Medical Library, Christiana Care Health System; Heidi Nickisch Duggan, associate director, Galter Health Sciences Library, Feinberg School of Medicine, Northwestern University; Barbara Iobst, library director, Lehigh Valley Hospital and Health Network; and Cynthia Robinson, AHIP, director, George T. Harrell Health Sciences Library, Pennsylvania State University College of Medicine. Michael Heyd, AHIP, director, Medical Library, Susquehanna Health System, acted as the moderator for both panel discussions.

Architect Julie C. Polletta, AIA, LEED AP, Radelet McCarthy, and architect for the Penn State Hershey College of Medicine library project, presented the closing address, which highlighted her experience renovating and repurposing library space for alternative uses and the implications of the competing agendas of various stakeholders on outcome.

KEYNOTE PRESENTATION

Thibodeau discussed four topics of broad interest that shed light on the future of libraries: (1) environmental scan; (2) world view of libraries' future; (3) roles, skills, and competencies; and (4) Duke University Medical Center Library in five to ten years.

Environmental scan

During this time of difficult economic challenge, health sciences library budgets must contend with rising electronic resource costs and shrinking budgets and resources. Libraries cannot continue to sustain their current collections as their budgets decrease and

the cost of many electronic resources increases by double digits. In an effort to meet the information demands of the Duke University Medical Center, the library has significantly reduced its book budget to augment funding for journals. In a further attempt to alleviate some of the financial burden, the medical center library and the main campus library participate in resource cost sharing, but the cost of resources continues to outpace the budget. Adding to falling revenue and budgetary woes, the library is also undergoing a loss of physical space.

To remain relevant and survive in this environment, libraries must retool services and resources and align them with institutional priorities. This involves altering current behaviors, mindsets, and attitudes to stop doing what has been done and focus on user experiences and expectations, flexible physical space, and emerging technology. If this change is accomplished, libraries will remain the providers of key information in a rich environment of research, education, health care reform, quality patient care, health care management, and consumer health care. As health care professionals experience information overload, librarians must use their ability to select, manage, and disseminate information to meet the growing demands of their institutions. Traditional physical structures such as journal and book stacks will no longer be part of the libraries' future. Thibodeau quoted Edward Deming, saying, "It is not necessary to change. Survival is not mandatory."

Thibodeau also discussed a paper by Thomas Frey of the DaVinci Institute, "The Future of Libraries: Beginning the Great Transformation," on key trends affecting the development of libraries [12]. Frey believes that print books as a medium have a finite life span, and search capabilities will become even more complex and involve experiential facets such as touch, smell, and taste. Library users will have less time, more information needs, and a desire for faster responses from librarians. How users experience digital library resources will change. For example, user access to a full-text electronic journal article might also include related information and interactive multimedia. Thibodeau identified five physician skill sets for which librarians can provide information and services: business savvy (market and competitive research), knowledge of quality-management science (serve on a quality-management committee), interdisciplinary cooperation (assist with institutional strategic plan), understanding of Medicare and managed care, and patient-centered skills (participate in disaster planning).

World view of libraries' future

For a world view of libraries' future, Thibodeau referenced a blog post by Adam Corson-Finnerty, previous library director of development/special initiatives at University of Pennsylvania, "Time to say goodbye" [13]. Corson-Finnerty believes academic libraries are looking at a death spiral and a financial era of doing "less with less." He postulates that if

the old formula is not working, then librarians should reconceptualize the library as an enterprise through removing most book stacks, providing learning environments, and instituting on-demand scanning services. Corson-Finnerty also suggests other roles for library staff, including participating on research teams, creating digital services and tools, becoming information brokers for the institution, training faculty to be information literate, marketing unique collections, and making them accessible.

The TAIGA Group, also mentioned by Thibodeau, monitors the current state of libraries, predicts the future of libraries, and proffers advice to librarians [14]. The group recommends librarians take personal responsibility on a regular basis for professional development. The group goes on to encourage libraries to collect only items requested by clients, keep only the material that is actively used, and abandon hybrid collections in favor of exclusively digital resources. Their prediction for the future is one where after many years of faculty disinterest, the library outreach model will be discarded and library buildings will become campus community centers. Library services will be aligned with administrative support rather than academic services. Library deans and directors will not be librarians but will come from other areas including business and health care. In the near future, public services and technical services will merge into consulting services and all information discoveries will begin with Google.

Roles, skills, and competencies

Looking to the future, Thibodeau identified core skills and knowledge sets that can be applied to many areas in an institution. First, librarians are organizational experts who see not only the big picture, but also the components necessary to reach goals. Librarians are strategists who work within the political environment to build coalitions, collaborate, and align themselves with institutional goals. Thibodeau advised librarians to organize classes, participate in institution-wide complex projects, learn the business terminology and apply it in different situations, and speak out at meetings. Librarians must assist clients with their organizational needs and move away from technical services by utilizing the staff's skills elsewhere. Second, librarians are information disseminators and communicators, and they should promulgate resources, share information and data sets, and participate in institutional teams. They must employ technology to provide better communication and use Web 2.0 to offer faster access to services and resources. Libraries can provide a filtering service by building expertise in distilling information or by selecting tools that offer this. Third, the library is neutral and can act as a communication bridge between departments by placing people in contact with others working on similar projects. Finally, to succeed, librarians must be open to new opportunities and directions; know when to walk away from traditional services; talk with academic vice deans, the information technology

department, and faculty; be involved in data storage and other research needs; and identify institutional gaps that can be filled by librarians. If librarians do not step into these roles, others will. Thibodeau asked Duke University Medical Center Library senior management for their list of future roles for librarians. These are some of the future roles they identified: e-science, technology, advisors, partners/collaborators, evidence-based medicine experts, information filters, embedded informationists, educators integrated into curriculum, continuing medical education, open access, scholarly communication, project orientation, user-focused collection development, designers of self-instruction and on-demand instruction, individuals who customize services, tools for easier access, professionals who push resources where people will find them, influencers of Google rather than fighters of it, and informers of design of systems. Thibodeau stated, "Librarians are more than their collections. Librarians make libraries valuable."

Duke library in five to ten years

In the next five to ten years, all Duke University Medical Center Library decisions about services, resources, staff, and space will be aligned with institutional priorities. Consultation will become the most important service, followed by teaching new technology courses, evidence-based medicine instruction, information management, courses for new faculty, further integration into the curriculum, and participation in continuing medical education responsibilities. Personal librarians will be assigned to all medical students. The library will be involved in faculty projects, instructional design, research labs, and provide a "SWAT team" approach to diagnosing and treating information problems. Current and emerging web technologies will be the primary entry point to all library resources. Technical services will be absorbed by reference and instructional services. Technologies will be integrated throughout the library, not just in the information commons area, and the library will become the home for a faculty center and student gathering space. Students will reconfigure flexible library spaces, and the library will be the most sought after resource on campus.

