Academic Information Services: A Library Management Perspective

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ABSTRACT
Using networked information resources to communicate the results of scholarship has great potential value for academic libraries. This development, here called "academic information services," will require collaboration among libraries, scholars, computing centers, and university presses. Three barriers to collaboration are discussed: (1) clashes of organizational cultures, (2) personal incompatibilities, and (3) different approaches to change. In each case, library managers can take steps to overcome the barriers and help ensure successful collaboration. Developing appropriate organizational structures, selecting staff who work well in a collaborative environment, and showing leadership in organizational flexibility are all important management contributions to the development of academic information systems.

INTRODUCTION
Technological innovations have the potential to alter the nature of any industry. The information industry seems particularly subject to the effects of technology and currently is adapting to the introduction of a number of technological advances that are associated with the general availability of networked electronic information resources. The advent of systems that allow documents to be created electronically, stored and maintained in computers, and easily found and read using high-speed communications networks may produce dramatic...
changes in the information industry. It is certainly not clear whether documents prepared, distributed, and used through this new technology will replace or augment information resources published using more traditional media, but it seems likely that this new technology will bring about some changes in the structure of the information industry.

Technological innovation is frequently a key element in the evolution of an industry. Older firms with large investments in existing technology may find it necessary to retool to stay competitive with new entrants who can begin their operations with state-of-the-art means of production and distribution. This process can lead to a shake-out in which established firms lose market share to new entrants. In addition to shifting market demand from older to newer firms, new technology can also open up new markets. Changes in market demand, driven by technological innovation, can lead to changing patterns of ownership in an industry, particularly the restructuring and merger of existing operations. Abernethy and Clark (1988) described an innovation that simultaneously disrupts the market links between producers and consumers and the competence of the firms in means of production as tending to produce architectural change in the industry.

One example of technological change disrupting market links occurred with the introduction of commercial air traffic. Customers wanting long-distance transportation no longer went to railroad or steamship companies but to airlines. The traditional market relationship between travelers and transportation companies was disrupted.

An example of technological change affecting competence in means of production was the introduction of robotics into the automobile industry. Traditional assembly-line production methods were made obsolete, and the companies that could quickly become expert in the new technology were most competitive. If the technology affects both the market links and the means of production simultaneously, an industry can expect significant architectural change. This means that new firms will begin to compete with existing firms and may drive some of them out of business. Existing firms will have to adopt radical strategies for survival, including mergers, acquisitions, and the simultaneous restructuring of many aspects of their business.

The technology supporting networked electronic information resources seems likely to produce architectural change in the information industry and particularly in publishing. Readers will no longer depend on traditional publishers for information (thus disrupting the market link) and publishers will not necessarily be expert in the production of networked information services (thus disrupting their traditional expertise in the ways information gets produced). In an
industry experiencing architectural change, new businesses can emerge rapidly, taking over markets once dominated by traditional firms. Traditional firms may find it necessary to form new alliances to stay competitive. One view of the current round of mergers and acquisitions in the information industry is that it signals a period of rapid change in which the industry will be significantly transformed.

If this understanding of the current state of the information industry is correct, then possibilities exist for new production arrangements for different types of information. Scholarly information may provide a case in point. The advent of networked electronic information resources sets the scene for the development of what Atkinson (1993b) called "academic information services" (AIS). AIS would allow universities to gain control over the scholarly information transfer cycle by creating an electronic network for articles and books that are now published by commercial publishers or scholarly associations. In addition to being the primary producers and the main consumers of scholarly information, universities would become the principal publishers and distributors of the information. This AIS scenario can be seen in terms of the architectural change described earlier. Market links between scholars and publishers would be disrupted since scholars would be able to obtain information from the networked information resources. Similarly, the expertise required for AIS (information systems development, telecommunications, network tools) that is currently more likely to be found in universities than in publishing houses, would provoke a disruption of the means of production. In this situation, we would expect to see competition between publishers and universities as each tries to obtain control over the flow of scholarly communication. In this competition, the universities would have significant competitive advantages.

