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A History Of The Rhetoric And Reality Of Library And Computing Relationships

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CHAPTER ONE

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Considerable discussion and publication occurred in the early 1980s regarding the relationship between computing centers and libraries. The dialogue centered on whether libraries and computing centers should be merged into a single organizational unit with broad responsibility for the big "I"—Information—on campus. In 1985 Raymond K. Neff wrote an article entitled, "Merging Libraries and Computer Centers: Manifest Destiny or Manifestly Deranged?" This article focused the discussion and debate that continued for the rest of the decade. It began with the sentence: "The idea of merging the university library with the university computing center is not grounded in experience—no institution has actually done it—but comes instead from trends that can be observed in both types of organizations."[1] Neff identified eight trends that demonstrated the similarities of libraries and computer centers. The increasing use libraries made of computers and electronic databases served as the basis for the similarities, resulting in an overlap and reliance, not previously existing, between libraries and computer centers.

Thirteen years later Arnold Hirshon identified more than ninety institutions in this country that had formal organizational relationships between the library and the computing center. What has happened in the intervening years to make Raymond Neff's rhetoric a reality?

The authors of this chapter believe that interest in the formalized conjoining of libraries and computing centers emerged during two very distinct periods—between 1984 and 1987 and from 1992 to the present. We believe that the unique confluence of driving forces in higher education, information technology, and libraries contributed to the waxing of interest and subsequent waning.

THE 1980S MERGER MANIA

Merger and acquisition theory suggests that structural alliances will develop when change occurs at the industry, enterprise, or institutional level.[2] Taking their

cue from this theory, the authors examined the above-mentioned "driving forces" during the two historical periods to better understand why colleges and universities began to consider merging libraries and computing centers. For our purposes, we have defined the three levels at which change occurs as follows: industry level changes occur throughout higher education; enterprise level changes occur throughout academic libraries and academic computing; and institutional level changes occur within individual institutions of higher education.

Industry Level Change

During both historical periods under discussion, significant changes occurred in higher education that challenged the status quo. During the 1980s, propelled by studies such as *A Nation at Risk,*[3] which focused on K-12, and Ernest Boyer's *College: The Undergraduate Experience in America,*[4] a national imperative for achieving educational excellence arose. In particular, some leaders in higher education expressed a significant concern about the quality of undergraduate education.[5] As a response to this, universities began to reemphasize the importance of teaching. A key aspect of the educational reform of the mid-to-late 1980s focused on helping faculty members become better teachers. Technology often played a significant role in these discussions because many educational reformers viewed it as a pedagogical tool of almost unlimited promise. The new emphasis on teaching also legitimized the efforts of faculty who sought to integrate computer-based tools into their teaching, although institutions seldom rewarded these efforts in the same way as research. Traditional academic support services such as the library and media services, joined by academic computing centers, found themselves working together in efforts to enhance teaching—sometimes alone or sometimes in partnership with a "teaching center." The emphasis on the importance of undergraduate teaching enabled computing to move from being seen as something special done by researchers in the sciences to being seen as a tool for the classroom. Previously, technology in support of classroom teaching had been the purview of media centers, which were often part of libraries. Now many computer center staffs saw it as part of their purview.

At this same time, the federal government cut funds for higher education. While this had the most immediate impact on available research dollars, it also had longer-term consequences with an impact on financial aid. With the cuts in federal research dollars, educators and administrators found particularly appealing gifts and heavily discounted hardware from vendors such as IBM, Apple, and NeXT. These gifts and discounts hastened the use of technology in faculty and student research, in student work and, eventually, in teaching. They, however, resulted in a difficult financial situation four or five years later as new technology became available and many machines had to be replaced after vendors either disappeared or quit offering gifts and heavy discounting.