PANEL DISCUSSIONS

Following the keynote address by Thibodeau, two panel discussions addressed issues related to the conference themes. To allow panelists time to prepare and maintain focus throughout the panel discussion, each received the list of predetermined questions prior to the conference. Listed below are the questions posed to the panelists and a synopsis of their verbal responses:

1. As libraries reduce their print and in some cases electronic collections, is it wise to believe that interlibrary loan (ILL) will fill the gap? Response: ILL will fill the gap for academics if institutional collaboration is sought, journal backfiles are acquired,

and licenses are astutely negotiated for ILL and access. Article pay per view might be an option, but the price tag for some institutions may be cost prohibitive.

2. Given that e-resource management can be equally as cumbersome as or more cumbersome than print materials management, what benefits do you hope to achieve by going electronic? Response: Electronic resources improve access for library clientele but have resulted in pushback from students, faculty, and staff who want continued access to print material. As many libraries convert the majority of their collection to the electronic format, they must brand and market the library website. Marketing library resources so faculty, staff, and students are aware of who provides the information is imperative.

3. How can efficient, effective library spaces be designed that provide the best of both worlds, print and electronic? How have you repurposed existing space? Response: The conversion from print to electronic provides the opportunity to create space for collaborative learning environments, additional computers, instruction labs, and socially interactive spaces, including a faculty business center. Compact shelving can be strategically placed to create a zone for quiet spaces where individuals and groups study. Flexible spaces with movable monitors on carts, laptops, and whiteboards are sought by students. Repurposing library space can be cheaper than creating new library space. Find out what other libraries are doing; research and discuss library knowledge commons projects.

4. What will be the most important services and roles the library and librarians play in your hospital, college, or institution? Response: The library is the place where everyone can share 24/7 computer resources. Many library websites are not device ubiquitous, and as such, libraries need to build sites for mobile technology devices that incorporate point-of-care resources, widget search engines for databases like PubMed Clinical Queries, and instructional videos on YouTube. In addition to computer stations, the library can provide laptops and netbooks for check out at the circulation desk. If libraries align themselves with the goals of the institution, they may be asked by administration to participate in nontraditional roles and thus find themselves to be an invaluable asset. Digitize archives in an effort to preserve the institutional history. Construct an information technology help desk outpost in the library to answer questions. Statistics remain valuable, so perform benchmarking with other similar institutions and keep relevant statistics, such as electronic resources utilization, computer use, and instruction sessions. Evaluate the library experience, embrace new information technologies, and experiment with creative spaces.

5. In scanning the literature, a number of new roles are proposed, such as informationist, instructor, and provider of point-of-care resources for the electronic patient record. What other roles do you see as being important to embrace? Response: Librarians will need to construct an entirely different skill set to support

institutional priorities and an electronic infrastructure. For example, consider volunteering to assist with the medical school accreditation process. Get involved in faculty development programs, participate in new employee orientations, develop web-based resources and instruction, offer consultation services, serve on the patient safety committee, create clinical librarian rounding, and provide lunch-time seminars. Communication is extraordinarily important, and when the opportunity presents itself, librarians must be able to briefly expound on library initiatives. Carefully select point-of-care resources based on need and correlate outcomes with a change in user behavior. Make circulating materials available at library satellite spots, where users work. To demonstrate the priority of "user focus," librarians may be embedded in various places throughout the clinical enterprise. Integrate evidence-based medicine into the medical school curriculum. The National Institutes of Health open access might provide "entree" into research areas as librarians partner with principle investigators in submitting manuscripts to PubMed Central.

6. How do you address the issue of library staff with outdated skill sets? Response: Host in-service training, promote online courses, and pay for courses to equip staff with the skills they need to succeed in a technologically rich environment. Hire staff with specialized skills such as a health care educator, instructional designer, and systems analyst. Cross-train staff, and encourage library faculty to participate in library teams.

BREAKOUT SESSIONS

Breakout sessions took place after the panel discussions to permit further dialogue in small groups seated at tables. The tables were organized by library affiliation (hospital versus academic versus special) and facilitated and recorded by local volunteer librarians. Clinical scenarios were presented, and ideas were exchanged on the four basic conference themes.

Recommendations related to the reduction of print collections include:

- revise collection development policy with greater emphasis on digital resources
- analyze collection and usage
- relate library priorities to the institutional mission
- outsource cataloging or technical services
- purchase only recommended resources
- determine ratio of cost per use for journals
- consider pay per view instead of annual subscriptions
- join consortia and consider cost sharing within the institution to support collections and services
- improve negotiation skills

Recommendations related to repurposing space include:

- identify possible institutional partners (e.g., informatics/information technology, bookstore, simulation lab, food services/cafeteria, specific clinical departments, and administrators)

- perform a needs assessment that includes focus groups, online survey, and a literature review
- consider space reconfigurations to support private study areas, group study areas, collaborative spaces, multimedia lab, computer stations, laptop area, carrels, smart classroom, training and development areas, multipurpose and conference rooms, café, skills lab, service to patients and families, and outreach to the public

Recommendations related to emerging roles for librarians include:

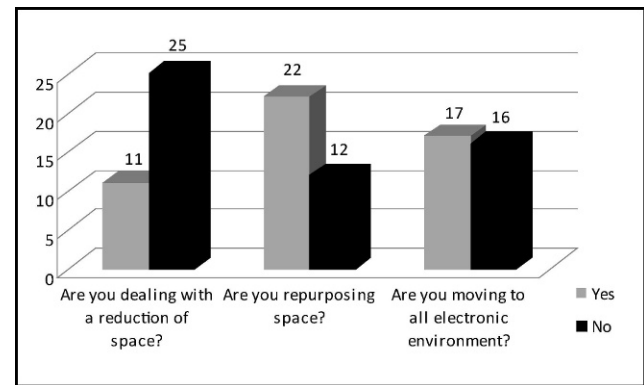
- train staff for more sophisticated and technical roles
- market information management skills of existing staff
- create library liaison programs for students and faculty
- participate in clinical rounding and consider embedding librarians in clinical departments
- market grant-writing skills
- manage or participate in institutional repositories
- offer editorial support and technical writing services
- integrate instruction into the medical school curriculum, residency training, and clinical education

ARCHITECT'S CLOSING REMARKS

In her closing remarks to conference attendees, Polletta discussed the fundamental changes in behavior and expectations for library space and services. Libraries are not in a transitional phase, they are in transformational change. Using the Starbucks archetype that transformed the coffee bean to a branded coffee refreshment and finally to a coffeehouse experience, libraries are similarly moving from a goods-based economy (books), to a service-based economy (reference), to an experience-based economy. Library users value the "library as place" experience. Patrons appreciate repurposing legacy space to interactive zones, collaborative cafés, or knowledge commons. They value the experience of finding information, discussing it, and sharing it.

