

EFFECTS OF AUTOMATION ON ACADEMIC LIBRARIES

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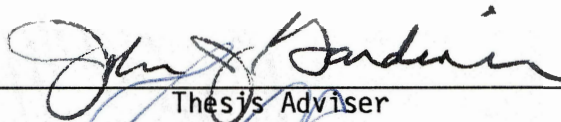
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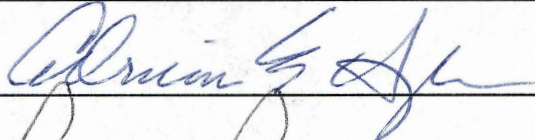
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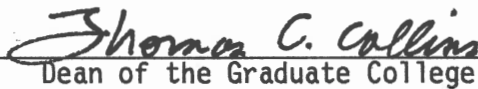


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CHAPTER I

INTRODUCTION

Background of the Problem

The growth of academic libraries is one of the most significant factors in the advancement of the American university. Although the origin of academic libraries in America dates back to 1638 at Harvard, some of the most dramatic changes have occurred since World War II. Collections grew extensively during the 25-year period from 1945 to 1970. By the early 1970's, technologies (including automation) began to affect libraries in profound ways. Charles B. Lowry (1985), Library Director for the University of South Alabama, noted:

Libraries are fundamentally nineteenth-century institutions. They have, for over a century, been labor-intensive craft workshops. Today, the library is being transformed into a capital-intensive, high-technology light industry. The extent of technology applied to libraries over the past ten years is unprecedented in scope and impact (p. 27).

The major cause for change in academic libraries in recent times has been the adaptation of computers to library activities. Card catalogs are being replaced by new, on-line public access catalogs. Various indexes to periodical literature and encyclopedias are searched through on-line, database retrieval services. Interlibrary cooperation has been revolutionized through electronic transmission of information. Some educators and librarians see the new technology phasing out traditional libraries and replacing them with computerized information systems.

Numerous obstacles are faced by librarians as the new technologies invade their libraries. Library collection development offices are confronted with a variety of issues as they examine ways to deal with the proliferation of the printed page and a high yearly inflation rate caused by increased prices in publication.

Many buildings are not large enough to adequately house large academic library collections. Policy statements are outdated quickly, due to changes in faculty, curriculum, and technology.

Libraries are faced with ". . . the realities of limited resources, tremendous growth in the amount of information available, increased demand and expectations of users, and increased cost of acquiring, storing, and servicing collections" (Tolliver, 1987, p. 223). In spite of these realities, Tolliver believed collection development to be the most fundamental library function and felt that it deserves top priority in academic libraries.

Frankie (1982) stated:

The definition of collection development still is not widely understood. . . . There is little theory to guide us. . . . The theory has been revived through a 'cloud of mystery'. . . . Collection development today is certainly a most exact science. There is really no way, at present, for any of us to determine whether a collection is or is not adequate. Formulas exist, but these are arbitrary constructions rather than validated criteria (p. 103).

In response to problems facing academic libraries, librarians are having to take a hard look at automation and the changes it is bringing about.

Need for the Study

Institutions of higher education in the United States must maintain libraries that can adequately support the instructional and research needs of their faculty and students. Having ready access to a variety of

information is essential in any university. Costs of periodical subscriptions and index services continue to mount, however, causing library administrators to rethink the need for increased numbers of subscriptions. Publishing costs continue to grow, making interlibrary cooperation essential, as book costs mount. There is also a tremendous increase in the cost of automation, especially in light of patrons' needs. The typical American college student, like his/her counterpart in the business world, wants specific bits of information quickly. Browsing the shelves for a good book may become a thing of the past, as librarians turn to automated information retrieval.

Space is yet another area librarians and university administrators are studying. New technology does not always mean space savings. Though card catalogs are massive, there is still a need for the same space allocation to house numbers of public access terminals, printers, CD-ROM readers, and data processing equipment. Reference services are also having to reconsider traditional methods for using the reference section. Librarians now must be able to pull together key word search techniques to locate information on-line through various databases rather than looking through rows and rows of reference books.

Academic libraries continue to face difficulties of various forms in their efforts to provide information to their users. As technology shapes the face of academic libraries and the way their collections are built, it becomes necessary to clarify the questions and define the issues. Therefore, as a beginning, it is essential to determine the effects automation and systems of electronic retrieval of information have on academic libraries.

Statement of the Problem

Academic libraries are undergoing numerous changes as a result of automation. It has become increasingly more important that studies be conducted to evaluate the effects automation is having on library personnel, library users, and library budgets.

The purpose of this study was to determine the effects automation is having on academic libraries. The study was designed to provide answers to the following research questions:

1. What are the major factors in developing and library implementing an automated system for an academic library?
2. What are anticipated benefits resulting from automating the library?
3. What results were observed that were not anticipated following automation of the library?
4. What effects will automation have on the total library budget?

Significance of the Study

It is hoped that information derived from this study will make a vital contribution to the understanding of technology and its effects on academic libraries. It is further expected that the result will be useful to academic library directors in their planning for the future.

Definition of Terms

An understanding of the following terms will be useful and important in achieving the purpose of this study:

Collection Development. Collection development is the systematic selection and purchase of materials in a wide variety of formats that

enable the library to fulfill its mission to the students and faculty of the institution it serves. Not only does it involve the acquisition of new materials, it also involves weeding and preservation of existing materials.

OCLC. The Online Computer Library Center is a nonprofit membership organization located in Dublin, Ohio. The OCLC operates an international computer network that libraries use to

. . . acquire and catalog books, order custom-printed catalog cards and machine-readable records for local catalogs, arrange interlibrary loans, maintain location information on library materials, and gain access to other databases (OCLC Annual Report, 1987, p. 20).

Currently, there are over 9,000 members of the OCLC, and their online union catalog contains over 20 million titles. Libraries from a variety of countries, such as Japan, the United Kingdom, Denmark, France, Spain, and the United States, participate in the network.

AMIGOS. The AMIGOS Bibliographic Council is a nonprofit organization that acts as a resource-sharing network for libraries in the Southwest United States. AMIGOS has over 300 members from Arizona, Arkansas, Illinois, Kansas, Louisiana, Nevada, New Mexico, Mexico, Oklahoma, and Texas. AMIGOS acts as a go-between for its members and the OCLC.

CD-ROM. CD-ROM (compact disc/read only memory) is a form of media that can store and retrieve large quantities of information through the use of laser optics. One CD-ROM can store the equivalent of 250,000 typewritten pages (Nissley, 1988).

Database. For library use, a database is a collection of index records in machine-readable format.

Full-Text Database. A full-text database is one that contains the complete text of a resource document.

Information Retrieval Systems. Harter (1986) defined the information retrieval system as

. . . a device interposed between an end-user of an information collection and the collection itself. The purpose of the system is to capture wanted items and filter out unwanted items from the information collection (p. 245).

Machine-Readable Format. Machine-readable format is a database readable by electronic input devices.

Online Information Retrieval System. An online information retrieval system is

. . . an information retrieval system operating with a computer, terminals, communication lines and links, models, disk drives, and databases in machine-readable form that are accessible in an online, interactive mode (Harter, 1986, p. 246).

Software. Software is the programs that control the functions of a computer system.

Assumptions of the Study

It was the researcher's desire to determine the effects automation is having on academic libraries, yet it was not expected that all of the effects would be identified. It was also the researcher's desire that the library directors selected to participate in the study would report accurately and honestly their assessment regarding automation at their institutions.