The vision of AIS presented by Okerson (1991) and Atkinson (1993b) is particularly attractive to academic librarians. The advantages of networked electronic information resources over the current system are primarily those of speed and cost containment. Speed is realized by shortening the production process. Although peer review and some amount of editing are built into most visions of AIS, it is generally maintained that review and editing would proceed more quickly in the electronic environment. And it seems undeniable that the delays associated with (for example) printing and physical distribution of journals would be eliminated. The cost containment offered by AIS is based on an assumption of on-demand distribution of information. Scholars would acquire only the information that they judge to be relevant rather than having to subscribe to journals containing some potentially relevant material along with articles that are not of interest. It also assumes that electronic production and
distribution is less costly than print publication and distribution, and Bryant (1994) gave some dimensions of this saving. His figures suggested that production costs would be 25 percent lower for electronic journals than for their paper counterparts, equivalent to a 10 percent subscription price decrease.

In the AIS environment, academic libraries would have the benefits of timeliness and cost containment. They would move from providing access through ownership to providing access through networks, and from acquiring materials in anticipation of potential patron need to providing information in response to expressed patron demand. Although there is no clear consensus on how the costs of AIS would be supported, it is argued that these costs would surely be less than those associated with journal acquisition. Metz and Gherman (1991) anticipated that serials pricing would drive the development of academic information systems, and that focusing on access rather than ownership would allow libraries to forego the costs of storage and concentrate on providing optimal delivery systems for their users.

There are also perils for libraries in this scenario. Some academic librarians are concerned that they will be left behind—as specialists in an obsolete information technology—unless they are active participants in the development of academic information systems. Arnold (1993), in an article that announced (perhaps prematurely) the death of the scholarly monograph, suggested that academic libraries and university presses share this danger. Bryant (1994) also spoke of direct electronic communication between author and reader as endangering the continued existence of university presses and libraries. Failure to participate in AIS, then, might leave libraries out of the mainstream of scholarly communication. Participating in AIS may have its own perils. The scenario outlined above suggests that universities (including academic libraries) will enter into direct competition with commercial publishers. Those who speak of this competition, such as Atkinson (1993a), cannot predict the outcome. It was noted earlier that universities have substantial competitive advantages. But it would not be wise to overlook the strengths of the academic publishers. They have large and loyal markets and have managed to maintain those markets despite technological change in the past. It is at least conceivable that the publishers might win out over the universities and retain their market. In that case, universities would have expended considerable sums in the development of unsuccessful AIS. Academic libraries, as partners in an expensive and unsuccessful enterprise, might find that they would be expected to share the costs of the failed AIS to the detriment of their budgets.

Barriers to Collaboration

Those who predict the development, and ultimate competitive success, of AIS agree that its development will require collabora-
tion among many sectors of the university. The symposium chaired by Bailey and Rooks (1991) identified academic libraries, computer centers, university presses, and professional associations as possible members of that collaboration. There are, however, concerns about how collaboration between the academic library and other parts of the academic community might be implemented. Despite many examples of successful cooperation in the past, there is an ongoing perception that collaboration between library and computer center, or between library and university press, might be difficult to achieve.

Stereotypes and perceptions in support of this idea are readily called to mind by academic librarians. For example, in one academic community working on a library automation project, contact between the library and the computer center was limited to one individual from each unit. All library input was channeled through one librarian and was directed to one member of the computer programming and development team. The stated reason for this arrangement was that more widespread communication between the two organizations working on the collaborative enterprise would have produced confusion. It was not just that the needs of the two agencies were felt to be different, but their ways of speaking about those needs were felt to be incompatible. Any wider channel of communication was expected to be less effective because the library community was thought to be so different from the computing community.

Anecdotes such as this are indicative of perceptions that reflect some element of truth. There are barriers in any academic community that can act to prevent or make more difficult the necessary collaboration between the academic library and other sectors of the community. This article will examine three barriers to collaboration: clashes of organizational culture, personal incompatibilities, and different approaches to change.