Polletta provided examples and best practices for library renovations. A planning team must be recruited and must articulate the vision of the project that includes priorities and parameters. A budget must be established and a realistic schedule determined. Stakeholders must be identified, and methods of communication must be put in place. The construction project moves from the feasibility studies, to the schematic design, to bidding, to construction, to occupancy, and finally, to the opening. The Penn State Hershey College of Medicine George T. Harrell HSL project has resulted in a highly successful conversion from a quiet, underused stack area to a vibrant 10,000-square-foot complex of observable simulation labs, debriefing conference rooms, collaborative spaces, galleries, and independent learning areas. At the same time, the remaining library space has been updated with compact shelving, new furniture, additional computers, an increased number of carrels, improved lighting, and additional electrical and

Figure 1
Attendee responses



wired network connections. Polletta encouraged librarians to work with architects to create a comfortable modern environment where students, faculty, and staff come to avail themselves of the technologically robust, resource-rich, social space.

EVALUATION

Printed evaluations were included in the packets and distributed to the 70 conference attendees. Thirty-eight of the 70 attendees returned the questionnaire, for a response rate of 54.3%. Of those who completed the evaluation, 88.9% (32/36) reported their knowledge of the topic was enhanced or greatly enhanced. One hundred percent of the respondents agreed or somewhat agreed that the conference objectives were met (38/38); audience participation was appropriate (38/38); conference content was well organized, timely, and useful (38/38); and conference outcomes were relevant and applicable (38/38). Of those who completed the evaluation, 86.1% (31/36) graded the conference as an "A" and 13.9% (5/36) gave it a "B." Interestingly, 30.6% (11/36) of the respondents were dealing with reduction of existing space; 64.7% (22/34) were repurposing space; and 51.5% (17/33) were moving to an all electronic environment (Figure 1).

CONCLUSION

The successful, one-day library space planning conference generated discussion about reducing the print collection, repurposing space, adjusting library services, and defining emerging roles for librarians. The ongoing conversion from print to electronic resources affords librarians the opportunity to create state-of-the-art flexible collaborative spaces, areas for individual study, archival repositories, and information technology help desks in the library. As librarians evolve to embrace new roles and services, they assume more complex responsibilities. In-depth knowledge of electronic licensing agreements, close alignment with the institutional mission, information technology infrastructure, informatics, information

literacy, e-science, metadata creation, and open access are some of the areas in which librarians can play a proactive role. The future is bright if librarians collaborate to define a new vision, purpose, and mission. As Donald A. B. Lindberg declared in his opening remarks for the "Library as Place" symposium, "There is a role for libraries in the digital age" [1].

ACKNOWLEDGMENTS

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AUTHORS' AFFILIATIONS

Valerie A. Lynn, MLS, MSIT, AHIP, vag3@psu.edu, Head Librarian, Library, Penn State Hazleton, 76 University Drive, Hazleton, PA 18202; **Marie FitzSimmons, MS, AHIP**, muf2@psu.edu, Reference Librarian; **Cynthia K. Robinson, MA, AHIP**, crobinson1@hmc.psu.edu, Director; The George T. Harrell Health Sciences Library, College of Medicine, Penn State Hershey, H127, 500 University Drive, P.O. Box 850, Hershey, PA 17033-0850

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Valerie A. Lynn, MLS, MSIT, AHIP; Marie FitzSimmons, MS, AHIP; Cynthia K. Robinson, MA, AHIP

APPENDIX

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Most librarians can give examples from their own experience in which a library's physical space was either ill suited to the work to be performed or, in some unfortunate cases, a genuine barrier to productivity. In an effort to correct or avoid these situations, planners of library renovations or new construction make pre-design studies of individual workers' tasks and workflow at the work-unit level. In this article, the authors discuss how a pre-design review of library and institutional values influenced the course of a library renovation. The identification of collaboration as the major theme of the library and the institution's strategic directions drove renovation decisions and resulted in a facility that supports and promotes this concept.

Beagle D. The emergent information commons: philosophy, models, and 21st century learning paradigms. J Libr Adm. 2010 50(1):7–26. (Available from: <<http://www.informaworld.com/smpp/ftinterface~db=all~content=a918534669~fulltext=713240930>>. [cited 4 Oct 2010].).

The learning support role of the information commons exhibits emergent properties characteristic of organizational learning theory. The literature review highlights four articles from the United States, one from Germany, and one from Japan to illustrate the issues involved. The philosophy of the commons extension across physical, virtual, and cultural domains and the development of the learning commons as collaboration among multiple learning support units, including libraries, is traced from theoretical origins through real-world examples.

Beam PS, Schimming LM, Krissoff AB, Morgan LK. The changing library: what clinicians need to know. Mount Sinai J Med. 2006 Oct;73(6):857–63. (Available from: <<http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=DetailsSearch&Term=17117311%5BPMID%5D>>. [cited 4 Oct 2010].).

Over the last two decades, changes in technology have allowed academic medical center libraries to bring the world of biomedical information to the physician's computer desktop. Because digital libraries have grown so rapidly and in so many ways, some clinicians may be uncertain about the services and resources that are available to them. This article explains how clinical faculty can best utilize their libraries to support their research and patient care. It addresses some of the most common myths about the "new" medical library, and it highlights innovations in library resources and services that can help physicians to better access, use, and manage medical information.

Beatty S. Information commons, University of Calgary: providing service through collaboration and integration. *J Libr Adm.* 2010;50(2):145–59. (Available from: <<http://www.informaworld.com/smpp/ftinterface~db=all~content=a918684653~fulltext=713240930>>. [cited 4 Oct 2010].).

The Information Commons at the University of Calgary (<http://www.library.ucalgary.ca/infocommons/>) is a 42,000-square-foot facility on the 2nd floor of the main library building. It is an integrated service facility that provides both technical and library assistance. In this article, the author describes the main features of the planning process, the services, and the staffing and highlights the collaborative partnerships that have developed over time. The next steps for the commons will be toward establishing new services, programs, and partnerships in the learning commons in the new Taylor Family Digital Library, set to open in 2010.

Bennett S. The choice for learning. *J Acad Libr.* 2006 Jan;32 (1):3–13. (Available from: <http://www.libraryspaceplanning.com/assets/resource/Choice_for_Learning.pdf>. [cited 4 Oct 2010].).

We are building conventional library space without making the paradigm shift our digital environment requires. The chief obstacles to change lie in our conception of readers as information consumers, our allegiance to library operations as the drivers of library design, and the choice made between foundational and non-foundational views of knowledge. We have the choice of focusing on the delivery of electronic information and abandoning many of our claims on physical space or of designing library space for learning. The latter choice is illustrated by a thought experiment involving the reference desk.

Bowden VM. Health sciences library building projects, 1996–1997 survey. *Bull Med Libr Assoc.* 1998 Jan;86(1):46–56. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=9549012>>. [cited 4 Oct 2010].).