The research methodology used in the study should not be viewed as the only valid way to determine the effects automation is having on academic libraries. Other methods may be equally effective in identifying additional effects.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter was to present a review of selected literature as background for the study. The review of literature was organized into three major areas: (1) historical development of academic libraries in the United States, (2) collection development issues in academic libraries from 1940 to 1970, and (3) automation and academic libraries from 1970 to the present.

Historical Development of Academic Libraries in the United States

The academic library in the United States has gone through a number of transitions since its beginning at Harvard College in the early seventeenth century. In order to gain a clear perspective of today's academic library, a look into the academic library of the past is essential.

After the death of John Harvard in 1638, Harvard College received his entire 400 volume collection (Hamlin, 1981). Some 30 years later, Solomon Stoddard was appointed the first Harvard librarian (Hamlin, 1981). It was not until 1772, however, with the selection of James Winthrop, that the ". . . country's first professional librarian was employed" (Hamlin, 1981, p. 11). From its beginning, Harvard placed a great deal of emphasis on the library and maintained that emphasis into the mid-1800's, when "John L. Sibley arrived on the scene and gave it greater force" (Hamlin, 1981, p. 27).

The College of William and Mary and Yale University both established libraries early in their development. "William and Mary is, undoubtedly, the first to use college funds for the library" (Hamlin, 1982, p. 13), while Yale received nearly a thousand volumes from the private library of Bishop George Berkeley (Hamlin, 1981).

Princeton, the University of Pennsylvania, and Kings College all followed suit, opening libraries predominantly from private collections and donations. "Dartmouth began assembling books seven years before receiving its charter in 1769" (Hamlin, 1981, p. 18). From Dartmouth, the practice, questionable as it was, of charging students for library use was started. Apparently, income from the circulation of books provided money for new purchases, ". . . which indicates Dartmouth alone of the colonial colleges had a regular appropriation for library acquisitions" (Hamlin, 1981, p. 18). Library service during these early years was primitive at best. Books were oftentimes chained to the shelves, and hours were usually at the convenience of the keeper of the books (Hamlin, 1981).

An important figure in the development of academic libraries was Thomas Jefferson. Clayton (1968) suggested that Jefferson was of primary significance for the growth of higher education in Virginia:

Jefferson brooded for many years about higher education's lack of concern for modern history, modern languages, and the applied sciences; moreover, he wanted colleges to espouse frankly the concepts of natural law, reason, and observation. At first, he hoped significant change along these lines could be effected at William and Mary; but, when such efforts came to nothing, he turned his thoughts toward the establishment of an entirely new university that would be structured around some of his most cherished notions (pp. 124-125).

The founding of the University of Virginia by Thomas Jefferson was significant in the development of academic libraries as well. Clayton stated that Jefferson incorporated a library into his plan of study:

This was no token effort on the part of the nation's third president, for Mr. Jefferson personally planned the library building, chose the initial collection, arranged for its purchase, classified the materials, and played a large part in selecting the first two librarians (p. 125).

Following the death of Thomas Jefferson, the library at the University of Virginia fell into decline. General interest in higher education and libraries was very low during the early 1800's.

Anyone examining the sociology of higher education can see ambivalence toward advanced learning that has been a traditional part of American thought. Because hundreds of colleges were founded throughout this era, higher education must have been important to innumerable persons who had but little schooling of their own. Yet, a popular notion, simultaneously held, was that colleges were for America's privileged classes, and from 1800-1860 the climate of opinion increasingly became one in which domination by the common man was idolized and rugged individualism ruled supreme. The chief concerns of the country were not along intellectual lines, for the overwhelming majority of persons were more interested in physical work and in earning a living than in mastering theoretical refinements traditionally derived from bookish sources (Clayton, 1968, p. 126).

"It was the University of South Carolina that led the way with the first building to be planned for and solely devoted to library purposes" (Hamlin, 1981, p. 29). The building was completed in 1840, but was followed closely by a new building at Harvard in 1841.

Libraries during these years prepared paper lists of books in order to know what their holdings were.

The innovation which finally led to the modern form of the card catalog came at Harvard, where Joseph Green Cogswell, librarian from 1821-1823, abandoned the traditional printed listing and put the catalog on loose sheets filed in boxes (Hamlin, 1981, p. 34).

These sheets were replaced by cards in 1848 and were finally made available to the public in 1861.

It was around this time that libraries began to make a distinction between graduate and undergraduate collections. An 1854 Harvard regulation read: "The books most suitable for the use of undergraduates shall

be separated from the rest, and kept in the librarian's room" (Person, 1988, p. 2). This particular policy was unpopular, and by 1857, students began to . . . "petition for a separate undergraduate library and reading room. . . . Such a reading room was finally established (with student funding) in 1872" (Elkins, 1954, p. 52).

Changes were not only occurring in libraries during the mid-1800's; higher education in general was undergoing massive changes. The Morrill Act of 1862 established the Land Grant University, and the natural sciences became an important part of the curriculum. An elective system was established to allow students more flexibility in their degree programs during this same time period.

A pivotal year for the academic library in America was 1876. It was during this year that the first true research university was founded in the form of Johns Hopkins University. Also, in 1876, a new publication was founded, entitled Public Libraries in the United States, issued by the U.S. Bureau of Education. This particular journal emphasized better access to libraries and the importance of longer hours of library service (Hamlin, 1981).

This complete about-face, from stress on guarding the collection to the exclusion of use, to one of emphasis on use even at some risk to preservation, is the single most important event in the history of the American library (Hamlin, 1981, p. 22).

Other important changes occurring in 1876 involved the founding of the American Library Association and the first professional library journal by Dewey, called the American Library Journal, later known as the Library Journal. Library Bureau, a commercial enterprise, began manufacturing equipment for libraries and is still operating today. The outline of the Dewey Decimal Classification System was published for the first time,

along with Cutter's Rules for a Printed Dictionary Catalogue (Hamlin, 1981).

With the creation of the new research-oriented university came a change in the academic library. After the creation of Johns Hopkins in 1876, Harvard established a graduate school and the ". . . library gained increasing recognition as essential to the new academic role" (Hamlin, 1981, p. 48). Library hours were increased, buildings were enlarged, and budgets began to grow.

By 1879, Harvard students were allowed to enter the book stacks; however, they were not given the permission to retrieve their own books. After locating a desired entry in the card catalog, the user

. . . first tipped the card up in the tray. Then he called a library page, who memorized the title and shelf mark. The page went off to find the volume, and all too often returned to report the book not available, a report as often prompted by memory failure or careless work as by the actual absence of the book (Hamlin, 1981, p. 50).

Justin Winsor, long-time Harvard librarian, remedied the situation by introducing what came to be known as the call slip (Hamlin, 1981). Winsor was known for his ability to humanize the library and was ". . . fortunate to have a President who shared his views" (Hamlin, 1981, p. 50).

Between the late 1800's and the 1930's, there was little action in the academic library setting, but there was steady growth. Louis Wilson, Dean of the Graduate Library School at the University of Chicago, said of the 1930's:

In spite of the fact that the period was one of profound financial depression, of slashed maintenance budgets, and of painful readjustments, it was none the less one in which the erection of library buildings, the provision of gifts for library purposes, and the development of the Friends of Library Movement were unusually noteworthy (Hamlin, 1981, p. 64).

Collection Development Issues in Academic

Libraries: 1940-1970

The organization of collection development in large academic libraries underwent substantial redesign between World War I and the late 1960's. Just as the German model had influenced graduate education at the doctoral level in the United States, the organization and staffing of collection development as it is carried on in German universities eventually was adopted in American university libraries (Osburn, 1979, p. 94).

