

Digital Libraries Need Digital Organization: Identifying, Defining, and Creating New Academic Library Management Structures

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Introduction

This paper explores the impact of emergent digital technologies and resources on the organizational structures of academic libraries. As the number of digital resources created, collected and made accessible increases, the need for effective management of these operations becomes more important as usage expands. This dynamic situation has significant implications for how libraries staff to better serve faculty and students. The paper will provide a brief historical focus on library technology development and then consider the theoretical foundation of digital library organization. The current state of resource allocation, digital services and staffing patterns will be examined and new models of organization will be discussed.

Brief Look at Academic Library Technology History

Academic libraries started to cope with the digital world when Henriette Avram and the Library of Congress developed the MARC record in the 1960s. Later, the onset of computer usage brought efficiencies to repetitive clerical tasks in circulation, acquisitions, cataloging and serials, enabling us to free up staff to engage in service-like endeavors. The initial academic

library computer systems were developed at research libraries. By the mid-1970's OCLC developed the union catalog and cataloging backlogs disappeared. More recently, the availability of digital content has transformed how we do business; now every academic library has a web site to guide patrons to the wealth of resources and services. How have library professionals envisaged the need for organizing the library as a primarily digital facility—content, services and staff?

In 1994, Karen Drabenstott, through the auspices of the Council on Library Resources, authored a report, really a comprehensive analytical literature review, on the library of the future reflected in the writings of many library leaders at that time. Back then many librarians grappled with definitions and names for the library of the future:

“[T]he library of the future will be an on-line network of librarians-generalists and specialists. Each will be expert in catalog indexes and searching connected and linked to massive computer databases...the virtual library will be without walls, but with instantaneous electronic connections to libraries, individuals, institutions, and commercial firms worldwide

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providing access to a reservoir of intellectual resources encompassing not only formal libraries, but also databases, electronic texts, multimedia objects, and potentially millions of interacting human minds.”¹

The difference today is that we now have the technology in place to truly build a digital library environment. The challenge is to design, develop and refine the services, staffing and content that will make the resources and the organization fully functional.

Some eight years ago, I engaged the CEO of a major online library system vendor in a discussion about the future evolution of digital library systems. The executive had many years of experience in providing higher education with computer software systems and felt academic libraries were rather slow to adapt new digital technologies into their organizational workflow, stating that museums were much further ahead in realizing the advantages of digital resources for their patrons.

In the ensuing decade comparative statistics from academic libraries have shown a surge in the number of electronic databases subscribed to and the proportion of the budget allocated to creating and purchasing digital content.

The digital library era has arrived. The shift to electronic access for current information needs has been swift. Within the next five years, I predict the average academic library collection profile will provide access to at least 80% digital content and increasingly less than 20% print resources. In many cases, budget allocations have already reached the 60/40 threshold in favor of purchasing or accessing electronic resources. Several institutions already spend over 75% of their materials funds for electronic resources. ARL statistics show that in the 2006-07 budget year the average research library spent 47.7% of its budget on electronic resources, up from just 14.8% in 2000-01. The average private comprehensive library spent 42% of its acquisitions budget on electronic resources. An interesting point of comparison between these two sectors when examining the expenditure levels and the ability to leverage networking opportunities is the actual number of e-journal subscriptions your acquisitions money buys access to. The ARL libraries median average of 28,006 subscriptions almost exactly matches the private comprehensives median average of 27,910. Yet their overall total acquisitions budgets

scale very differently of course: the ARL average is ten times larger, \$10.8 million to the comprehensives average of only \$1.05 million.² Will library organizational structures adapt effectively with this significant shift in resource allocation?

Digital Library Theory

From the organizational point of view, academic libraries have long been divided into three main areas of work: administration, public services and technical services. The CLR report briefly discussed organizational structures and the literature proposed different models emerging: staff will be deployed in service teams that cut across materials handling, access systems and delivery service lines...library organizations will be more flexible and innovative, networked, flatter and more centralized.³

Dr. Christine Borgman, a leading information studies theorist, states that the concept of digital library organization needs to encompass the full life cycle of creating, seeking, using, preserving and disposing of information resources.⁴

Daniel Atkins, the founding dean of the School of Information at the University of Michigan, delineated four basic potentials that the digital library offers:

1. reduces constraints of time and place
2. supports the creation and use of more dynamic, integrated formats for representing data, information and knowledge
3. can support new forms of group collaboration in the creation and use of information and develop new communities of practice
4. enables customization and personalization of information, including assistance with management of information overload

Let's look at two of the salient points Dr. Atkins makes in 1993: digital organizations can support new forms of group collaboration and new communities of practice, and assist in the management of information overload.⁵ Have academic libraries taken full advantage of these potentials yet? Have organizational structures emerged to facilitate improvements in collaboration among communities of scholars and students? Have libraries been better able to manage information overload?