Nine building projects are briefly described, including 4 new libraries, 2 renovations, and 3 combined renovations and additions. The libraries range in size from 657 square feet to 136,832 square feet, with seating varying from 14 to 635. Three hospital libraries and 4 academic health sciences libraries are described in more detail. In each case, an important consideration was providing computer access. Two of the libraries expanded their space for historical collections. Three of the libraries added mobile shelving as a way of storing print materials while providing space for other activities.

Bowden VM. Health sciences library building projects, 1998 survey. *Bull Med Libr Assoc.* 1999 Oct;87(4):415–36. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=10550027>>. [cited 4 Oct 2010].).

Twenty-eight health sciences library building projects are briefly described, including 12 new buildings and 16 additions, remodelings, and renovations. The libraries range in size from 2,144 square feet to 190,000 gross square feet. Twelve libraries are described in detail, including 3 hospital libraries, 1 information center sponsored by 10 institutions, and 8 academic health sciences libraries.

Byrd GD, Shedlock J. The Association of Academic Health Sciences Libraries annual statistics: an exploratory twenty-five-year trend analysis. *J Med Libr Assoc.* 2003 Apr;91(2):186–202. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=12883578>>. [cited 4 Oct 2010].).

This paper presents an exploratory trend analysis of the statistics published over the past twenty-four editions of the *Annual Statistics of Medical School Libraries in the United States and Canada*. The analysis focuses on the small subset of 19 consistently collected data variables (out of 656 variables collected during the history of the survey) to provide a general picture of the growth and changing dimensions of services and resources provided by academic health sciences libraries over those 2½ decades. The paper also analyzes survey response patterns for US and Canadian medical school libraries, as well as osteopathic medical school libraries surveyed since 1987. The trends show steady, but not dramatic, increases in annual means for total volumes collected, expenditures for staff, collections and other operating costs, personnel numbers and salaries, interlibrary lending and borrowing, reference questions, and service hours. However, when controlled for inflation, most categories of expenditure have managed just to stay level. The exceptions have been expenditures for staff development and travel and for collections, which have both outpaced inflation. The fill rate for interlibrary lending requests has remained steady at about 75%, but the mean ratio of items lent to items borrowed has decreased by nearly 50%.

Cain TJ, Rodman RL, Sanfilippo F, Kroll SM. Managing knowledge and technology to foster innovation at the Ohio State University Medical Center. *Acad Med.* 2005 Nov;80(11):1026–31. (Available from: <<http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=DetailsSearch&Term=16249301%5Buid%5D>>. [cited 4 Oct 2010].).

Biomedical knowledge is expanding at an unprecedented rate—one that is unlikely to slow anytime in the future. While the volume and scope of this new knowledge pose significant organizational challenges, they create tremendous opportunities to release and direct its power to the service of significant goals. The authors explain how the Center for Knowledge Management at The Ohio State University Medical Center, which was created during the 2003/04 academic year, is doing just that by integrating numerous resource-intensive, technology-based initiatives—including personnel, services and infrastructure, digital repositories, data sets, mobile computing devices, high-tech patient simulators, computerized testing, and interactive multimedia—in a way that enables the center to provide information tailored to the needs of students, faculty, and staff on the medical center campus and its surrounding health sciences colleges. The authors discuss how discovering, applying, and sharing new knowledge, information assets, and technologies in this way are collaborative processes. These processes create open-ended opportunities for innovation and a roadmap for working toward seamless integration, synergy, and substantial enhancement of the academic medical center’s research, educational, and clinical mission areas.

Campbell J. Changing a cultural icon: the academic library as a virtual destination. *EDUCAUSE Rev.* 2006 Jan/Feb;41(1):16–31. (Available from: <<http://net.educause.edu/ir/library/pdf/ERM0610.pdf>>. [cited 4 Oct 2010].).

Services suggested are: “providing quality learning spaces; creating metadata; offering virtual reference services; teaching information literacy; choosing resources and managing resource licenses; collecting and digitizing archival materials; and maintaining digital repositories.”

Clemmons NW, Clemmons SL. Five years later: medical reference in the 21st century. *Med Ref Serv Q.* 2005 Spring;24(1):1–18. (Available from: <<http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=DetailsSearch&Term=15760829%5Buid%5D>>. [cited 4 Oct 2010].).

In 2000, three groups of health sciences librarians—new library school graduates, those currently working at a medical library, and medical library directors—were interviewed about the status and future of medical reference librarianship. Five years later, this follow-up article summarizes the responses from many of the same librarians about the biggest changes, newest trends, evolving roles, challenges, and hopes for the future.

Freiburger G. A “white elephant” in the library: a case study on loss of space from the Arizona Health Sciences Library at the University of Arizona. *J Med Libr Assoc.* 2010 Jan;98(1):29–31. DOI: 10.3163/1536-5050.98.1.011. (Available from: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801975/?tool=pubmed>>. [cited 4 Oct 2010].).

The Arizona Health Sciences Library is housed in a 4-story building that serves 4 University of Arizona colleges in Tucson. In October 2005, the dean of the college of medicine informed the library director that one floor of the library had to be converted to open classroom space by June 2006. Library staff planned and participated in the conversion of the space. Twenty thousand seven hundred square feet of library space (34% of public space in the building) was used briefly for large classes but is now rarely used. The space is now largely open and contains a variety of moveable seating and tables not suited for quiet study.

Funk CJ. Evolving roles of life and health sciences librarians for the twenty-first century. *Bull Med Libr Assoc.* 1998 Jul;86(3):380–4. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=9681173>>. [cited 4 Oct 2010].).

The twenty-first century will provide exciting challenges for life and health sciences librarians that will force us to redefine our position in the world of information. This rapidly changing environment influences the profession in a variety of ways including whom we serve and through what service, how and where we practice librarianship, and even what the very composition of the profession itself is. We must look at the changes in society and make the appropriate reciprocal changes in how we educate future librarians, how we market the profession, and how we develop the profession as a whole. We, as life and health sciences librarians, need to meet these challenges head on in order to continue the evolution of profession well into the twenty-first century.

Gray SA, Brower S, Munger H, Start A, White P. Redefining reference in an academic health sciences library: planning for change. *Med Ref Serv Q.* Fall;20(3):1–11. (Available from: <<http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=DetailsSearch&Term=11757391%5Buid%5D>>. [cited 4 Oct 2010].).

Deciding that changes in the pattern of questions at the reference desk required focused consideration, the reference librarians at the Health Sciences Library of the University at Buffalo held a planning retreat. Technology-induced changes in the information-seeking behavior and reference needs of the library’s clientele caused a reassessment of how these needs could best be met and what is the best use of librarians’ time. The librarians considered current trends in reference in other academic libraries, the specific needs of the clientele of the health sciences library, and the strengths and expertise of the library staff. The results of this structured discussion produced ideas for redefining reference to provide customized services for the clients and environment.