The responsibility of ordering books was one of the early issues in the area of collection development. The German model called for faculty selection of materials to be added to the collection. Osburn (1979) reported that part of the redesigning process that began after World War II was caused by an increase of professional activity on the part of the faculty outside the university, thus reducing the amount of time they had to concentrate on library development.

Prior to this time, collection development tended to be chaotic, with little or no planning taking place. American libraries have historically been autonomous, with little or no reference given to collection development in other libraries. Edelman and Tatum (1976) noted that this individuality was especially so in regard to the development of academic library collections prior to the outbreak of World War II.

With increased research interests caused by the World War II, Edelman and Tatum (1976) reported that weaknesses in research collections as a result of this lack of planning were revealed. Large numbers of important scientific works published abroad were not to be found in any academic library. To help correct this problem, the Library of Congress authorized the purchase of \$250,000 worth of materials from the British in 1941 to distribute among American research libraries. This action,

according to Edelman and Tatus, was the first such action aimed at the procurement of foreign materials for research libraries.

Edelman and Tatum (1976) further stated that the newly created Interdepartmental Committee for the Acquisition of Foreign Publications was successful in supplying books and journals to various war agencies, which, in turn, were microfilmed or photocopied for use in university libraries. They also reported that the Cooperative Acquisitions Project, a project sponsored by the Library of Congress which began in 1945, allowed libraries the opportunity to purchase wartime materials from many different countries.

Simpkins (1974) noted that academic libraries' concerns for their condition culminated in the first truly national cooperative in the form of the Farmington Plan. The Farmington Plan, an agreement sponsored by the Association of Research Libraries, helped specific libraries purchase significant books by having participating libraries assume responsibility for acquiring such materials published in foreign countries.

As mentioned above, the issue of where the responsibility for book selection might lay gained attention during World War II. The problem of poor collection building also began to change during that period of time. Downs (1975) cited several reasons for the tremendous growth of academic libraries following World War II. Newly established colleges and universities, different methods of instruction, and a growing emphasis on faculty research and publishing were some of the reasons. Another major reason for growth during this time was the expansion, year by year, in the number of books and journals published. Downs also indicated the possibility that institutional rivalries may have played an important role in the growth of academic libraries. "A strong library has become a

status symbol which lends prestige to a college or university; something to point to with pride" (Downs, 1975, p. 32).

As early as 1944, Rider (1940) saw some of the problems academic libraries would face as a result of the growth that was taking place. Rider formulated a plan to help libraries control growth by extensive use of microforms. During the same period, Bishop (1940) suggested that the best approach to dealing with future growth was through cooperation on a national scale. Bishop predicted that by the 1970's, a researcher could have an item or a photocopy of it from a variety of libraries throughout the United States within two or three days.

Although librarians were calling for planning during this time of rapid growth, it appears that little was done in a formal way. Osburn (1979, p. 93) reported that by the early 1950's, collection development in university libraries was, for the most part, proceeding with ". . . great, unharnessed energy." Osburn further stated that the ideas and suggestions which were offered until the mid-twentieth century were neither adhered to nor implemented until the mid-1970's.

The 1940's, then, was a decade of change. German university libraries had set the tone by having faculty members take care of book selection. The period around World War II saw the increased need for information, which, in turn, was responsible for the infusion of foreign materials.

During the 1950's, debate continued as to who should select the materials for academic libraries. Osburn (1955) indicated that a sharing of responsibility between the faculty and library staff was the ideal situation, but the ultimate responsibility should rest with the librarians.

Growth of academic libraries continued on into the 1960's. Osburn (1979) acknowledged that libraries readjusted their collecting activities to meet the needs of the heightened interest in science and engineering. There was also an increased interest in reprinting. Thousands of titles not available until this time were made available to libraries in micro-form. "The ideal of completeness was a predominant force in the shaping of principles behind the practice of collection development in large academic libraries from the 1930's through the 1960's" (Osburn, 1979, p. 107). Osburn continued by saying that these firmly entrenched ideals were all librarians needed when postwar materials became available along with new fiscal resources. Large scale approval plans of the 1960's and increased budgets enabled academic libraries to spend large sums of money for acquisitions. "The development of collections accommodated primarily the growth aspects with little regard for changing patterns of research" (Osburn, 1979, p. 107).

The 1960's saw another important change in the library world. Chisholm (1971) stated that the development of Machine Readable Cataloging in 1963 had tremendous significance for libraries. Known as MARC, this computer tape was developed by the Library of Congress and contains full bibliographic data about books, serials, music, maps, and atlases.

By sending the tape to various libraries and information centers in the U.S. and other parts of the world, it is possible to supply a vast amount of information in a compact form and to provide coordination in automation undertaken in any information center (Chisholm, 1971, p. 9).

Standardization due to the proliferation of published materials is essential, according to Chisholm, and MARC provides a standard format internationally accepted that supports automation.

As the 1940's and 1950's saw tremendous growth in academic libraries because of increased publication and increased interest, and increased

funds for libraries, the 1960's and 1970's witnessed more discussion as to how to deal with the proliferation of materials.

Automation and Academic Libraries: 1970
to the Present

Growth for academic libraries continued until the 1970's. Osburn (1979) has suggested, however, that this growth began to slow by 1970 and began to cause a crisis for American academic libraries. The causes for the decline, as pointed out by Osburn, were a decline in federal funding for research and development and a decline for funding of academic research. Osburn further reported that between the years of 1966 and 1977, book costs more than doubled, while the cost of serials nearly tripled. During this high inflationary period, ". . . funds were shifted steadily and in large amounts from monograph to serials. In 1973, four serials subscriptions were added, on the average, for every three that were canceled" (Osburn, 1979, p. 114). Osburn said, of the period of the 1970's:

Whereas collection development formerly had been a question of selecting the important scholarly works from among the total universe of possibilities, it came to constitute the more difficult question of selecting from among the select. In that regard, the need to define the role of the library within higher education generally and to tighten the relationship between collection development and academic research specifically became clear in the 1970's. The time had arrived when academic administrators would have to reckon with the full costs of research (p. 126).

Noel (1973, p. 18) illustrated the growing problem libraries were having by saying that libraries were an ". . . insatiable creature," needing more and more a portion of the total university budget. Noel also suggested that every academic library tends to try to meet demands of the future:

The numbers of books and journals published each year continue to expand at rapid rates, the fields of interest deepen, and

the bibliographic tools needed to chart this flood increase in cost at multiple compounded rates (p. 18).

Most libraries, according to Noel, cannot keep up with this pace and are falling behind trying to stay in place. The solution, Noel pointed out, is not planning to meet future research demands but to be able to respond quickly to actual demands. It is useless for a university library to attempt to build a self-sufficient collection through unrestrained purchases (Noel, 1973). The difficulties caused by unrestrained purchases led to the development of what is known as approval plans.

Gore (1970) believed approval plans to be extremely useful to academic libraries. Approval plans, developed in the 1960's, act as a means by which librarians can work directly with publishers in building collections. Instead of using a title-by-title search method by faculty and librarians, the library indicates its subject field needs to the publisher, who, in turn, searches for books to meet those needs. "The statistical evidence indicates strong and growing favor for approval plans" (Gore, 1970, p. 16).