Enterprise Level Change

As libraries began to automate in the late 1960s and the early 1970s, libraries and computing centers often found themselves at odds with each other over the development of in-house systems. Anne Woodsworth and James Williams wrote that the library jockeying for a "stand-alone" computer and the computer center resisting this effort characterized this period. The library's desire to

maintain complete control over all aspects of its services, as well as some skepticism about the responsiveness of the computer center, served as the crux of the attitude of many librarians.[6]

By the 1980s attitudes began to shift because of the high failure rate of in-house library automation systems, the costs of running these systems, the need for technical staff to maintain them, and the space and capital needed for computer rooms in libraries. As turnkey systems became the norm, libraries often brought computer centers into the contract negotiations to ensure library system capability for interfacing with other systems on campus. Compatibility issues became critical. Furthermore, while the "early adopters" of library automation often had the resources to hire and train systems staffs, as automation spread smaller libraries frequently found it necessary to look beyond their doors for support in running the hardware and software. Computing centers, particularly administrative computing centers, had the personnel and the experience to run large mainframe databases, and supporting the library's integrated system seemed a natural alliance.

At the same time, computing centers found themselves in the midst of a far more "revolutionary" change. Up until then, computing centers—where they existed—had two primary purposes: to support administrative applications like finance, the registrar, and human resources, and to support large scale number crunching for certain academic disciplines. Sciences, mathematics and, to a lesser extent, quantitative social sciences were the primary users. But with the introduction of microcomputers in the early 1980s, the user population shifted. Brian Hawkins writes, "When we moved from mainframes to micros, we certainly saw a different set of demands, a different audience. The sleeping giant of the humanists and many social scientists woke up and started to become demanding users."[7] New users now required new support structures and resources. In seeking models of service-driven organizations on campus, computing centers often looked toward libraries. Faculty and administrators seldom questioned the importance of the role of the library. Technology, on the other hand, was seen as a new kid on the block, and many in academe expressed skepticism of its value, particularly when applied to teaching. Thus, both libraries and computing centers underwent changes that encouraged them to look to each other as allies and partners.

Institutional Driving Forces

While industry-wide or enterprise-wide forces may create an environment for organizational change, alliances between libraries and computing centers will not occur unless changes at the institutional level create opportunities to rethink the relationship. These changes, unique to each institution, may be strategic, departmental, or operational.

The rapid growth of technology in colleges during this period created opportunities for strategic change. On the strategic level, many institutions struggled to discover the best organizational patterns for computing support. While administrative applications historically had centralized support, academic disciplinary computing usually had distributed support. However, distributed models created inequities, particularly when most financial support for computing came from research dollars. Where was the support for the "have-nots" to come from, particularly in the humanities and arts? When an institution decided to go

with a centralized support model, it seemed to address these inequities and create an organization tied to the academic mission in much the same way as the library. Where an institution chose a centralized academic computing model, it then had to grapple with whether this new organization should be separate from administrative computing services. Libraries often found it easier to form alliances with separate academic computing organizations than with combined academic and administrative computing organizations.

Change at the department level, such as the departure of the library director or the director of computing or the hiring of new personnel, often provided the catalyst for restructuring. For example, the opportunity to hire a systems person or team often opened discussions about whether that person or team should report to the library or the computing center.

Other issues that influenced decisions to merge or not to merge dealt with the "appropriate" sort of leadership in the library or computing center. Was the library director technologically savvy? Was the computer center director service-focused?

During the 1980s many areas of mutual interest emerged from the changes occurring within libraries and computing centers. Various operational decisions also brought libraries and computing centers into each other's areas of responsibility. These included decisions to support public computing in libraries, to purchase software for circulation, to create training programs for various general applications, to allow unmediated database searching, and to develop locally maintained databases. All necessitated a closer working relationship.

In some universities and colleges, computing centers continued to work in the mainframe world, while libraries developed microcomputer clusters. In others, computing centers sought space in libraries because of the library's long hours and the increasing computer experience of many of the library staff. The trend to provide microcomputers became so significant that the Association of College and Research Libraries (ACRL) formed a group in 1984 to provide a forum for discussion of these issues. Software acquisition and support offered another area of collaboration. Sometimes these collaborations involved only baby steps, such as the library offering to catalog software documentation. Other more significant cases occurred as libraries fully integrated software support into their operations and hosted workshops on general applications such as word processing.