As a library school student in 1973-4, the most discussed article in several courses happened to be a Vannevar Bush *Atlantic Monthly* contribution, which

described a theoretical machine called a 'memex.' The memex functioned as a storage and retrieval device using microfilm. Its goal was to extend human knowledge through association by making links between documents. This system, although not digital, seems remarkably similar to what hypertext can offer. It also has clear associations with Google and other search engines. Interestingly, when I returned to my library school alma mater in 1996 to take a doctoral seminar on the concept of the digital library, I found that the predominate discussion among the doctoral students and professor leading the seminar was the service demands a digital library would entail, and the methods people would use to connect and access its resources.⁶

Academic Library Organizational Models

Henry Mintzberg in his classic *The Structuring of Organizations* defines the type of organization academic libraries have become, which he calls a professional bureaucracy.⁷ This type of organization relies on the skills and knowledge of operating professionals to function and produce a set of standardized services. The professionals, in our case librarians, work relatively independently of their colleagues, but usually maintain a close relationship with the customers they serve. This type of organization, according to Lars Groth in his book on future organizational design, provides a limited platform for successful adaptation to advanced information technology due to the core work being professional judgment.⁸ In the OCLC report referenced above, the self-service aspect of student access to electronic information through search engines presents a further barrier to extending professional service to customers and may be seen as the principal threat to the continued centrality of the library in the academic environment.

I examined the organizational structures of a sample of the three main clusters of ACRL libraries as devised by the Carnegie classifications: liberal arts colleges (27), comprehensive institutions (32) and research universities (28) by going to their web sites and analyzing the way the library delivered technology resources and services. Overall there are three types of structures that emerge:

1. the library does not have a specific department to manage digital operations
2. the library has a department to manage digital initiatives (average size is two professionals and one support staff at the liberal arts/comprehensive level)

3. the library formally partners with the IT organization at the institution

The third model cuts across all three types of institutions but is not prevalent yet. In a random sample of twenty-seven liberal arts colleges, seven libraries (26%) were fully integrated with the campus IT department to provide information services (e.g. Mt. Holyoke and Ohio Wesleyan). Among a sample of thirty-two comprehensive-level libraries, only two (6%) library organizations formally partnered with IT (Santa Clara and Xavier). The research libraries examined produced a similar percentage with 3 (11%) out of 28 libraries integrated together (e.g. Brandeis).

All but one research library have a dedicated department for library technology services. These departments tend to be large, ranging from a high of twenty-nine professionals to a low of two individuals; the average size department is comprised of a dozen staff members, usually organized equally between librarians and support personnel.

Academic libraries without a digital department cluster at the liberal arts college level, where there may be only one individual professional or support staff member providing services; they may be assigned to various service departments or administration. Four liberal arts colleges from the sample had no single individual that could be identified as functioning in a dedicated technology position.

These models will continue to evolve and many will be emulated and adapted at other institutions since the economic, sociological and technological environments are shared almost universally throughout higher education. Academia tends to be imitative in organizational structures and libraries are no exception. A general model of college and university organization predicts that the size of full-time enrollment determines the number of faculty and will reflect the size of the library staff; that is the scale of the institution tends to balance across constituencies.

Two areas of particular concern with these models of digital organization are the amount of staff applied to managing digital resources and the type of work the staff are responsible for. Also, are there correlations between the size of the staff and the amount of the budget allocated to purchasing or accessing electronic information?

Examples of digital work:

1. acquiring and managing digital materials (as opposed to print/media)

2. developing digital materials (scanning, conversion, reformatting, creating)
3. managing all activities related to websites and other digital technologies
4. creating online tutorials (but not teaching BI to a live group)

The proportion of the library's collection size to number of full-time professional staff was initially explored by ARL in 1980, when it was determined that there was a strong correlation between the number of volumes held and the size of the professional staff. Through analysis of the data available at that time, the size of the staff can be predicted by a ratio of 1 professional librarian for each 40,000 volumes held, above a base of 21 professional staff members. For example if an academic library held 2 million volumes (or 40,000 x 50) the formula would predict 71 librarians.⁹

Can a similar correlation be made with the need for professional staff involved with digital operations based on the size of electronic resources?

For example, the Ithaca College Library employs a total of 31 full-time staff members of which seven staff, five librarians and two support staff, manage digital resources and provide technology services. This represents 36% of staff salaries, but only 23% of the staff complement. The library acquisition budget expended for digital resources represents 58% of the total amount and the library subscribes to over 44,000 electronic journals. Similar disparities in proportional activity exist across the sample of comprehensive-level academic libraries sampled.¹⁰

Remarkably, a comparison between the number of technology staff at research libraries and at comprehensive libraries reflects the difference in scale, perhaps 4 to 1, yet the average e-journal subscriptions are almost identical. The inference appears that managing e-journal subscriptions requires the same amount of staffing across academic library sectors. One can also assume, and a sample of web sites bears this out, that research libraries engage in more digitization projects and have more flexibility in re-assigning or developing staff into digital responsibilities.

Trends

What would a digital workforce look like in libraries? What departments would be superfluous? Merged organizations jettison which departments first?