**Clashes of Organizational Culture**

There are organizational differences between libraries and other campus units. Probably the best documented organizational difference, because the two academic units have had broad experience of working together, is that between libraries and computer centers. It has been suggested that libraries have a service orientation while computer centers have a product orientation. Breaks (1991) spoke of a clash of cultures between libraries and computer centers that might imperil the management of an academic information service. While this may be an unfortunate stereotype, it is true that libraries are academic units while computing centers tend to be administrative units. Bebbington and Cronin (1989) discussed in more detail the different orientations of the cultures of computer centers and libraries.
The question of different organizational cultures or orientations becomes particularly crucial when ownership and control of information resources are at stake. Libraries share a service orientation that is built on the idea of free access to information. This is, of course, in complete opposition to any commercial orientation, in which control of the information resource, and marketing of the information resource as a commodity, may be a priority. As great an opposition exists between the managerial orientation, in which information is seen as a crucial organizational resource to be closely guarded, and the service orientation in which the only value of information is found in its wide distribution and use. Finally, libraries claim for themselves a user-centered orientation, and it is true that they try to consider the needs of all members of the user community in designing their services. This approach might be contrasted to that of other units on campus for whom the needs or wishes of powerful or influential user groups might be more likely to enter into information system design and access than those of less powerful constituencies. Indeed, much of the discussion of AIS has been couched in terms of meeting the needs of faculty and researchers, and we are left to wonder at times how such systems might be adapted to meet the needs of students.

**Personal Incompatibilities**

Another barrier to collaboration that has been suggested lies in the potentially incompatible personalities of librarians and other members of their academic communities. For example, Scanlon (1990) suggested that librarians and programmers are like oil and water: unable to mix or to work effectively together. Similarly, Lowry (1988) found that librarians are different from educational administrators in terms of their preferred mode of handling conflicts. There is no doubt that differences in personality, personal interests, backgrounds, and cognitive styles can lead to incompatibilities among workers. It is also true that individuals with certain personalities or abilities are likely to be attracted to, and retained in, one profession or occupation, while other occupations would be likely to attract people with different personal characteristics. It follows that personality differences between librarians and others on campus could set up a barrier to collaboration.

**Approaches to Change**

Different units that are important to the development of AIS may have different approaches to dealing with innovation. Some may move with greater speed than others in adopting new technology, and differences in rates of adoption can get in the way of productive collaborative relationships. This potential barrier to collaboration is particularly relevant in the context of AIS because some have suggested that
academic libraries appear to be passive in the face of this new technological possibility. They are perhaps impatient that libraries are not moving more quickly to generate AIS but rather are allowing other units (usually computer centers) to take the lead in information system development. Accordingly, it is appropriate to discuss how libraries can become more open to change and thus open to collaborative approaches to AIS.

**MANAGING FOR COLLABORATION**

Academic information systems can produce important service improvements and cost savings for libraries. It is crucial that academic libraries collaborate with other academic units if AIS are to be successful. The following discussion considers organizational structures that can be put in place to overcome the barriers associated with differences in organizational cultures, personnel strategies that can find (and create) personal compatibilities that will facilitate collaboration, and challenges to the library manager to provide leadership for organizational flexibility and openness to change.

**Organizational Structures for Cooperation**

Although there are undeniable organizational differences between libraries and other academic units that might impede collaboration, there are also ample precedents for ways around these differences. Probably the best recent examples of organizational solutions are centered upon library automation. Arms (1990) made the point that library automation is a logical precursor to networked information services. While there have been some negative experiences in library/computer center collaboration for library automation, there have also been a reasonable number of positive cooperative arrangements that have benefited both parties. Boss (1987) surveyed many cooperative arrangements between libraries and computer centers.

Those who have been engaged in cooperative efforts, and those who have observed them closely, note a variety of features that can lead to successful collaboration. For example, Lucker (1993) described the MIT Distributed Library Initiative and suggested that maintaining separate units, but making the boundaries permeable, is a viable organizational strategy. This arrangement would facilitate the sharing of organizational values and cultures while maintaining the organizational integrity of the two collaborating units. Woodsworth and Williams (1988) spoke of mutual interdependence and an administrative structure that would allow difficult issues, such as establishing priorities and schedules, to be settled. Since it is in these crucial areas that
clashes of organizational cultures and values are likely to occur, it seems logical to establish a separate administrative structure within which priorities and schedules can be negotiated. Dougherty (1993) suggested that technology itself, in the form of electronic mail and local networks, can break down organizational barriers to collaboration. One can see enhanced electronic communication between collaborating units as a means of negotiating and working through the problems that might be attributed to differences in cultures. Bebbington and Cronin (1989), while noting the potential for tension and turf clashes between academic units, suggested that collaboration might lead to a blurring of roles of the collaborating units and ultimately perhaps a loss of unit autonomy. In other words, the effect of working on an initiative such as AIS could be a reorganization or merger of the collaborating units. It is important in such an eventuality to ensure that the emergent administrative structure has a strong central guiding philosophy, and most librarians will concur that an emphasis on service quality and customer satisfaction provides an appropriate philosophy for an academic information service. If boundaries are permeable and communications are good, this philosophy can be communicated to other academic units to serve as a common approach to AIS.