Haas LM, Stillwell A. The library–information technology partnership: challenges and solutions. *J Libr Adm.* 2010;50(1):51–66. (Available from: <<http://www.informaworld.com/smpp/ftinterface~db=all~content=a918536165~fulltext=713240930>>. [cited 4 Oct 2010].).

The Klarchek Information Commons is collaboration between Loyola University Libraries and Information Technology Services (ITS). The information commons has been open almost two years and was in the planning stages for almost two years before its grand opening January 2008. During that period, the library and ITS learned to work together to successfully operate this new service hub on campus. In this article, the authors look at problems faced by the two groups and how they resolved problems and faced the challenges inherent in running a large, complex, service-oriented organization.

Halbert M. The information commons: a platform for innovation. *J Libr Adm.* 2010;50(1):67–74. (Available from: <<http://www.informaworld.com/smpp/ftinterface~db=all~content=a918534587~fulltext=713240930>>. [cited 4 Oct 2010].).

Information commons have successfully served as platforms for innovations in facilities and service programs in libraries over the past two decades. In this article, the author makes a series of points concerning the significance and meaning of the information commons as a trend, including the strength of the concept as a bridge between the past and future of libraries, limitations in perceptions concerning information commons, and ways that the trend may play out in the future.

Haynes C. Integrating with users is one thing, but living with them? a case study on loss of space from the Medical Center Library, University of California, San Diego. *J Med Libr Assoc.* 2010 Jan;98(1):32–5. DOI: 10.3163/1536-5050.98.1.012. (Available from: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801983/?tool=pubmed>>. [cited 4 Oct 2010].).

The University of California, San Diego (UCSD), Medical Center is the primary hospital for the UCSD School of Medicine. The UCSD Medical Center Library (MCL), a branch of the campus’s biomedical library, is located on the medical center campus. In 2007, the medical center administration made a request to MCL for space in its facility to relocate pharmacy administration from the hospital tower. The university librarian brought together a team of library managers to deliberate and develop a proposal, which ultimately accommodated the medical center’s request and enhanced some of MCL’s public services.

Hill T. Fear, concern, fate, and hope: survival of hospital libraries. *J Med Libr Assoc.* 2007 Oct;95(4):371–3. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=17971883>>. [cited 4 Oct 2010].).

“Decision makers are asking, ‘Why have hospital libraries?’ ... [L]ibraries must communicate ... the library’s return on investment demonstrate [that] hospital libraries contribute to excellent clinical care.”

Klein MS, Ross F. End-user searching: impetus for an expanding information management and technology role for the hospital librarian. *Bull Med Libr Assoc.* 1997 Jul;85(3):260–8. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=9285126>>. [cited 4 Oct 2010].).

Using the results of the 1993 Medical Library Association Hospital Libraries Section survey of hospital-based, end-user search services, this article describes how end-user search

services can become an impetus for an expanded information management and technology role for the hospital librarian. An end-user services implementation plan is presented that focuses on software, hardware, finances, policies, staff allocations and responsibilities, educational program design, and program evaluation. Possibilities for extending end-user search services into information technology and informatics, specialized end-user search systems, and Internet access are described. Future opportunities are identified for expanding the hospital librarian's role in the face of changing health care management, advances in information technology, and increasing end-user expectations.

Koelker JK, Bouchard K, Lutz J. Development of the information commons at TCU: a case study. *J Libr Adm.* 2010;50(2):95–115. (Available from: <<http://www.informaworld.com/smpp/content~content=a918685013~db=all~jumptype=rss>>. [cited 4 Oct 2010].).

This article describes the development of an information commons (IC) at the Mary Couets Burnett Library at Texas Christian University. The two major administrative units in the partnership are the library and the campus information technology department. The article includes information about the initial process of developing an IC, the design of facilities supporting delivery of IC services, the staffing by employees and students, and the challenges faced in the development of the IC.

Kronenfeld MR. Trends in academic health sciences libraries and their emergence as the “knowledge nexus” for their academic health centers. *J Med Libr Assoc.* 2005 Jan;93(1):32–9. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=15685271>>. [cited 4 Oct 2010].).

Objectives: The objective of this study was to identify trends in academic health sciences libraries (AHSLs) as they adapt to the shift from a print knowledgebase to an increasingly digital knowledgebase. This research was funded by the 2003 David A. Kronick Traveling Fellowship. **Methods:** The author spent a day and a half interviewing professional staff at each library. The questionnaire used was sent to the directors of each library in advance of the visit, and the directors picked the staff to be interviewed and set up the schedule. **Results:** Seven significant trends were identified. These trends are part of the shift of AHSLs from being facility and print oriented, with a primary focus on their role as repositories of a print-based knowledgebase, to a new focus on their role as the center or “nexus” for the organization, access, and use of an increasingly digital-based knowledgebase. **Conclusion:** This paper calls for a national effort to develop a new model or structure for health sciences libraries to more effectively respond to the challenges of access and use of a digital knowledgebase, much the same way the National Library of Medicine did in the 1960s and 1970s in developing and implementing the National Network of Libraries of Medicine. The paper then concludes with some examples or ideas for research to assist in this process.

Lee TH. Quiet in the library. *N Engl J Med.* 2005 Mar 17;352(11):1068. DOI: 10.1056/NEJMp048360. (Available from: <<http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=DetailsSearch&Term=15784662%5Buid%5D>>. [cited 4 Oct 2010].).

“The library at my medical school has never been a better place to work. The journals are shelved in perfect order. The copying machines have no lines. Quiet, comfortable places in which to read are plentiful. The reason: hardly anyone goes there anymore.”

Leeder C. Surveying the commons: current implementation of information commons web sites. *J Acad Libr.* 2009 Nov;35(6):533–47. (Available from: <http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6W50-4XBF8SS-1&_user=10&_coverDate=11%2F30%2F2009&_rdoc=1&_fmt=high&_orig=search&_origin=search&_sort=d&_docanchor=&view=c&_searchStrId=1484334101&_rerunOrigin=google&_acct=C000050221&_vers>. [cited 4 Oct 2010].).

This study assessed the content of seventy-two academic library information commons (IC) websites using content analysis, quantitative assessment, and qualitative surveys of site administrators to analyze current implementation by the academic library community. Results show that IC websites vary widely in content, design, and functionality, with few established standards. Recommendations for developing a consistent set of standards are presented.

Lewis DW. A strategy for academic libraries in the first quarter of the 21st century. *Coll Res Libr.* 2007 Sep;68(5):418–34. (Available from: <<http://www.ala.org/ala/mgrps/divs/acrl/publications/crljournal/2007/sep/Lewis07.pdf>>. [cited 4 Oct 2010].).