The Rhetoric in the 1980s

As these changes in computing, libraries, and higher education created opportunities for interaction and mutual support, members of the two professions began to examine their convergence. As libraries implemented online catalog systems, envisioning the availability, through computers, of information traditionally housed in the library did not require a great leap of imagination. Pat Molholt, then at Rensselaer Polytechnic Institute, and Pat Battin, then at Columbia University, both wrote about the coming "electronic library" and the need for a strong relationship between the computer centers and the libraries.

Pat Molholt asserted that, as more and more information became electronically available, there would be a need for an information support system made up of services from both areas.[8] She identified the various pieces of this support system that could come from the library and from the computer center. Molholt clearly believed that a logical and mutually beneficial relation-

ship existed between computing centers and libraries that should be developed. She wrote strongly that librarians need to be proactive in coordinating and leading this new effort.[9] Pat Battin held similar views about the necessity for coordination between libraries and computing centers. She wrote:

> Scholarship will require a mixture of formats and a mixture of hardware for a very long time to come. The challenge is to provide the necessary linkages between formats, and this can only be done by reorganizing our information services—libraries and computer centers—into one coordinated information function.[10]

The Reality in the 1980s

In 1986, motivated by discussions of mergers, convergence, and the obvious need to work together to support library automation, ACRL created a Task Force on Libraries and Computing Centers "to investigate cooperative ventures between academic libraries and computing facilities and to draft guidelines for such cooperation."[11] The task force developed a list of some ninety institutions (major research libraries, state universities, and liberal arts colleges) and surveyed them to ascertain the likelihood of organizational merger. The survey results, in fact, revealed that only four institutions indicated the high likelihood of a merger, while 86 percent of the respondents thought it improbable. This is in spite of that fact that 83 percent had engaged in cooperative efforts usually involving the library's integrated system.[12]

The Task Force issued its final report in July 1988 and included the summaries of interviews with individuals at eleven institutions that had some type of merged organization or extensive cooperative programs. These institutions included Columbia, Carnegie Mellon, and Vanderbilt, precisely the same institutions from which came such library visionaries as Bill Arms, Pat Battin, and Malcolm Getz. These leaders and others from the eleven institutions represented the cutting edge of integration of technology into their libraries. The ACRL report authors recognized the very institution-specific nature of the issues. The Task Force issued fifteen guidelines to assist libraries contemplating some type of relationship with computing centers. Only the last six specifically addressed the factors that should be taken into consideration in contemplation of a merger.[13]

That same year, Anne Woodsworth suggested that the rapidly changing nature of the technology combined with rising client expectations exceeding staffing and financial abilities of both computing centers and libraries had created the need for a relationship between computing centers and libraries.[14] She believed that fear and the mistaken assumption that libraries should control their own computers provided the impetus for two of the activities the profession was involved in—the Standards for the Evaluation of University Library Performance and the ACRL Task Force on Libraries and Computing Centers.[15] Woodsworth ended her article on a positive note, however, in writing, "The combined efforts of libraries and computing centers are beginning to bear fruit on campuses where the brightest and the best from both operations combine forces. They are providing information services which, heretofore, could not be provided."[16] This acknowledgment of the unique skills that each brought to the academic enterprise was reiterated by Richard Dougherty."[17] He urged the cre-

ation of a close working relationship between the two. Wrote Dougherty, "Both have special and complementary skills that are in short supply. Working together, they should become a powerful influence in the reshaping of research and scholarship in higher education."[18]

In 1989, Pat Molholt wrote an article entitled "What Happened to the Merger Debate?" in the final issue of *Libraries and Computing Centers: Issues of Mutual Concern.* In the article she observed, "Their [computer centers and libraries] predicted merger—perhaps never comfortable to either side—has instead evolved into a kind of functional cooperation."[19] By the end of the decade, much of the discussion had subsided. Marilyn Martin, writing in 1992, summed up the end of the decade by saying:

> It [the debate about mergers] seems to have died due to lack of interest. Libraries and academic computer centers have been increasingly cooperative, as mutual benefits have become apparent, and many of the problems cited in the literature during the late 1980s have been resolved.[20]

THE 1990S REEMERGENCE

However, in the early 1990s, the debate reemerged with renewed vigor and interest. Why this reemergence of the issue? Why this change? The answers lie in the numerous forces in libraries, computing centers, and higher education that became so significant that they presaged a major paradigm shift in these organizations.