In summary, the experience of libraries in cooperating with computing centers on library automation suggests that, although the organizational cultures of the two units are different, this barrier can be overcome by appropriate organizational structures. Permeable boundaries, special administrative forums to deal with crucial issues of schedules and priorities, and enhanced communications mechanisms can allow units on campus with different organizational cultures to work together productively. It is within the realm of possibility that working on AIS could lead to the development of an integrated information organization on some campuses.

Finding (and Making) Personal Compatibilities

This discussion will concentrate on personality differences between librarians and other professionals on campus as potential barriers to collaboration. However, the main points of this discussion are also true for all of the personal incompatibilities that can impede collaboration, and the management principles derived from looking at personality differences can be applied to all other personal incompatibilities as well. Although the idea of differences in personality as a barrier to collaboration seems plausible, it rests on an assumption that may not be supported by the evidence: that there is a personality that typifies librarians. There has been a great deal of research, much of it inconclusive, regarding the special personality type that identifies librarians. Early studies were analyzed by Fisher (1988), who found
no support for the idea of a distinct librarian personality type. More recent research into librarian personality types has used the Myers-Briggs Type Indicator (MBTI). Webreck (1985) collected data from fifty-five librarians, and identified tendencies toward introversion and judging in both public and technical services staff. Webb (1990), relying on data from 267 librarians collected by the Center for Application of Psychological Type, identified the librarian personality as typified by introversion, sensing, feeling, and judging (ISFJ), supporting Webreck's findings.

However, in what is apparently the largest research project into the personality of librarians completed to date, Brimsek and Leach (1990) obtained somewhat different results. Using data from more than 1,300 special librarians, they identified four personality types as most frequently found in librarians, none of which correspond to the stereotype accepted by Webb. Their findings were:

- Introversion, Sensing, Thinking, Judging (ISTJ) 17.50%
- Introversion, Intuition, Thinking, Judging (INTJ) 14.37%
- Extroversion, Intuition, Thinking, Judging (ENTJ) 8.85%
- Introversion, Intuition, Thinking, Perceiving (INTP) 8.49%

Tyson (1988) investigated seventy-two academic library directors in Virginia and found the following distribution of personality types:

- Introversion, Sensing, Thinking, Judging (ISTJ) 21%
- Introversion, Intuition, Thinking, Judging (INTJ) 15%
- Extroversion, Intuition, Thinking, Judging (ENTJ) 12%
- Extroversion, Sensing, Thinking, Judging (ESTJ) 12%

Once again, none of these personality types correspond to the stereotype offered in Webb's article and, although Tyson's findings correspond to those of Brimsek and Leach in the top three types, the similarity stops there. Finally, Hendrickson and Giesecke (1994) reported the personality types of twenty-nine managers at the University of Nebraska–Lincoln. They found 31 percent ISTJ, 10 percent INTJ, and 10 percent INFP, a distribution once again different from any other reported in the literature.

If we assemble the results presented by these researchers, it becomes clear that there is no consistent pattern. No one personality type accounts for more than one librarian in five. There is no consistent pattern in the findings that would suggest a single stereotypical librarian personality type. In short, we are left with a conclusion resembling that of Fisher (1988). We cannot state that librarians are personally incompatible with others in the academic community because we cannot generalize about librarian's personalities.
This does not mean that the MBTI is not a worthwhile instrument. In fact, productive uses of the MBTI, such as those suggested by Monty (1994), Moreland (1993), and Rome (1990), are based on the understanding that librarians represent different personality types, and that managers should be sensitive to these differences in creating work teams and dealing with other personnel issues.