Apparently, while some libraries had success with approval plans, others did not. Rouse (1970) indicated that approval plans at the Oklahoma State University library were not successful. "The lack of organization and the obvious use of untrained personnel indicated that the company was not ready to take on customers" (Rouse, 1970, p. 37). Rouse also indicated that nearly 50% of the titles sent by the company to the library did not meet the approval of the library staff.

Lickliger (1968) believed automation to be the only way to solve the problem of dealing with the vast amounts of material being published. He suggested that information maintained in the library collection would be better off stored in a computer with tremendous memory. Lickliger

believed that such a computer could be connected with consoles from various points in the United States. This type of system would provide on-line access to the automated database through mechanical questioning and supported by a state-of-the-art telecommunication system. Licklider felt that libraries would be replaced with a series of computers interlocked through telecommunication systems. The 1960's would see the rise in automation, and by the 1970's, libraries would begin to look at different ways of acquiring information, other than purchasing.

Taylor (1972) suggested that networking and cooperation are vital for the development of academic libraries:

The significant and interesting thing about the concept of networks is that, if data exists, we can begin to understand networks in scientific fashion as switching configurations. Such an approach provides the framework and criteria to ascertain the most efficient manner of transmitting a message (p. 178).

Crucial to cooperation, Taylor reported, is the development of a standardized format. The MARC format provided this standardization, but ". . . it will take the MARC concept a number of years before it touches the broad spectrum of libraries, media centers, and information centers in significant areas of their interests" (Taylor, 1972, p. 180).

Taylor (1972) cited the Hampshire Inter-Library Center as an example of a system currently sharing its resources. Consisting of Amherst, Mount Holyoke, Smith College, the University of Massachusetts and the Forbes Library, this network is linked to 110 public libraries in the western part of Massachusetts. Each institution helps fund the collection, and a daily delivery system connects the libraries. Joint purchasing exists in such networks; however, ". . . the commitment to cooperative agreements in the past now has a tendency to bind institutions to

patterns which attempt to solve past rather than future problems" (Taylor, 1972, p. 192).

As early as 1972, authors begin to question huge library collections, and even questions what the word "library" implied:

There are moments, and this is one of them, when we wish we did not have to use the word 'library.' The word carries too many connotations which, partially truth and partially myth, may not let the library get to tomorrow, may inhibit its adaptability. The term exaggerates the difference between print and other media. It emphasizes the static warehouse rather than the dynamic process. It focuses on physical objects rather than on people. It impedes communication. It provides a dichotomy between people who should be working together. All of these disadvantages have implications for operations and effectiveness, both now and in the future (Taylor, 1972, p. 200).

By the 1980's, academic libraries were faced with new major changes. Automation made sweeping reforms possible, and a variety of issues confronted library directors, especially in the area of collection development. Never completely resolved was the problem of who should select materials for academic libraries. Another aspect of acquisitions still being debated is whether to be selective or to strive to collect everything possible. A newer issue became prominent, and that is the issue of whether a library turns its attention to electronic retrieval of information, continues to build paper monographs, or reaches some sort of medium.

Librarians who wish to maintain a tradition of the library as a collection of printed material and who strive to increase such collections and their material budgets will have little impact. However, librarians who perceive the library as an information center and who seek to provide services at the convenience of their users can enhance the library's role in the academic and research activities of their institutions (Hyatt, and Santiago, 1987, p. 10).

An addition to user needs occurred during the late 1970's and early 1980's. These needs are for current information and quick retrieval of that information--something of a "fast foods" mentality. Taylor (1972)

suggested that the conventional library is outdated and therefore unable to meet present and future needs:

Academic research libraries in the 1980's are confronted with major technological advantages that are changing the way information is created, perceived, and used, making the traditional ways in which library services have been conducted no longer comprehensive enough to meet all of the library patrons' needs. In order to remain a viable and essential component of the university's information systems network and a major contributor to university instructional and research programs, academic libraries will have to be able to respond effectively to an environment of rapidly changing scholarly information needs and capabilities (Snowhill, 1986, p. 5).

Snowhill (1986) further indicated that the library will continue to play a vital role in academic instruction but must be flexible in order to meet ever changing research needs. Speaking of the University of California at Santa Barbara (UCSB) library, Snowhill stated that the advances in technology have resulted in the automation of library processes and the development of new information sources, thereby requiring the UCSB library to ". . . examine the nature and scope of its services to the campus academic community" (p. 12).

Snowhill (1986) has stated that information storage and retrieval will see drastic change and pose tremendous challenges for planning by academic librarians:

Technological changes projected for the next five to ten years will greatly increase current library information services and capabilities in four major areas: (1) storage of data and information; (2) access to and identification of information sources; (3) transmission of information; (4) automation of office procedures and systems (p. 13).

Speaking for the UCSB again, Snowhill stated:

There are current technologies that the library can readily adapt and apply to increase user access and awareness of the library's resources. The degree to which the library is able to incorporate these new technologies into its services will determine the extent of its leadership in providing comprehensive access to information for the campus (p. 13).

Some of the new technologies Snowhill (1986) referred to are video-disc, laser disc, and CD-ROM. These new formats provide greater, faster, and more economic storage than do traditional formats such as paper, microforms, and various printed indexing tools.

While the traditional formats will continue to be published, there will be an increasing number of information databases available only through these several new technologies. In order to continue to provide high level information service, the library will need to incorporate these new technologies (Snowhill, 1986, p. 14).

Sankowski (1987), Collection Department librarian at St. John's University, believed that collection development, combined with automation, is a key issue in libraries today. He also said that, due to its significance in the library world, two professional journals were created: Collection Development and Collection Building.

The issues themselves have become practical as we realize that collection development must be effective in order to succeed. . . . The academic realities combined with technological development, shrinking budgets, communication needs, and the changing role of the information professional all contribute to the present emphasis on collection development (Sankowski, 1987, p. 269).

Sankowski also believed that libraries of the 1980's must reflect the multidimensional nature of information. He suggested that it is impossible to acquire all that is being published and that selection of library materials is an art requiring a great deal of concentration and specialization in subject fields.

Speaking about the effects automation will have on academic libraries, Sankowski (1987) stated that the new technology will allow librarians the opportunity to analyze collections more effectively. Automated circulation systems can generate reports that show how many times particular titles are checked out and can thus be instrumental in weeding decisions.

Discussing CD-ROM, Sankowski acknowledged a number of problems such as standardization, equipment requirements, and lack of multiple simultaneous access. However, the compact disc will be a definite advantage as far as space saving is concerned.

Branin (1988), of the University of Minnesota, made the following statement regarding collection development and the new technologies:

Underlying the current preoccupation with information, whether couched in terms of 'information handling,' 'information storage and retrieval,' 'information centers,' or 'information policy,' is a legitimate need for a definition and broader understanding of how the content of knowledge is organized, preserved, and communicated. In libraries this means expanding responsibility beyond the traditional information boundaries of published print or print-derived materials into new formats of electronic data, images, and sounds. Therefore it means a change in the way libraries deliver information to its users. Collections of material that are housed on-site and owned by libraries are being supplemented by information sources that are remote but rapidly accessed using new delivery systems (p. 19).

Branin (1988) pointed out that electronic retrieval of information will not replace printed formats but is merely a way of expanding the information base. According to Branin, printed works make up the majority of academic library collections today, ". . . but in this new information age, collection development librarians must look beyond their traditional shelving to a world of computer screens and databases" (p. 19).

We must provide new structures of access to knowledge in an increasing variety of formats and, at the same time, continue to preserve, manage, and make available scholarly information in the traditional printed formats with appropriate links between all formats (Battin, cited in Branin, 1988, p. 10).