Industry-Level Driving Forces

By the early 1990s, information technology assumed a much greater role in the university as it permeated the entire higher-education enterprise. Information technology became the new "black hole" down which administrators continued to push more and more dollars without those dollars ever being enough. As old technology (legacy systems) required replacement, costs escalated. Institutions needed new phone and data switches, new administrative systems, new library systems, and new microcomputers on five-year, then four-year, then three-year replacement cycles. The vendors found themselves no longer in a position to give major hardware donations or deep discounts. They had successfully penetrated the higher education market. Institutions had built enormous hardware infrastructures that needed continual updating. Higher-education administrators struggled to deal with the technology, both financially and organizationally. The development of the college or university Chief Information Officer (CIO) position became one popular response to their concern. As noted in a HEIRAlliance background report from the University of Indiana:

> Many university presidents are countering the tendencies toward disintegration of their information resource fabric by appointing high-level administrators to coordinate and lead the evolution of their information resource environment. Approximately one third of the institutions responding to the 1992 CAUSE IT survey report having a CIO position at the present time.[21]

We must remember in 1992 that the CIO position generally referred to the Chief Information Technology person on the campus. At that time the CIO issue centered on whether both academic and administrative computing should report

to the same individual.[22] Few of these CIOs had libraries that reported to them—a development that came later.

An increased demand for accountability and fiscal responsibility reflected the other major change in higher education during this period. With less federal and state aid, and "genteel poverty" no longer accepted as a perquisite of faculty rank, universities and colleges found themselves committing over two-thirds of their operating budgets to salaries and financial aid. Support services and the administrative lines provided the only places to cut costs.[23] As in business, reengineering often became the solution. Particularly at tuition-driven private institutions, strong pressure developed to reduce costs drastically in order to hold tuition increases down. Colleges without large endowments found themselves having to look at cutbacks and layoffs, outsourcing, and reengineering.

Accountability in higher education is also linked to the increased emphasis on teaching, particularly of marketable skills. Although there is no one solution, almost all colleges and universities in the past five years have struggled with the question of whether computing literacy should be a core competency required of their graduates. Discussions of computing literacy often have broadened to discussions of information literacy; and in broader campus discussions of information literacy, it has often been confused with technology literacy. Libraries and computing centers both are working on solutions to enhance students' facility with technology and information. Both want to get their foot in the door and claim this issue as their own.

Enterprise-Level Driving Forces

The widespread implementation of campus networking and the exponential growth of the Internet provided the primary driving force at the enterprise level. Efforts to integrate technology into the curriculum moved beyond the early adopters. Many more faculty members began demanding increased technical support. In the library, technology moved from the "back room," or automation of processing, to the reference desk with computer-based indexes and other resources. This move required an increased emphasis on instruction and training necessary to use technology for library research. While Molholt and Battin had predicted radical changes in the ways libraries did their business, not until the establishment of campus networking did institutions realize their visions for the transformation of scholarly information and consequent transformation of libraries and computing centers. Hirshon correctly notes that the increase in mergers corresponded directly with the advent of the World Wide Web.[24]

The formation of the Coalition for Networked Information (CNI) is symbolic of the extent to which many viewed networking as in the purview of both libraries and computing organizations. The major professional associations in higher education computing—CAUSE and EDUCOM, and the Association of Research Libraries—formed CNI. It sought to realize its mission, "to advance scholarship and intellectual productivity,"[25] through networking via the efforts of its working groups on standards, directories, teaching and learning, publication, and research projects.

Computing centers had for some time been involved in providing campus information through bulletin boards and other systems. They now quickly migrated to Gophers and subsequently to the Web. Both Gophers and the Web offered relatively simple authoring environments, so other campus units often became involved in providing information. However, computing centers almost

always retained responsibility for the server. While the servers and networks fell to the computer center to support, librarians generally viewed the question of content as belonging to the library. That division seemed clearest with content in bibliographic databases. The lines soon became blurred, however, in talking about broadly defined information. The development of campus-wide information systems, the provision of access to software archives, the support of numeric data files such as the Inter-university Consortium for Political and Social Research (ICPSR), and the creation of digital libraries confounded the question of who did what.