Just as there is no single librarian personality, there is no single computer programmer personality. Pope (1988) studied the personality types of computer programmers and technicians and found a diversity that resembles in many ways the results quoted earlier for librarians. But it is interesting to note that the personality type most frequently found in computer programmers (INTP) was found in almost one librarian in ten by Brimsek and Leach (1990), and that the personality type most frequently found in computer technicians (ESTJ) was found in 12 percent of library directors by Tyson (1988). This suggests that some librarians will work quite well with computer personnel, and that one responsibility of management is to put in place personnel mechanisms to facilitate interaction among staff members in support of collaboration.

Further corroboration of this approach can be found in the research of Alberty (1987). He tested 294 undergraduate students to see which personality types (as tested by the MBTI) were associated with fast and successful learning of computer programming. Several of the personality types found frequently among librarians were in the top half of his students in both speed and successful learning. ISFJ students (corresponding to the librarian stereotype presented by Webb) did poorly, as did ENTJ students (corresponding to 8.85 percent of special librarians in Brimsek and Leach, and 12 percent of library directors in Tyson). However, students with personality types corresponding to 40.36 percent of special librarians and 57 percent of library directors did very well on learning computer programming. This suggests that many librarians are able to adapt well to a high-technology environment, and therefore will collaborate well with computer programmers and others on campus who work in that kind of environment.

The managerial challenge, then, is to recognize that in any professional staff there will be some librarians who will work well in a collaborative environment with computer center professionals, administrators, and academic press staff. Similarly, there will be some librarians for whom such a collaborative enterprise would pose problems. Managers can select those librarians who will become lead players in developing AIS, or support those who select themselves for leading responsibilities. No one benefits from stereotyping, either of librarians or of any other professionals. The trick is to make the best
use of staff so that their different personal characteristics can be matched with appropriate tasks. Similarly, the hiring process can be used to obtain not only expertise and experience, but also personal characteristics that will result in successful collaboration. Some libraries have experimented with personality tests of various kinds to aid in the task of selection. Whether this formal assessment, or the more informal assessment that takes place in the employment interview, is used, it is important that managers take the responsibility for selecting staff who will be able to contribute to collaborative efforts such as AIS.

Organizational Flexibility

Technological change has sometimes been regarded as determining organizational outcomes. Librarians might think of automation in this way: that the introduction of automated systems must inevitably bring about changes in library organization or in service provision. Management research shows, however, that the idea of technological determinism is inappropriate. Orlikowski (1992) emphasized the notion that technology is interpretively flexible. In any organization, managers and staff interpret technology according to their own understanding, derived from their background experience, and this interpretation influences the organizational response to technology.

Some specific aspects of the organization's interpretation of technology can be labeled conservatism and flexibility. Child, Ganter, and Kieser (1987) discussed the role of organizational conservatism in establishing constraints on the effects of technology on the organization. Personal and organizational attitudes can preserve organizational structures and services through the most pervasive and rapid technological change. Zammuto and O'Connor (1992) illustrated the importance of organizational flexibility in adopting new production technologies. If the organization is flexible, as opposed to conservative, then technological change can more readily influence the kinds of services that the organization offers and the structures that are put in place to produce services.

One important aspect of organizational flexibility is the capability to redeploy organizational resources into new services and structures. For example, in the case of academic information services and libraries, it would be important to be able to assign library staff to the tasks of designing access systems for networked information resources, soliciting and collecting electronic texts, and organizing the processes of reviewing and editing the texts. The charge of passivity leveled against academic libraries should be viewed in the context of organizational flexibility and the ability to redeploy resources. University libraries are hardly passive places. They are extremely busy, engaged
in meeting current information needs by building collections, providing access to electronic resources, teaching information literacy, and providing answers to many questions. It seems unlikely that libraries generally are in the position to redeploy resources away from these priorities to engage in AIS-related activities. This lack of organizational flexibility may be a serious factor in impeding the collaborative work necessary to develop AIS.