The wide application of digital technologies to scholarly communications has disrupted the model of academic library service that has been in place for the past century. Given the new Internet tools and the explosive growth of digital content available on the web, it is now not entirely clear what an academic library should be. This article is an attempt to provide a strategy for academic libraries in what is left of the first quarter of the twenty-first century. There are five components of the model: (1) complete the migration from print to electronic collections; (2) retire legacy print collections; (3) redevelop library space; (4) reposition library and information tools, resources, and expertise; and (5) migrate the focus of collections from purchasing materials to curating content. Each of the components of the strategy and their interactions will be considered. It is hoped that the result will provide a useful roadmap for academic libraries and the campuses they serve.

Lewis M. The University of Sheffield Library information commons: a case study. *J Libr Adm.* 2010 Feb;50(2):161–78. (Available from: <<http://www.informaworld.com/smpp/content~content=a918685344~db=all~jumptype=rss>>. [cited 4 Oct 2010].).

This article describes the new information commons building at the University of Sheffield, which opened in 2007 as a joint project between the university library and the university's information technology services department. The building is described from architectural and operational viewpoints and the planning processes that led to its construction are outlined. The impact of the information commons is assessed, and some potential lessons for others considering similar projects are explored.

Lindberg DAB, Humphreys BL. 2015—the future of medical libraries. *N Engl J Med.* 2005 Mar 17;352(11):1067–70. (Available from: <<http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=DetailsSearch&Term=15784661%5Buid%5D>>. [cited 4 Oct 2010].).

“Multimedia ‘digital libraries’ feature rich interconnections among genetics research data, aggregated clinical and public health data, published literature, and high-quality health information in many languages. ... Digital libraries derive much of their value from the selection, organization, analysis, and linking performed by highly skilled human beings aided by increasingly advanced software systems—in other words, digital libraries still need librarians.”

Lippincott JK. Information commons: meeting millennials' needs. *J Libr Adm.* 2010;50(1):27–37. (Available from: <<http://www.informaworld.com/smpp/ftinterface~db=all~content=a918535669~fulltext=713240930>>. [cited 4 Oct 2010].).

Information commons are popular with millennial (also called net generation) students, who often work in groups, use technology avidly, and combine their academic and social lives. Enhancing the configuration of services for the information commons can assist in leveraging the value of the available content, hardware, software, and physical setting to support learning and academic programs. Understanding millennial student's lifestyle is key to developing a robust service program to engage and support them.

Ludwig L. Health sciences libraries building survey, 1999–2009. *J Med Libr Assoc.* 2010 Apr;98(2):105–34. DOI: 10.3163/1536-5050.98.2.004. (Available from: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2859257/?tool=pmcentrez>>. [cited 4 Oct 2010].).

Objective: A survey was conducted of health sciences libraries to obtain information about newer buildings, additions, remodeling, and renovations. Method: An online survey was developed, and announcements of survey availability posted to three major email discussion lists: Medical Library Association (MLA), Association of Academic Health Sciences Libraries (AAHSL), and MEDLIB-L. Previous discussions of library building projects on email discussion lists, a literature review, personal communications, and the author's consulting experiences identified additional projects. Results: Seventy-eight health sciences library building projects at seventy-three institutions are reported. Twenty-two are newer facilities, built within the last ten years; two are space expansions; forty-five are renovation projects; and nine are combinations of new and renovated space. Six institutions report multiple or ongoing renovation projects during the last ten years. Conclusions: The survey results confirm a continuing migration from print-based to digitally based collections and reveal trends in library space design. Some health sciences libraries report loss of space as they move toward creating space for "community" building. Libraries are becoming more proactive in using or retooling space for concentration, collaboration, contemplation, communication, and socialization. All are moving toward a clearer operational vision of the library as the institution's information nexus and not merely as a physical location with print collections.

Ludwig LJ, Shedlock J, Watson L, Dahlen K, Jenkins C. Designing a library: everyone on the same page? *Bull Med Libr Assoc.* 2001 Apr;89(2):204–11. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=11337952>>. [cited 4 Oct 2010].).

Excerpts are presented from an interview by the *Bulletin of the Medical Library Association* buildings projects editor with four academic health sciences library directors: one who had recently completed a major library building project and three who were involved in various stages of new building projects. They share their experiences planning for and implementing library building programs. The interview explores driving forces leading to new library buildings, identifies who should be involved, recalls the most difficult and exciting moments of the building projects, relates what they wished they had known before starting the project, assesses the impact of new library facilities on clients and services, reviews what they would change, and describes forces impacting libraries today and attributes of the twenty-first century library.

Ludwig L, Starr S. Library as place: results of a delphi study. *J Med Libr Assoc.* 2005 Jul;93(3):315–26. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=16059421>>. [cited 4 Oct 2010].).

Objective: An expert consensus on the future of the library as place was developed to assist health sciences librarians in designing new library spaces. Method: An expert panel of health sciences librarians, building consultants, architects, and information technologists was asked to reflect on the likelihood, desirability, timing, and impact on building design of more than seventy possible changes in the use of library space. Results: An expert consensus predicted that the roles librarians play and the way libraries are used will substantially change. These changes come in response to changes in technology, scholarly communication, learning environments, and the health care economy. Conclusions: How health sciences library space is used will be far less consistent by 2015, as space becomes more tailored to institutional needs. However, the manner in which health sciences libraries develop and deliver services and collections will drastically change in the next decade. Libraries will continue to exist and will provide support for knowledge management and clinical trials, provide access to digital materials, and play a host of other roles that will enable libraries to emerge as institutional change agents.

Lyman P. What is a digital library? technology, intellectual property, and the public interest. *Daedalus.* 1996;125(4):1–33.

Lyman's intellectual overview of digital information includes a discussion of the politics, governance, social context, and accessibility of cyberspace.

McKinnell I. Challenges for the next 25 years. *Health Info Libr J.* 2008 Dec;25(suppl 1):47–8. (Available from: <<http://www.ncbi.nlm.nih.gov/pubmed?term=19090848%5Buid%5D&cmd=DetailsSearch>>. [cited 4 Oct 2010].).

McKinnell concludes that health libraries must participate in clinical decision making, must integrate with other digital systems such as patient electronic records, must support open access, and apply service-oriented architecture.

Moore ME, Garrison S, Hayes B, McLendon W. Reinventing a health sciences digital library—organizational impact. *Med Ref Serv Q.* 2003;22(4):75–82. (Available from: <<http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=DetailsSearch&Term=14711051%5Buid%5D>>. [cited 4 Oct 2010].).

What is the organizational impact of becoming a digital library, as well as a physical entity with facilities and collections? Is the digital library an add-on or an integrated component of the overall library package? Librarians see sweeping environmental and technological changes. The staff members feel exhilarated and challenged by the pressures to adapt quickly and effectively. Librarians recognize that a web presence, like other technology components, must be continuously enhanced and regularly re-engineered. The Health Sciences Library, University of North Carolina at Chapel Hill, is reinventing its digital presence to better meet the needs of the community. This paper provides a case study focusing on major changes in planning processes, organizational structure, staffing, budgeting, training, communications, and operations at the health sciences library.