The implementation of campus networks changed the nature of the applications that computing centers supported. While word processing and spreadsheets remained popular, communication tools and applications to support delivery of information across the network grew quickly to become the most widely used software on campuses. Both libraries and computing saw these applications as extensions of their existing responsibilities. Libraries viewed newsgroups and electronic mailing lists as part of the scholarly communication apparatus, and, to them, the content available through the Web or Gopher servers looked very much like the information libraries typically collected. The Web became a front door to a virtual library. On the other hand, the computing center viewed these as another set of applications to be supported. In fact, both librarians and information technology professionals had considerable expertise to bring to supporting users of these applications. For example, librarians brought to the problem considerable skills based on an extensive history of dealing with long-term preservation, as well as organization of knowledge and an understanding of issues of authority and authenticity. Information technology (IT) professionals understood their primary user culture, the underlying structures of these applications, and the technology to create, store, and retrieve digital information.

Buoyed by easier authoring environments such as HyperText Markup Language (HTML), the increased availability of useful digital-based resources, and intensive training programs, many faculty members moved from relying on computing simply to support largely personal productivity and research to increased reliance on computing for support for technological applications in the classroom. Continuing emphasis on educational reform and better teaching provided even more incentives to focus on pedagogy. The spread of technology placed increased pressures on already stretched computing staffs to support both standardized applications and innovation in the classroom. In some cases, librarians provided leadership in working with the faculty; in others the institutions drafted librarians because of their experience in training and instruction and their familiarity with disciplinary resources to work with faculty on curricular issues. This resulted in fruitful partnering at places like Kenyon College, Colgate University, and North Carolina State University, and some well-publicized projects like U-Wired.[26] The work of the CNI furthered these initial models of collaboration by sponsoring a series of conferences and workshops at which teams of librarians, information technology professionals, and faculty presented work accomplished through teamwork.[27]

The shift in the focus of library technology from automating processes to the provision of digital information provided a third enterprise-level change. Battin's "scholar's workstation" finally arrived on faculty and student desktops; the network provided the conduit to deliver resources as both commercial providers and scholars began to build the digital library. As technology thor-

oughly permeated reference services, librarians quickly became among the most skilled users of technology on campus to assist patrons adequately. Once computers found their way into the reference room, librarians also found themselves troubleshooting network and printing problems, assisting patrons with e-mail, downloading, and file transfer. Increasingly what librarians did at the reference desk and what IT professionals did at help desks overlapped each other. The idea of combining help desk and reference functions grew directly out of this dilemma of trying to parse patrons' questions.

Institutional-Level Driving Forces

Again, during the 1990s strategic changes have played a critical role in providing opportunities for mergers and other types of structural alliances. The problem of deferred maintenance necessitated renovation of many buildings, which provided an opportunity for campus-wide networking, including the networking of dormitories. In planning a new library building or expansion or renovation, senior administrators often used the opportunity to ask whether the computing center should be moved into the new or expanded or renovated building.

As accountability became an issue and costs for technology escalated, the need to plan more carefully for technology became obvious. Development of campus-wide strategic plans for technology allowed for open discussions exploring the optimal organizational structures. Even where organizational structures were not at issue, the library's new role as a key technological player opened the door for joint technology planning and paved the way for increasing collaboration.

During this period, individual institutions began to look at and adopt business models such as Total Quality Management (TQM). While reorganization seemed to be a daily fact of life in computing centers, many libraries also began to look at reengineering to streamline operations or absorb losses of positions. Libraries and computing centers experimented with team-based organizations and flattened hierarchical structures. While such structures may have more permeable boundaries and thus be more open to structural alliances, they also implied a flexibility and willingness to change on the part of members of these organizations—essential elements for any larger scale reorganization.