Following Battin's remarks, Branin (1988) concluded that librarians involved with collection development should not abandon loyalty to the printed page but should widen their range to include automated forms of

information retrieval. Branin emphasized the idea that electronic access to information should not replace published print information.

CD-ROM is altering library procedures in numerous ways. This new technology promises to revolutionize research. Not only are huge amounts of data instantaneously presented at the push of a button, but the tools for bibliographically accessing the data are imbedded in the product and are more susceptible to personalized manipulations than the older card catalogs or printed indexes of the past (Ferguson, 1988, p. 325).

Writing as a representative of the Columbia University library, Ferguson (1988) related the excitement that institutions feel toward CD-ROM. There are, however, some tests the new technology must pass before it is totally satisfactory for their needs. The collection development policy for Columbia requires that eight criteria be met before something is added to the collection. The criteria are: ". . . relevance to program needs, scope of treatment, the ability to fill existing gaps, quality of scholarship, currency of information, accessibility, language, and cost" (Ferguson, 1988, p. 326). According to Ferguson, CD-ROM does not enable the library to meet all of the collection development criteria adequately. As for relevance, CD-ROM is unable to provide numerous titles and the scope thus far is limited to bibliographic information only. Gaps are not easily filled. The quality of the CD-ROM packages seems high, but the cost may not create any savings. Ferguson further stated:

It is doubtful that there will be any overall savings because of the high cost of CD-ROM products, the linkage in the subscription pricing of some CD-ROM products and their printed versions, and the reality of multiple users needing more than one work station at a time. The other collection development managers questioned believe that, while a few print tools might be replaced by CD-ROM versions, they will largely be supplementary devices (p. 329).

Haar (1988), of Virginia Commonwealth University library, adds another twist to collection development problems in the 1980's by

suggesting that ". . . information brokers can exercise a subtle but significant influence on a library's collection development practices through the reference tools they produce" (p. 113). With the new technologies being developed, Haar suggested that more and more vendors are producing reference tools in optical disc format and thereby changing usage and the way collections are being built.

Haar (1988) suggested that librarians need to remember the goals and functions of their collections and make decisions appropriately. New technologies, Haar believed, should not alter the need for quality collection development:

Even if a library adds only a few basic optical systems and pays for them through its collection budget, its general collection development program is apt to be adversely affected. . . . Measured in terms collection development officers can relate to, this could be tantamount to a decision not to purchase twenty to thirty to forty thousand dollars worth of monographs, perhaps even more, per year (p. 118).

Another aspect of new technology is patron use. Haar showed that in numerous libraries, patrons regularly waited to use disc technology rather than consult the standard printed indexes. Willar (1983) predicted:

. . . that while the computer technology revolution in enhancing how information gets disseminated is and will continue to be enormous, the library will be recognizable to the observing public pretty much as it is today for the foreseeable future (p. 32).

Willar (1983) compared the claim that computers will change our work lives to the claim that changes in food technology will alter our nutritional lives by allowing us to pop food pills. Instead of seeing a total demise for the library, as many others do, Willar believed that the library will become a type of ". . . economic middleman, allowing the public to financially participate in subscription to network resources" (p. 32).

Leighton and Weber (1989), looking ahead to the 1990's, projected that computer access of information will not be surprising to patrons:

There will continue to be rationale for traditional access to library materials and using computers for bibliographic control. Only to a very limited degree will computers be used for full text until late in the next decade. However, electronic publishing of heavily used materials, such as journals and major reference works, will come more rapidly than for the general collections, which tend to be much less heavily used than computer technology would economically support at this time (p. 24).

Leighton and Weber further predicted that large reference collections will be greatly reduced in size as more services go on-line: "Already in the 1980's indexing and abstracting services are much less used in print form" (p. 25). They also believed, however, that the traditional book format will remain in the reference room. Although buildings will need to change to deal with the new technology, Leighton and Weber stated:

Even if cost is not an acceptable argument for the desirability of traditional over high-tech formats, there are very practical reasons supporting the traditional technology--the book. It is a universally familiar format, compact, portable, attractive, often indexed, and readily accessed to any chapter or page. It facilitates, much more easily than does a database, the scanning or creative serendipity of reading a volume. Meanwhile, with a growing level for computer literacy and use, the computer will extend the capacity to know of the existence of books and other units of information, to find these items, to copy and transmit them, and to expand greatly the manipulative handling of information. Libraries therefore will not shrink, but rather grow and add an entirely new information management technology, expanding the library function and requiring a host of building adjustments (p. 26).

In response to Leighton and Weber (1989), Kilgour (1989) spoke to the growing number of works using the electronic format for tables of contents and indexes. Electronic indexing increases access in immediacy and availability. Kilgour wrote about Electronic Information Delivery Online System (EIDOS) as an on-line method for the retrieval of information from books that are in digital form. The way this system works is that a researcher sitting at a microcomputer can retrieve a book's

contents or index, select a particular chapter or page, request the page, and then receive the page requested on a monitor.

Kilgour (1989) stated that EIDOS has three goals: (1) to provide immediate availability of information in electronic form to any user at any time, (2) to increase the scope and quantity of available information, and (3) an improved user-satisfaction/producer-cost ratio. According to Kilgour, studies reveal that EIDOS will greatly improve ability to retrieve information from books.

Citing studies conducted, Kilgour (1989) noted that 59% of people entering a library are successful in finding the particular book they want. He stated that 11% fail because the book is checked out, 8% fail due to poor library procedures, and 5% simply cannot find the book on the shelf. Five percent fail to locate their book because of error in searching the card catalog. "EIDOS will eliminate these twenty-eight percent failures, thereby making it possible for eighty-seven of every 100 users to obtain desired information rapidly and accurately" (Kilgour, 1989, p. 36). The EIDOS project began in 1983 and was demonstrated in London and in Paris in 1984 and 1985, respectively. The pilot model should have been up and running in 1989, according to Kilgour (1989).

Certainly, automation has brought tremendous changes to the academic library, but will automation do away with the printed page? Willar (1983) predicted that screens will be used to locate information but will not replace the ". . . enjoyment of sustained reading from the printed page" (p. 33). Willar made this statement to reiterate his position:

Over the next twenty years, the interior library landscape will change with the disappearance of extensive paper files, card catalog cabinets and with many self-service terminals appearing throughout the facility. Books will still be seen and documents in the form of printouts will roll off attachments to the terminals. While access to backfiles of many periodicals will be done electronically and while some scholarly, scientific and

specialized journals will only be available electronically, and not in print form as we now know them, the publication of general interest periodicals will continue unchanged, and as markets become more segmented, may even grow. It is unlikely that the publication of magazines will be dinosaurs into history (pp. 33-34).

Rutstein (1986, p. 43), of the Colorado State University library, said that ". . . a major premise of collection development is to maintain the core collections necessary for the onsite academic programs." However, Rutstein believed that libraries must learn to depend on other libraries for those materials they do not have. Rutstein further indicated that, ". . . of all the automated systems now in place, not one has effectively changed the nature of collecting in institutions" (p. 48).

If I were a prognosticator, I would say that eventually this technological revolution will subsume the idea and practice of collection development. . . . In the long run, these preemptive technologies will remove the need for formalized book selections. Technical service operations as we know them today will also disappear. Unlike technical services, the change agent will occur outside library walls because of the way information will be packaged. The traditional agents we are accustomed to will no longer be relevant; i.e., the chain which gravitates from author to publisher to bookseller or vendor to library to user. The process of change will be hastened once the crucial link is made between access to sources in databases and full text retrieval. Libraries will no longer be great storehouses of information, but will resemble data resource centers organized for on-demand information retrieval (Rutstein, 1986, pp. 43-44).