Nelson PP. Current issues in the design of academic health sciences libraries: findings from three recent facility projects. *J Med Libr Assoc.* 2003 Jul;91(3):347–51. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=12883559>>. [cited 4 Oct 2010].).

Planning a new health sciences library at the beginning of the twenty-first century is a tremendous challenge. Technology has radically changed the way libraries function in an academic environment and the services they provide. Some individuals question whether the library as place will continue to exist as information becomes increasingly available electronically. To understand how libraries resolve programming and building design issues, visits were made to three academic health sciences libraries that have had significant renovation or completed new construction. The gathered information will be valuable for planning a new library for the University of Colorado Health Sciences Center and may assist other health sciences librarians as they plan future library buildings.

Persily GL, Butter KA. Reinvisioning and redesigning “a library for the fifteenth through twenty-first centuries”: a case study on loss of space from the Library and Center for Knowledge Management, University of California, San Francisco. *J Med Libr Assoc.* 2010 Jan;98(1):44–8. DOI: 10.3163/1536-5050.98.1.015. (Available from: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801976/?tool=pubmed>>. [cited 4 Oct 2010].).

The University of California, San Francisco, is an academic health sciences campus that is part of a state public university system. Space is very limited at this urban campus, and the library building’s 90,000 square feet represent extremely valuable real estate. A planning process spanning several years initially proposed creating new teaching space utilizing 10,000 square feet of the library. A collaborative, campus-wide planning process eventually resulted in the design of a new teaching and learning center that integrates clinical skills, simulation, and technology-enhanced education facilities on 1 entire floor of the building (21,000 square feet). The planning process resulted in a project that serves the entire campus and strengthens the library’s role in the education mission. The full impact of the project is yet unknown as construction is not complete.

Shedlock J, Ross F. A library for the twenty-first century: the Galter Health Sciences Library’s renovation and expansion project. *Bull Med Libr Assoc.* 1997 Apr;85(2):176–86. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=9160155>>. [cited 4 Oct 2010].).

A renovation and expansion project at the Galter Health Sciences Library of Northwestern University strikes a balance between traditional and future libraries, library ambiance and high technology, old and new. When guided by a vision of future building use, renovation projects can succeed in meeting many institutional goals as a viable alternative to new library buildings. Issues addressed include planning considerations, architectural history, library design, building features, information technology considerations, and ideal library space design when new construction is not possible.

Shuhuai R, Xingjun S, Haiqing L, Jialin C. From information commons to knowledge commons: building a collaborative knowledge sharing environment for innovative communities.

Electronic Libr. 2009;27(2):247–57. (Available from: <<http://www.emeraldinsight.com/journals.htm?articleid=1784826&show=abstract>>. [cited 4 Oct 2010].).

Purpose: Based on the information commons service model, the aim of this article is to propose a new model for knowledge commons. It seeks to define the conceptual model and constructing framework of knowledge commons, which aim for a collaborative knowledge-sharing environment to support the innovative community activities of a university library. **Design/Methodology/Approach:** By analyzing the innovation activities of communities and infusing theories of knowledge management, collaboration, and Library 2.0, the knowledge commons conceptual model is brought forward to improve communication, collaboration, sharing, and conversation. **Findings:** Because the innovative community is interdisciplinary and cross-campus, the scattered research team and study group require a library to extend services to a logical system, while the virtual layer makes this spatially decentralized and logically centralized system a reality. The core elements—namely information technology, organization, management, culture, and spirit—make up the supporting layer, of which trust and collaborative culture for innovation are important. **Practical Implications:** Research work and practice of information commons and Library 2.0 have aroused a new round of the library service movement, while the knowledge commons conceptual model would provide steering for a knowledge-sharing environment. **Originality/Value:** In this paper, the new model is based on information commons and assimilating the theories of knowledge management, collaboration, and Library 2.0, intended to integrate digital library, physical resource, virtual resource, and human resource into a whole. It is of great importance for the library to serve education and scientific research well.

Steiner HM, Holley RP. The past, present, and possibilities of commons in the academic library.

Ref Libr. 2009;50(4):309–32. (Available from: <<http://www.informaworld.com/smpp/ftinterface~db=all~content=a915636281~fulltext=713240930>>. [cited 4 Oct 2010].).

Within the past ten years, commons have become increasingly prominent in academic libraries. Commons evolved out of the “library as a place” movement and stem from the digital revolution, increased emphasis on collaborative learning, and changing student habits and needs. The three levels of commons are information commons, learning commons, and the emerging virtual commons. Libraries implementing commons must consider the impact on reference services and staffing and be prepared for higher than anticipated use. Libraries should use both quantitative and qualitative assessment methods. Commons can revitalize the library by giving it a key role in reaching university strategic goals.

Stoffle CJ, Cuillier C. Student-centered service and support: a case study of the University of Arizona Libraries’ information commons. J Libr Adm. 2010;50(2):117–34. (Available from:

<<http://www.informaworld.com/smpp/ftinterface~db=all~content=a918685302~fulltext=713240930>>. [cited 4 Oct 2010].).

The university libraries’ information commons opened its doors on January 2, 2002. Its mission is to create an inviting out-of-classroom environment for learning, growth, and enrichment through student-focused research assistance, outreach to all students, and innovative instructional services. This case study details the history of the information

commons at the University of Arizona, planning strategy, available services and high-tech equipment, partnerships with other campus units, staffing, lessons learned, challenges, policies, and assessment mechanisms.

Thibodeau PL. When the library is located in prime real estate: a case study on the loss of space from the Duke University Medical Center Library and Archives. *J Med Libr Assoc.* 2010 Jan;98(1):25–8. DOI: 10.3163/1536-5050.98.1.010. (Available from: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801964/?tool=pubmed>>. [cited 4 Oct 2010].).

The Duke University Medical Center Library and Archives is located in the heart of the Duke Medicine campus, surrounded by Duke Hospital, ambulatory clinics, and numerous research facilities. Its location is considered prime real estate, given its adjacency to patient care, research, and educational activities. In 2005, the Duke University Library Space Planning Committee had recommended creating a learning center in the library that would support a variety of educational activities. However, the health system needed to convert the library's top floor into office space to make way for expansion of the hospital and cancer center. The library had only 5 months to plan the storage and consolidation of its journal and book collections, while working with the facilities design office and architect on the replacement of key user spaces on the top floor. Library staff worked together to develop plans for storing, weeding, and consolidating the collections and provided input into renovation plans for users spaces on its mezzanine level. The library lost 15,238 square feet (29%) of its net assignable square footage and a total of 16,897 (30%) gross square feet. This included 50% of the total space allotted to collections and more than 15% of user space. The top-floor space now houses offices for Duke Medicine oncology faculty and staff. By storing a large portion of its collection off-site, the library was able to remove more stacks on the remaining stack level and convert them to user spaces, a long-term goal for the library. Additional space on the mezzanine level had to be converted to replace lost study and conference room spaces. While this project did not match the recommended space plans for the library, it underscored the need for the library to think creatively about the future of its facility and to work toward a more cohesive master plan.