Kozlowski and Hults (1987) provide insight into the ways that libraries (or any element in the academic community) can develop the organizational flexibility that will ensure that innovation, creativity, and up-to-date competencies are representative features of the organization. Organizations like libraries that already employ complex technological systems tend to be able to adapt to additional technological change. One example will serve to illustrate this kind of flexibility. Twenty years ago, many academic libraries established positions, usually in their reference departments, with titles such as "online search specialists." Librarians hired into these positions had expertise in a new technology called online searching, and they had the responsibility to provide services using this technology and to train the rest of the library staff in online searching. Eventually the responsibility for online searching became more general, and online search specialists were less likely to be needed in reference departments. In library schools, we educate future reference librarians to handle both print and online reference sources. Now an increasing number of academic libraries are advertising positions like "networked information services librarian." It is possible to anticipate that librarians in these positions will have the same function as the online search librarians of a previous generation. They will, initially, have responsibility for expertise in a new service area. Ultimately, they will communicate that expertise to their colleagues, and all librarians will deal with networked information services. This strategy for dealing with organizational change could well be followed in establishing academic information services. A single librarian would have initial responsibility for dealing with the technology and leading the collaboration with other units on campus. Eventually, many staff members would become involved in AIS.

Kozlowski and Hults (1987) noted that organizations typified by high levels of standardization in their procedures and means of production are less likely to have the organizational flexibility that is associated with successful adoption of technological change. The insidious effect of standardization in stifling creativity is also highly relevant to the issues associated with academic information services. Libraries have achieved many benefits from having standardized ways of dealing with information. MARC communication standards and
AACR2 rules have produced great efficiencies and have allowed the proliferation of systems that provide great enhancements in information retrieval that libraries can offer to their patrons. At the same time, these standards have acted to reduce the adoption of innovative and creative approaches to information retrieval. It seems clear, for example, that cataloging as it is standardized is not an effective way of providing access to networked information resources. Unless ways can be found to disassociate library information systems from long-standard methods, there is reason to be pessimistic about the ability of academic libraries to make a real contribution to AIS.

Kozlowski and Hults (1987) pointed out that internal rewards for innovation, built into the organizational structure of an organization, are particularly effective in encouraging the introduction of new technology into the organization. This idea could be fruitfully developed in academic libraries. The rewards structures associated with faculty or academic status are seldom directly tied to innovation. Some individual innovation in system development or service improvement may lead to publication, but rewards for publication are not available in all libraries. In those libraries where publication leads to tenure, the reward is not immediate nor directly associated with the innovation displayed. On the contrary, the bureaucratic management systems of academic libraries can stifle innovation. When financial management depends on line-item budgets, there is a strong incentive to carry on providing services in the same way as last year. When there are strong hierarchical communications structures, obtaining approval for any innovative approach to services or systems may have to undergo scrutiny at many levels as it ascends the hierarchy, then descends, perhaps changed beyond recognition. Where collegial structures are used for communication, innovation can get bogged down in committee meetings that examine every detail. The disincentives to innovation sometimes seem to outweigh the rewards for innovation.

What would seem to be called for is a system where librarians who wish to display initiative and new approaches to service, such as developing components of academic information services, should have available a reserved portion of the annual library budget, a thorough but speedy mechanism for reviewing and approving innovative projects, and a personnel system that acknowledges innovation along with competence and scholarship in making promotion, tenure, and salary decisions.

Library managers have significant leadership responsibilities in ensuring that the library as an organization is ready to change, and to participate in collaborative efforts such as academic information services. Encouraging organizational flexibility by supporting resource
redistribution, challenging the standardization of inappropriate approaches, and rewarding innovation are ways of ensuring that technology is interpreted positively by the library.

**CONCLUSION**

Examining the barriers to collaboration and the ways these barriers can be overcome has illuminated a number of general management problems and potential solutions to those problems. It seems arguable that these management solutions are of general application, regardless of the (somewhat problematic) future of academic information services. Collaboration with other academic departments on campus is essential to developing collections, instructional programs, and information services. Similarly, collaboration with administrative units is important to the survival of the library, not only because administrators are influential in making decisions about resources allocation on campus, but also because the administrative units they represent compete with the library for scarce resources.

In addition to this general case for the importance of on-campus collaboration for the future well-being of academic libraries, a special case can be made for the development of academic information services as a particularly crucial instance of collaboration. Information is the domain of the library. Library personnel have immense experience in dealing with acquiring, storing, and using information resources. It can be argued that librarians bring an important emphasis to the development of information systems—the user focus. Although there are enough examples of libraries that are not friendly or helpful to their users to keep librarians modest, there are also success stories that show how important a user orientation can be. Atkinson (1993a, 1993b) sees the role of librarians who will work on AIS as being able to personalize and humanize the relationship between the information systems and its users.