Contrary to the opinion that libraries are becoming large computer centers networking only through automated techniques, Super (1989) suggested the need for maintaining large book collections. Super quoted E. F. D. Roberts: "Whatever else it may be, a [research] library must be a museum of the book" (p. 61). Super finds that researchers such as himself miss a great deal by not having access to hands-on material. The example he uses is the novels that authors sometimes write in serial publications. "The essence of literary history, as of the art of litera-

ture itself, is attention to detail, and to discover these details one must turn to the original journals" (Super, 1989, p. 62).

Super (1989) felt that it is difficult to predict what a scholar might need in conducting research. He cited an instance where he visited another university's library and found a complete run of The Athenaeum, an influential journal of the nineteenth century. On closer examination, Super found that all of the advertisements had been removed prior to binding, thus ruining important evidence regarding the publishing history of books.

Within the past decade shelving in the main building of my own university library has been very markedly reduced to make room for library offices and, now, for machines. They are the wave of the future. . . . Like paleontologists, humanists need their museums--museums of books; like physicists and chemists need their laboratories, we need shelves through which to browse. A university's reputation often depends on its humanist scholars, and they and their work must be preserved. If this sounds a bit mercenary, let me say that there is real joy in making discoveries for one's self, more joy in seeing one's students make them, and the library in which discoveries can be made will be the real preserver of the past by giving it meaning to new generations as they use that past to build a future (p. 64).

Gore (1974) pointed out that library collections are doubling every 15 years and that libraries having several hundred thousand volumes in the 1930's now maintain collections numbering in the millions. One method employed to combat the tremendous growth use of publication was the use of microforms.

One solution that has been tried, and proved a failure, is miniaturization, through microfilming or computer storage, or any other technique. While certain results are achieved by those measures--for example, vast and probably useless expansion of total resources, and reduction of data-retrieval times--they contribute nothing to the solution of the physical growth problem. The highest growth rates in the history of academic libraries have occurred precisely during the 30-year period when microtechnology was on the ascendant. That microtechnology has had no effect on the space problem is partially accounted for by the fact that librarians typically acquire publications in microformat only when, for whatever reason,

they cannot or will not acquire them on paper. Microform collections have thus generally developed not as substitutes for something bulkier, but as collections that simply would not have existed in any form had they not been available in microform (Gore, 1974, p. 12).

Gore (1974) believed that new technology is not the answer to the problem. He acknowledged the fact that the Western attitude of bigger being better follows that of the Alexandrian Library of 300 B.C. "The Alexandrian answer is simply that the library should acquire everything and keep it forever, lest something of inestimable value perish from the Earth" (Gore, 1974, p. 12).

Gore (1974) spoke about a second possible answer to the problem, a philosophical solution. Basically, this answer said that an academic library should be large enough to support the curriculum, research programs, and reading for pleasure. This answer provides no

. . . clue as to the actual size of the library beyond the relative indication that a larger library will be required to support a larger curriculum. The philosophical answer avoids any forthright mention of what will happen to the collection if, say, a segment of the curriculum is simply dropped, or course content is updated in such a way that much of the existing collection proves to be either irrelevant or erroneous. By default, it amounts to agreeing that an academic library shall always be larger (Gore, 1974, p. 13).

A third answer to the problem is the scientific answer (Gore, 1974). Gore says the scientific answer provides an exact number of volumes necessary based on a formula which usually asks how small a library may be. In other words, the scientific answer requires libraries to grow, just as do the Alexandrian and philosophical answers.

Collections housed in academic libraries are what libraries are all about. The tremendous growth in the amount of published information since World War II continues to cause library administrators great concern. The need for more space, and a different type of space, has become apparent.

Rouse (1985), Dean Emeritus of the Oklahoma State University library, stated:

The changes we see moving in upon us brought about by developments in laser technology; miniaturization; satellite transmission; computer progress; and electronic databases definitely will alter the manner in which we carry out our work as librarians, and will certainly have no effect upon the library building design. However, they will not change the purpose, the *raison d'etre*, of librarians. Goals will be achieved through other means than before, and the buildings to house these functions must be planned differently than before (p. 160).

Summary

Throughout literature, the writers identify quantity vs. quality and selection by faculty members vs. librarians as central concerns. In addition, the literature confirms a need for written collection development policies and a need for growth in the area of resource sharing. The literature further acknowledges a line being drawn between hard-copy collections and those libraries seeking only electronic search and retrieval of information. The literature also reveals that automation may be affecting libraries in numerous ways. Budgets may be increasing, while funds for materials may be decreasing due to high costs of automation equipment. Collections are being searched from remote locations, librarians are having to learn new skills, and buildings must be designed for new technologies. In summary, the literature clearly focuses on the importance of automation and its effects on academic libraries.

CHAPTER III

METHODOLOGY

Introduction

This study involved 26 university libraries to determine the effects automation is having on academic libraries. The method for gathering the data was the Delphi technique, which was developed for Project Delphi, an Air Force-sponsored, Rand Corporation study in the 1950's by Olaf Helmer and his associates (Cookson, 1986). Included in this chapter is a description of the population, sample, design of the questionnaire instrument, and the Delphi study procedure.

Population

The population for this study consisted of 100 university library directors selected from the membership in the AMIGOS Bibliographic Council. No distinction was made between small academic libraries and large academic libraries based upon the researcher's premise that all academic libraries are attempting to serve their particular institution's academic programs and, therefore, no major differences exist among them.

To be part of this population, the 100 library directors met the following criteria:

1. Be part of a growing academic library.
2. Be responsible for the overall management and planning of the library.

3. Be alert to growing trends in library development.
4. Be actively involved with patrons and the technical aspects of library operations.
5. Be directors of academic libraries having at least three of a library's procedures automated.
6. Be members of the AMIGOS Bibliographic Council.

The rationale for the population was based on the premise that library directors belonging to the AMIGOS Bibliographic Council had the expertise, knowledge, information, and regional perspective to meet the stated criteria.

Sample

The initial sample for this study was a random selection of 40% of the total population. Due to nonresponse bias, the final sample was 26% of the population.

Design and Procedure

A study known as the Delphi Method was selected to guarantee a high quality of response from the experts in the field of library growth and development. According to Cookson (1986), the Delphi Method enables a group of experts to reach a consensus about a particular subject by statements and comments made through participation in a series of questionnaires.

As noted by Cyphert and Gant (1970), the Delphi method is used to achieve consensus without bringing the experts together. Consensus many times is reached when a group member having the most authority influences the discussion of others. Sometimes the "bandwagon effect" (Cyphert and Gant, 1970, p. 418) takes over and majority opinion makes up the con-

sensus. "The Delphi technique is a procedure in which an attempt is made to overcome these factors by not bringing the participants together" (Cyphert and Gant, 1970, p. 418). The method involves a series of questionnaires, followed each time with feedback of the results, until a convergence of opinion is determined.

The instrument used in the study consisted of a questionnaire mailed to the library directors who met the stated criteria. Names and addresses were obtained from the Executive Director of the AMIGOS Bibliographic Council. The data were gathered and analyzed following the return of each mailing.

On June 5, 1991, the questionnaire was mailed with an individually typed cover letter to each participant in the study (Appendix A). Telephone calls were made to those not responding within 30 days.