Three work areas that employ significant numbers of staff include access services, acquisitions and refer-

ence. Let's look at how these staff can be switched from traditional print-related activities to digital/electronic work. The long-term advantage of automating repetitive tasks has been to release workers to provide more direct services to customers and work on intellectually challenging tasks. The ratio of professionals to support staff in academic libraries has changed in the last twenty-five years from 1:2 to 1:1 due to the efficiencies integrated online systems gained in acquisitions, circulation and cataloging. This process enabled more librarians to be hired at the expense of clerical staff. Another trend in hiring, developing over the last ten years, has been the staffing of libraries with computer professionals who do not have an MLS degree.

OCLC's 2006 report on college students' perceptions of libraries and information resources indicates that the predominant activity, after using the library for studying, involves using digital resources. The report findings conclude, however, that academic libraries are not seen as the top choice for electronic resources, even when students are aware of those resources. 63% of college students use library electronic resources at least once annually, 86% use the website and 85% the OPAC also at least once a year, but only 51% respond that they use online librarian question service at least once during the academic year. Compare those "electronic usages" with traditional use of print resources, in-person reference assistance and studying in the library, these non-digital uses of the library cluster between 83% and 69% for annual use.¹¹

The leveraging of networking opportunities both internally at the institution level and externally, extra-institutionally, becomes critical in managing digital technologies. Networking offers the possibility of cost- and risk-sharing, while at the same time it enables network participants to keep up with constant changes in the information environment. IT/library mergers address the internal advantages of networking.

Increasingly networking trends also include external opportunities to outsource certain types of workflow. An emerging service popular with many academic libraries has been sharing 24/7 virtual reference across time zones with library and commercial partners. The Association of Jesuit Colleges and Universities library consortium provides an excellent example of this practice whereby eighteen institutions contribute funds and staffs time to provide an in-demand service. The AJCU virtual reference service, a

chat based service staffed by member organizations and supported by Tutor.com was started in 2005. Eighteen member institutions staff the service for 85 hours per week with “Librarians By Request” filling in from midnight to 9 am and weekend hours. Librarians from each institution staff the service from 4–8 hours per week based upon the size of the institution. Loyola Notre Dame Library has seen a 26% increase in use between 2007 and 2008. Consortial chat reference across the country is a unique opportunity to interact with colleagues from similar institutions and gain insights into how different academic institutions staff, integrate and promote services to their public.

Discussion

In many ways, academic library organization is a question of knowledge management. The transfer of knowledge, not just information, functions as the engine of this so-called Information Age. The economic value-added that spurred the digital revolution was the grasp of businesses to the potential the web brought to learning of customers’ needs. Two of the most talked about technologies in the library world in the past few years have been Google and Wikipedia. These tools are at the core of transferring information (Google) and knowledge (Wikipedia) most efficiently in a totally digital and interactive process. Academic librarians must grasp the sociological reasons why these resources are so popular: ease of access. Unfortunately, no equivalent to Google exists among the commercial digital library federated searching systems sold to libraries.

The key function that makes Google so successful is its ability to know what users click on after search results are posted and when similar subject terms are searched again by others to retrieve these links. The library retrieval systems fail to accomplish this core task. Think about how useful it would be to know what articles students click on and download—not to mention how useful it would be to integrate that information into your service model by, for example, making these items available in print or for quick searches online.

I think the problem of the significantly lower student preference for a library’s electronic resources and the diminished success in using the library web site over the availability of search engine generated information sources, indicate a strong area of growth potential for digital workforce deployment in develop-

ing a student-centered community of practice. While there has been some reluctance to engage students outside traditional access, information literacy and reference delivery models, developing more pro-active strategies to work with students on crafting electronic resources and services that better fit their needs and approach to learning and completing assignments is necessary.

I maintain that a carefully crafted web site that includes the best electronic articles and online materials for use in core courses throughout the curriculum, that is a full-text pathfinder if you will for each course, can begin to hook students early on the value of the library. I think librarians working with students to develop collections of the best undergraduate student papers culled from honors work or student portfolios (we already digitize and collect theses and dissertations from graduate students) would be a significant step in engaging students where they are most motivated. With new technologies such as Turnitin, and the ability to easily search content, plagiarism would not be the problem it appears to be. Rather it would be a way to model student excellence in producing quality work.

Beyond the creation of institutional repositories documenting each faculty member’s vitae, why hasn’t every academic library digitized the run of each academic journal edited by a faculty member and made it permanently available online? In other words expand the JSTOR concept exponentially for the more marginal scholarly publications. The costs of such an effort would be reasonable and the project manageable and the scale appropriate for each level institution. The value of long-term savings from not paying database vendors for storage and access might be significant for the overall academic library community.

Conclusion

The proliferation of digital content available to faculty and students through full-text online publication and the creation of digital artifacts from original print or media resources in academic libraries have created a new set of demands for staff organization. Several models of organizational structures have emerged and have been developed based on institutional needs and resources. More changes will occur as the amount of digital content managed supersedes the print and media collections in size and complexity. There are many opportunities to be innovative and to address

the new ways students' desire information access and intervention. Librarians have to become more creative envisaging a complete digital library within their own organization and acquire the requisite set of skills and develop the services that students will need and seek. Directors have to face up to the task of deciding how to allocate budget and staff resources to meet those new adaptations.

Notes

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