The Rhetoric and Reality

By 1993, the needed infrastructure had been put in place to realize the desktop delivery of information that formed the underlying rationale for Molholt's and Battin's ideas of merged organizations. To deliver the information and support users needed required strong alliances and active collaboration between the library and computing center. Hirshon's paper, issued some ten years after the ACRL Task Force's final report, cited ninety-four institutions in which significant aspects of both the computing and library operations report to the same chief information officer.[28] These he defined as integrated.

Even where the need to collaborate does not result in organizational integration, the potential overlap in responsibilities and blurring of those responsibilities can create tensions between the organizations that need to work together. Hardesty's data, gathered from 1994 to 1996, indicate few if any colleges and universities where these units work in isolation from each other.[29] In

1994, Library Solutions Press sponsored an institute for the heads of libraries and computing centers entitled "Building Partnerships." This workshop provided an opportunity to learn about successful collaborative ventures, to explore cultural stereotypes, and to develop strategies for ongoing cooperation and collaboration. In 1997, CNI began hosting regional workshops with a similar purpose. As the 1990s end, collaboration between libraries and computing centers seems to be the working model for most institutions. Formal collaboration is more often through committees than through organizational charts. Even those that have "merged" basically have two separate units that report to the same individual. Whether that individual is called a CIO, a Joint Director of Computing and Libraries, or a Vice President for Information Services, the result is a collaborative effort between the two areas. Very few institutions identified in the literature have merged the day-to-day operations of the computing center and library into one staff who handle the public services for both units.

CONCLUSION

Two distinctly different catalysts provided the impetus for mergers between libraries and computing centers for the two periods studied. During the first period, leadership within libraries and computing centers provided the catalysts. Visionaries saw a time in the not-too-distant future when the delivery of electronic information to the desktops of scholars would require a mix of skills and knowledge possessed by individuals in both libraries and computing centers. However, few actual mergers occurred. While libraries tended to be the clients—often the largest academic clients—of computing centers, true partnering between the two units remained still in its infancy.

During the 1990s two major forces coalesced: the wide-scale implementation of networks and the development of networked resources, and an adoption of streamlining support services as a strategy to control costs in higher education. As a result, there developed simultaneously an environment in which synergies could best be realized through cooperation and collaboration, and a perception by upper-level administrators that needed institutional economies could be realized through restructuring. While the largest single number of respondents (twenty out of forty-seven) to Hirshon's survey of CIOs reported the convergence of information and the technology on which it relies as the primary reason for organizational integration, Hirshon believes such formal reorganization unlikely to have happened without pressure from senior administration.[30] Hardesty also notes, "For the most part at the institutions I visited, the impetus is certainly not coming from computer center directors or library directors. I have to speculate that senior administrators are promoting the idea."[31]

The ultimate driving force should be provision of the best possible service to the patrons for the least cost. In the early years the visionaries focused primarily on the best ways to deliver the new technologies to users. The second guideline proposed by the ACRL Task Force sought to "emphasize the end users, rather than the information providers."[32] The verdict is still out on the second stage. Although there have been some interesting attempts to combine help desks and reference desks so that users can have "one-stop shopping," anticipated savings and structural considerations, as much as user needs, appear

to drive this second stage. Hardesty found in his study of liberal arts colleges that much of the pressure for change came "from presidents and boards of trustees,"[33] and that neither computing center directors nor librarians had confidence in their "motives nor the supposed results."[34] Boards, presidents, and deans "wonder why there are not more positive results from all the money the institution has invested in technology."[35] Hirshon warns that one should "not integrate to save money, or to solve a particular personnel or organizational problem."[36] The need to offer this advice reveals the impact these reasons, not user needs, have on decisions to integrate. The authors recommend additional study and research to determine if creation of CIO positions and further integration of computer centers and libraries actually better meet user needs.