Tobia RC, Feldman JD. Making lemonade from lemons: a case study on loss of space at the Dolph Briscoe, Jr. Library, University of Texas Health Science Center at San Antonio. *J Med Libr Assoc.* 2010 Jan;98(1):36–9. DOI: 10.3163/1536-5050.98.1.013. (Available from: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801967/?tool=pubmed>>. [cited 4 Oct 2010].).

The setting for this case study is the Dolph Briscoe, Jr. Library, University of Texas Health Science Center at San Antonio, a health sciences campus with medical, dental, nursing, health professions, and graduate schools. During 2008–2009, major renovations to the library building were completed including office space for a faculty development department, multipurpose classrooms, a 24/7 study area, study rooms, library staff office space, and an information commons. The impetus for changes to the library building was the decreasing need to house collections in an increasingly electronic environment, need for office space for other departments, and growth of the student body. About 40% of the library building was remodeled or repurposed, with a loss of approximately 25% of the library's original space. Campus administration proposed changes to the library building, and librarians worked with administration, architects, and construction managers to seek renovation solutions that meshed with the library's educational mission.

Tooev MJ. Renovated, repurposed, and still “one sweet library” a case study on loss of space from the Health Sciences and Human Services Library, University of Maryland, Baltimore. J Med Libr Assoc. 2010 Jan;98(1):40–3. DOI: 10.3163/1536-5050.98.1.014. (Available from: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801984/?tool=pubmed>>. [cited 4 Oct 2010].).

Setting: The Health Sciences and Human Services Library, University of Maryland, Baltimore, is located in an urban environment on the west side of downtown Baltimore. Founded in 1813, the library opened its current building in 1998 and is one of the largest health sciences libraries in the United States, with 6 floors and over 180,000 gross square and 118,000 net assignable square feet (NASF). Project: The initial discussions in late 2005 involved moving campus offices into the library. Almost immediately, it was recognized that a much larger renovation was needed due to the scope of the work. The vice president for academic affairs, the library executive director, and campus planners agreed that if the renovation was done thoughtfully, multiple needs could be met, including new office spaces, better user spaces, and synergy with the new campus center being built next door. Planning: The planning, design, and construction process was multifaceted and on a fast track. Although the final piece of the renovation was completed in June 2009, the majority of the planning, design, and construction took place between March 2006 and June 2008. All tenants were involved with office design. Library staff were involved in designing the public spaces and planning the strategy for weeding and shifting. Outcomes: Approximately 8,000 NASF was reallocated to new office space from shelving space, amounting to approximately 6.7% of the building NASF and approximately 10.6% of the public space in the building. The majority of new offices in the building report to the same vice president and are student focused and service oriented, with similar missions to that of the library, resulting in a very harmonious cohabitation. Additional units with these missions and reporting structure are located in the new campus center, creating a synergy between the 2 buildings.

Weise F. Being there: the library as place. J Med Libr Assoc. 2004 Jan;92(1):6–13. (Available from: <<http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=14762459>>. [cited 4 Oct 2010].).

The value of the library as place is examined in this Janet Doe Lecture. The lecture, which is intended to focus on the history or philosophy of health sciences librarianship, presents an overview of the library as a place in society from ancient times to the present. The impact of information technology and changes in the methods of scholarly publication from print to digital are addressed as well as the role of the library as the repository of the written historical record of cultures. Functions and services of libraries are discussed in light of the physical library facility of the future. Finally, librarians are asked to remember the enduring values of librarianship in planning libraries of the future.

Whitchurch MJ. Planning an information commons. J Libr Adm. 2010;50(1):39–50. (Available from: <<http://www.informaworld.com/smpp/ftinterface~db=all~content=a918537192~fulltext=713240930>>. [cited 4 Oct 2010].).

Wood EH. Health sciences librarianship in the new millennium. *Med Ref Serv Q.* 2000 Spring;19(1):1–8. (Available from: <<http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=DetailsSearch&Term=11299653%5Buid%5D>>. [cited 4 Oct 2010].).

Is the millennium really a critical point in time or just part of a continuum, in which health sciences librarians have always been innovators? Librarians have always had special knowledge that enabled them to identify, collect, organize, and distribute information. They have always embraced new technology, from the printing press to the Internet. As a profession, we must continue to promote how our particular skills can reinforce our role in the health care field.

Websites

Council on Library and Information Resources. Library as place: rethinking roles, rethinking space [Internet]. The Council; 2005 [cited 4 Oct 2010]. <<http://www.clir.org/pubs/reports/pub129/pub129.pdf>>.

Contents: “The Library as Place: Changes in Learning Patterns, Collections, Technology, and Use” by Geoffrey T. Freeman; “Righting the Balance” by Scott Bennett; “From the Ashes of Alexandria: What’s Happening in the College Library?” by Sam Demas; “The Ultimate Internet Café: Reflections of a Practicing Digital Humanist about Designing a Future for the Research Library in the Digital Age” by Bernard Frischer; “Space Designed for Lifelong Learning: The Dr. Martin Luther King Jr., Joint-Use Library” by Christina A. Peterson; “The Johns Hopkins Welch Medical Library as Base: Information Professionals Working in Library User Environments” by Kathleen Burr Oliver

Frey T. The future of libraries: beginning the great transformation [Internet]. DaVinci Institute; 1997–2010 [cited 19 Mar 2010]. <<http://www.davinciinstitute.com/page.php?ID=120>>.

Lippincott J. Chapter 7: linking information commons to learning [Internet]. In: Oblinger DG, ed. Learning spaces. EDUCAUSE [cited 4 Oct 2010]. <<http://www.educause.edu/learningspacesch7>>.

Taiga 4: provocative statements: community of AULs and ADs challenging the traditional boundaries in libraries: trends and recommendations presented at ALA 2/20/09 [Internet]. Taiga Forum; Feb 2009 [cited 1 Apr 2010]. <<http://www.taigaforum.org/documents/Taiga4StatementsAfter.pdf>>.

Toivonen L, Laskujärvi M. Changing physical library space: planning and design of new academic library [Internet]. Presented at: 11th European Conference of Medical and Health Libraries; Helsinki, Finland; 28 Jun 2008 [cited 4 Oct 2010]. <<http://www.slideshare.net/tertiolainen/changing-physical-library-space-planning-and-design-of-new-academic-library-495899>>.

PowerPoint presentation about how changes in technology (more electronic resources) and changes in pedagogy (more collaborative process) are the causes for physical changes in libraries. Libraries should include conference rooms, seminar rooms, and computer labs. Survey results indicated quiet study space is important. Premises are less important than customer service.

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