The second mailing took place on July 10, 1991, and consisted of responses identified by the participants in the previous mailing (Appendix B). Participants also received a cover letter which asked them to evaluate the responses to the three questions in the questionnaire. Telephone calls were made to those not responding.

The third mailing was sent July 19, 1991. The third mailing consisted of the library directors' responses to the questionnaire, and each director was asked to review the list of effects obtained in each question, and to respond if he or she felt any of the effects should be changed in any manner (Appendix C). If no changes were proposed, all participants were notified that the study was complete.

Data Analysis

Data were gathered and analyzed after each of the mailings was returned. The research questions were used in analyzing both the review of

literature and the results obtained through the questionnaire. It should be noted that questions 2 and 3 were combined for the mail-out, resulting in a total of three questions. The research questions were:

1. What are the major factors in developing and implementing an automated system for an academic library?

2. What are anticipated benefits resulting from automating the library?

3. What results did you observe that were not anticipated following automation of the library?

4. What effects did automation have on the total library budget?

Summary

Responses from the library directors, as well as a review of the literature, led to answers to the four research questions. The questionnaire sent in the first mailing included all four of the research questions; the following two mailings asked for the participants to evaluate and respond to the various responses obtained from the first mailing.

CHAPTER IV

PRESENTATION AND ANALYSES OF DATA

Introduction

The purpose of this study was to determine the effects automation is having on academic libraries. A review of the literature concerning automation in academic libraries and the utilization of the Delphi research technique were the basic components of this study.

This section of the research study is a presentation of the findings of data as collected from the responses and evaluations given by library directors who participated in the Delphi study in regard to the four research questions.

First Mailing

For the purpose of this study, only those responses received that were listed at least two times were established as meeting the criteria for inclusion. The first mailing consisted of the questionnaire of the Delphi study and was designed to obtain responses to the four research questions.

All 26 library directors responded to question number one (Table I). Over half of the participants listed hiring an outside consultant in the development and implementation of an automated library. In addition, selecting a committee of librarians to create a want list, a dedicated

staff, administrative support, and the formation of a fact-finding committee were listed by nearly one-half of the participants.

TABLE I
RESPONSES TO QUESTIONNAIRE: QUESTION ONE

Question One: Please outline the steps followed in the development and implementation of the automation of the library procedures now being used, such as an on-line catalog, circulation, acquisitions, serials check-in, and cataloging. For example, how did you decide on the system you now have? Did you have to solicit support from the administration of your institution?

<u>Responses Received</u>	<u>No. Times Listed</u>
Hire an outside consultant	14
Select committee of librarians to create a want list	13
Have full support of administration	13
Have dedicated staff and highly experienced person in technical services	13
Become a member of AMIGOS/OCLC	12
Create a new position of Systems Director, based on mainframe and library applications experience	8
Vendor selection based on functionality, cost, existing local hardware and support, speed and user friendliness	7
Select a committee of librarians and administrators to review vendor proposals and systems	7
Draft lengthy requests for proposals to be sent to major vendors	7
Make on-site visits to libraries having integrated systems	7
Have vendors bring demonstrations to the library	6
Convince administration of necessity to automate	6
Select committee of librarians and computer center people to study the systems	5
Determine grant sources	2
Implement over short period of time (6 months)	2
Implement over long period of time (3-4 years)	2

Note: Responses received more than once were used, due to their implied significance. A total of 16 responses met the criteria for inclusion.

Participants responding to question one were in agreement with the literature, in that automation is affecting academic libraries. At most libraries, committees were established to draft wish lists of what they wanted an automated library to do for them. Consultants were hired to help plan the automation of the library. New positions for systems specialists were created. Membership in library networks seems to be important to the participants as well. Taylor (1972) suggested that library cooperation and networking were vital for the growth and development of academic libraries.

The participants responding in the study to question number two saw major benefits, both anticipated and unanticipated, in enhanced reference service, reduced paperwork, and increased circulation (Table II). Other important benefits included: being able to provide on-line access of the holdings to homes and offices off-campus, the staff being able to move easily between work areas, and focused attention on the library. In addition, providing more control over circulation records, easier updating of the catalog, and the ability to do more with fewer or the same number of staff were mentioned more than five times. Providing more control over circulation, which had a high response rate, was consistent with the literature, as noted by Sankowski (1987). Sankowski suggested that automated circulation systems would enable librarians to evaluate their collections and therefore would assist in the area of collection development.

All 26 participants responded to question three (Table III). Increased dollars spent for maintenance of automated systems received 20 responses. In addition, other effects automation was having on the library budget that received the most responses included: increased need for equipment, OCLC costs increased, automation helped foster growth in

the total budget and mail costs increased. The responses were a confirmation of what is revealed in the literature. Leighton and Weber (1989) felt that the new information management technology would cause libraries to grow and would therefore lead to a variety of building adjustments.

TABLE II
RESPONSES TO QUESTIONNAIRE: QUESTION TWO

Question Two: What were the major benefits, both anticipated and unanticipated, resulting from the automation of the library?

<u>Responses Received</u>	<u>No. Times Listed</u>
Enhances reference service	15
Reduced paper work	15
Increased circulation	13
Created a reputation of the library as being a leader in technology	12
Permits staff to be moved easily between work areas	11
Provides more control over circulation records	11
Updating catalog much easier	10
Provides on-line access of holdings to home and offices off-campus	9
Able to do more with fewer or same number of staff	8
Library materials processed faster	8
Faster, error-free circulation	7
Automation focused attention on library	5
Ability to create bibliographies	3
Automation system proved to be good recruiting tool	2

Note: Responses received more than once were used, due to their implied significance. A total of 14 responses met the criteria for inclusion.

TABLE III
RESPONSES TO QUESTIONNAIRE: QUESTION THREE

Question Three: What effects did automation have on the following:
Library budget, library personnel, and library users?

<u>Responses Received</u>	<u>No. Times Listed</u>
<u>Budget</u>	
Maintenance costs considerable	20
Increased need for equipment	15
OCLC costs increased	13
Mailing costs increased	13
Needed to increase line item for personnel	10
Fostered increase in materials budget	9
Automation helped foster growth in overall library budget	8
Funds must be transferred from materials to yearly maintenance	3
Significant increase in computer supplies funds	3
Heavy increase in funds to travel to vendor yearly user meetings	2
Has not changed budget dramatically	2
<u>Personnel</u>	
Led to greater flexibility and cross-training of professionals	15
On-going training necessary to survive in an automated system	14
Increased workload	12
Personnel must become more computer literate	10
Needed to hire more personnel	9
Created stronger sense of unity among staff	9
Freed up time for staff to do other things	7
A well-planned transition and thorough training are necessary for staff	4
Requires fewer people	2
Processing operations greatly deprofessionalized	2
<u>Users</u>	
Users enjoy access from variety of points	15
Searching greatly facilitated	14
More faculty bring classes in for bibliographic instruction	12
Like being able to see if an item is checked out	12
Users very impressed with system	8
Easy to use	8
Able to find more information	5

TABLE III (Continued)

<u>Responses Received</u>	<u>No. Times Listed</u>
<u>Users (continued)</u>	
Circulation has increased	4
Some prefer old card catalog	2
On-line searching of remote databases, interlibrary loan	2

Note: "Budget" had a total of 11 responses which met the criteria for inclusion; "Personnel" and "Users" each had a total of 10 responses which met the criteria for inclusion.

Respondents to question three reported that personnel were effected by giving them greater flexibility and cross-training of professionals. The findings also indicated the need for on-going training. Other effects listed were: increased workload, personnel must be computer literate, and more staff was needed.