NOTES

1. Raymond K. Neff, "Merging Libraries and Computing Centers: Manifest Destiny or Manifestly Deranged?" *Educom Bulletin* 20 (winter 1985): 8.
2. Joseph E. McCann and Roderick Gilkey, *Joining Forces: Creating and Managing Successful Mergers and Acquisitions* (Englewood Cliffs, N. J.: Prentice-Hall, 1988); M. E. Porter, *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (New York: Free Press, 1980) and many other books and articles by Porter.
3. *National Commission on Excellence in Education, A Nation at Risk: The Imperatives for Education Reform* (Washington, D. C.: G.P.O., 1983).
4. Ernest L. Boyer, *College: The Undergraduate Experience in America* (Harper, 1987).
5. Patricia K. Cross, "Improving the Quality of Instruction," in Arthur Levine, ed. *Higher Learning in America 1980-2000* (Baltimore: Johns Hopkins, 1993), 288.
6. Anne Woodsworth and James F. Williams II, "Computer Centers and Libraries: Working toward Partnership," *Library Administration and Management* (March 1988): 85.
7. Brian Hawkins and Patricia Battin, "The Changing Role of the Information Professional: A Dialogue," *Cause/Effect* 20 (spring 1997): 2. The electronic version is at http://www.cause.org/information-resources/ir-library/html/cem971.html
8. Pat Molholt, "On Converging Paths: The Computing Center and the Library," *Journal of Academic Librarianship* 11 (November 1985): 286.
9. Ibid., 288
10. Patricia Battin, "Crossing the Border: Librarianship in the Information Age," *The Harvard Librarian* 19 (September 1985): 9.
11. Richard W. Boss et al., *ACRL Task Force on Libraries and Computer Centers Final Report* (Chicago: ACRL, 1988): 1.
12. Ibid., 2-3.
13. Ibid., 16-18.
14. Anne Woodsworth, "Computing Centers and Libraries as Cohorts: Exploiting Mutual Strengths," *Journal of Library Administration* 9 (1988): 27.
15. Ibid., 27-28.
16. Ibid., 32-33.
17. Richard M. Dougherty, "Libraries and Computing Centers: A Blueprint for Collaboration," *College & Research Libraries* 48 (July 1987): 289-296.
18. Ibid., 296.
19. Pat Molholt, "What Happened to the Merger Debate?" *Libraries and Computing Centers: Issues of Mutual Concern* 13 (May 1989): 1.
20. Marilyn Martin, "Academic Libraries and Computing Centers: Opportunities for Leadership" *Library Administration and Management* 6 (spring 1992): 77-80.
21. Thomas Ehrlich, James G. Neal, and Polley Ann McClure, "What Presidents Need to Know about the Integration of Information Technologies on Campus," Background

Paper for HEIRAlliance Strategies Report *no. 1*, 1992. http://www.educause.edu/ir/library/text/HEI1030.TXT

22. Alton Brantley, Lynn DeNoia, Barbara Horgan, and Harry Reif, "The Role of the CIO in the Curriculum Change Process," paper presented at CAUSE92, December 1-4, 1992, Dallas, Tex. Available at http://www.educause.edu/ir/library/text/cnc9214.txt
23. Ron Gales, "Can Colleges Be Reengineered?" *Across the Board* (March 1994): (1-3) on Lexis-Nexis.
24. Arnold Hirshon, *Integrating Computing and Library Services: An Administrative Planning and Implementation Guide for Information Services*, CAUSE Professional Paper Series 18 (Boulder, Colo.: CAUSE, 1998), 3.
25. CNI Web site, http://www.cni.org
26. U-Wired was founded in 1994 as a collaboration of the University of Washington's Libraries, Computing and Communications, and the Office of Undergraduate Education to support the use of technology in teaching and learning. For further information, see http://www.washington.edu/uwired/about/index.html
27. For more information on similar projects see http://www.cni.org/projects/nlc for descriptions of what a large number of institutions have done.
28. Hirshon, *Integrating Computing and Library Services*, 1.
29. Larry Hardesty, "Library and Computer Relations: The Human Side," a paper presented at a conference on Information Technology sponsored by the North Carolina Center for Independent Higher Education at Wake Forest University, October 25, 1995: 28.
30. Hirshon, *Integrating Computing and Library Services*, 4.
31. Hardesty, "Library and Computer Relations," 18.
32. Boss et al., *ACRL Task Force on Libraries and Computer Centers*, 16.
33. Council on Library Resources, *Research Brief* 2 (November 1997), 3.
34. Ibid.
35. Ibid.
36. Hirshon, *Integrating Computing and Library Services*, 29.