To meet this objective, librarians can bring to the academic information services collaboration their experience with user-based structures for retrieval. Part of this experience is negative in nature. Librarians have worked with, and in some cases developed, information systems that are based not on an understanding of user needs and information-seeking behavior but on the data structures apparent in artifacts such as books. Although frustrating enough for users and for the librarians who work with users, these systems do provide a valuable design base. In other words, librarians can help AIS developers avoid the design errors that are pandemic in bibliographic retrieval systems. There are, however, more positive experiences with
information systems that librarians can bring to the design task. Specialized academic libraries have created files tailored to the needs of their communities. For example, one engineering library has created a separately searchable file of records of conference proceedings so that users will not encounter the frustration of trying to locate these items in the online catalog. A library serving a specialized research institute has created a searchable file of all of the publications of scholars associated with that institute. A women's studies library has created a database that will bring together the widely scattered literature in this emerging field. These examples illustrate the experience in making information available to users that academic librarians can bring to the tasks of creating AIS.

Most of this experience relates, however, to designing systems that take existing information and retrieve it for users: in other words, designing systems for retrieval and output. Librarians have less experience in designing the information itself, typically choosing to purchase it "off the shelf." But the user-centered approach works equally well on information creation. For example, public librarians have frequently been involved in creating information systems that describe their communities—i.e., services offered by community agencies, special knowledge or expertise available from local individuals or organizations, and the functions of local government. Atkinson (1992) suggested that academic librarians should take increasing responsibility for the input side of information services. As a part of the academic community that is in regular and frequent contact with the information needs of all other segments of that community, academic librarians are in a position to bring that knowledge of information needs to the creation of information resources within the framework of AIS.

To ensure that collaboration between academic libraries and other academic units proceeds as effectively as possible requires a variety of managerial interventions. In considering the barriers that might prevent such collaboration, this article has identified several areas in which managers have a responsibility to act in support of collaboration. The first is in designing organizational structures that will encourage collaborative enterprises such as academic information services. It is important that library directors, as well as managers of other units in the academic community, work to create permeable boundaries between units so that the values and cultures of each unit can be shared. The many examples of structures that have been established to implement library automation provide examples that can guide future collaboration. At a minimum, facilities for electronic communication between academic librarians and other campus professionals can help to begin the process of cultural sharing that is so important in collaboration.
A second area of management responsibility is in the selection and appropriate deployment of personnel. The research into librarian personalities does not support a single stereotype. Rather, a variety of personality types are found among librarians and among other campus professionals. The task of academic library management is to ensure that those librarians who have personal characteristics and abilities that can enhance collaboration have an opportunity to engage in collaborative enterprises. In addition, selecting people with entrepreneurial attitudes and other characteristics that might be associated with successful collaboration and innovation makes good sense. Alexander, Boykin, and Meyer (1989), reflecting on a successful collaborative effort at Clemson, suggested that entrepreneurial attitudes in the librarians who were part of that effort led, in part, to its success. Building a library staff that can take an active role in the collaboration that will produce academic information systems, both through hiring new librarians and training existing personnel, is an important responsibility that Jennings (1992) considered the managerial priority for the future of university libraries.

Finally, establishing a climate that encourages innovation and collaboration is one of the important leadership roles challenging academic library directors. As the earlier discussion indicated, academic libraries have contradictory traditions in this area. In some ways, they have adequate precedent for building collaborative relationships and incorporating new technology into their services. In other ways, they are bound by standards, rules, and procedures that can inhibit innovation and collaboration. Emphasizing one and helping to break the influence of the other is an important role for library leaders. Practical steps that can reward innovation in the library organization can also be taken to emphasize the value placed on new approaches to the provision of information services.

As academic libraries cope with the rapid changes in the information industry, they have an opportunity to move into a pivotal role in the generation, collection, distribution, and use of scholarly information through academic information systems. This role is not something they can accomplish alone, however. Expertise and experience in information transfer are found in other areas of the academic community, and so collaboration is essential. Academic library managers have important responsibilities to ensure that their organizations are ready to assume this pivotal role in the information industry of the future.

REFERENCES