In responding to the third part of question three, the participants reported that users enjoyed accessing the catalog from a variety of points, searching had been greatly facilitated, and the users liked being able to see if an item was checked out.

Second Mailing

The second mailing of the Delphi study encouraged the participants to evaluate responses from the first mailing of the questionnaire. For the purposes of this study, statements receiving fewer than two were eliminated in an attempt to determine the more significant effects automation is having on academic libraries.

The 26 participants evaluated question one in the second mailing and the eight most important steps in the implementation and development of an automated library, as determined by those participants, are found in Table IV.

TABLE IV
EVALUATION AND ANALYSIS OF RESPONSES:
QUESTION ONE

Question One: Please outline the steps followed in the development and implementation of the automation of the library procedures now being used, such as an on-line catalog, circulation, acquisitions, serials check-in, and cataloging. For example, how did you decide on the system you now have? Did you have to solicit support from the administration of your institution?

<u>Responses Received</u>	<u>No. Times Listed</u>	
	<u>2nd Mail</u>	<u>1st Mail</u>
Vendor selection based on functionality, cost, existing local hardware and support, and user friendliness	19	7
Have full support of administration	16	13
Make on-site visits to libraries having integrated systems	15	7
Select committee of librarians to create want list of what they want	14	13
Have vendors bring demonstrations to library	13	6
Select committee of librarians and computer center people to study the system	12	5
Have dedicated staff and highly experienced person in technical services	11	13
Draft detailed requests for proposals to be sent to vendors	10	7

Note: From the responses received from question one, participants were asked to check the eight most important steps in the development and implementation of the automation of the academic library.

The findings indicated that vendor selection was based on functionality, cost, existing local hardware and support, and speed and user friendliness. The findings further showed that library administrators felt strongly about having full support of the administration. Other important steps in the development and implementation of automation of library procedures were: making on-site visits to libraries having integrated systems, selecting a committee of librarians to create a want list, and having a dedicated staff and highly experience person in technical services.

All 26 participants evaluated question two in the second mail out (Table V). The four major benefits, both anticipated and unanticipated, resulting from the automation of the library were: providing more control over circulation records, providing on-line access to a variety of places, updating the "card" catalog much easier, and enhancing reference service.

All 26 participants in the Delphi study reviewed and evaluated question three in the second mail out (Table VI). The responses pertaining to effects automation is having on the budget included increasing need for equipment, maintenance costs are considerable, and there is a significant increase in funds for computer supplies. The participants also indicated that automation helped foster growth in the total library budget.

Responses to the second part of question three involving effects of automation on personnel included increased workload, personnel must become more computer literate, a well-planned transition and thorough training are necessary for the staff, and on-going training is necessary to survive in an automated system.

TABLE V
EVALUATION AND ANALYSIS OF RESPONSES:
QUESTION TWO

Question Two: What were the major benefits, both anticipated and unanticipated, resulting from the automation of the library?

<u>Responses Received</u>	<u>No. Times Listed</u>	
	<u>2nd Mail</u>	<u>1st Mail</u>
Provides more control over circulation records	18	11
Provides on-line access of holdings to home and office off-campus	16	9
Updating catalog easier	13	10
Enhances reference service	11	15

Note: Participants responding to question two in the second mail out were asked to check the four major benefits, both anticipated and unanticipated, resulting from the automation of the library.

In responding to the final part of question three, pertaining to library users, the participants' responses included: users enjoy access from a variety of points, circulation has increased, searching has been greatly facilitated, and like being able to see if an item is checked out. Significantly, the participants responding to the final two mail outs reported similar feelings in identifying major effects that automation is having on the library budget, library personnel, and library users. The consensus was very strong.

Third Mailing

The third mailing of the Delphi method consisted of a list of results of tabulation of the responses the three original questions solicited from the second mailing. The participants were requested to review

TABLE VI
EVALUATION AND ANALYSIS OF RESPONSES:
QUESTION THREE

Question Three: What effects did automation have on the following:
Library budget, library personnel, and library users?

<u>Responses Received</u>	<u>No. Times Listed</u>	
	<u>2nd Mail</u>	<u>1st Mail</u>
<u>Budget</u>		
Maintenance costs considerable	22	20
Increased need for equipment	19	15
Significant increase in funds for computer supplies	16	3
Automation helped foster growth in overall library budget	12	8
<u>Personnel</u>		
A well-planned transition and thorough training are necessary for staff	20	4
Personnel must become more computer literate	18	10
On-going training necessary to survive in an automated system	17	14
Increased workload	16	12
<u>Users</u>		
Searching greatly facilitated	18	14
Users enjoy access from a variety of points	15	15
Circulation has increased	14	4
Like being able to see if an item is checked out	12	12

Note: From responses received from question three, participants were asked to check the four major effects automation has had on the library budget, library personnel, and library users.

the results carefully. If they felt that any item should be replaced or left out, they were asked to so respond. If no changes were to be recommended, they were notified that their participation in the Delphi study was complete. The 26 participants made no recommended changes.

Summary

The findings described in this chapter reported on data collected from the Delphi study research method with 26 library directors who are members of the AMIGOS Bibliographic Council. The high level of participation in the study and the continued response by the participants indicate the importance the research questions have to the profession. The high level of participation is also indicative of the interest librarians have in automation.

The findings showed a strong consensus among the participants, as indicated by the fact that steps followed in the development and implementation of automation of library procedures receiving the most responses in the final tabulations were: vendor selection based on functionality, cost, existing local hardware and support, speed and user friendliness, having full support of the administration, and making on-site visits to libraries having integrated systems.

The findings further showed that the major benefits, both anticipated and unanticipated, resulting from automation of the library receiving the most responses were: provides more control over circulation records, provides on-line access of the holdings to home and office off-campus, updating the catalog is much easier, and reference services were enhanced.

In addition, the findings revealed that the effects of automation on the library budget receiving the most responses were: maintenance costs

are considerable, increased need for equipment, significant increase in funds for computer supplies, and automation helped foster growth in the total library budget.

The findings further showed that library personnel were effected by automation in that there was an increased workload, on-going training is necessary, personnel must become computer literate, and a well-planned transition and thorough training are necessary for the staff.

Library users, according to the findings, found: searching to be greatly facilitated, they enjoyed accessing the catalog from a variety of points, and they liked being able to see if an item is checked out. It is to be noted that the findings also showed libraries having an increase in circulation.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This study was conducted for the purpose of identifying effects automation is having on academic libraries. An extensive review of the literature focusing on the historical development of academic libraries, history of library collection development, significant issues of academic libraries, and the introduction of automation to academic libraries was conducted. The Delphi study technique was the method utilized for gathering data. Three questionnaires were sent to 26 academic library directors belonging to the AMIGOS Bibliographic Council to elicit their responses.

Summary

Information obtained from the review of literature and analyses of the data revealed through the Delphi study technique showed that the eight most important steps in the development and implementation of automated library procedures are as follows: (1) vendor selection is based on functionality, cost, existing local hardware and support, speed and user friendliness, (2) have full support of the administration, (3) make on-site visits to libraries having integrated systems, (4) select a committee of librarians to create a want list of what they want, (5) have vendors bring demonstrations to the library, (6) select a committee of

librarians and computer center people to study the systems, (7) have a dedicated staff and highly experienced person in technical services, and (8) draft detailed requests for proposals to be sent to vendors.

The analyses of the data further revealed that major benefits resulting from automation, both anticipated and unanticipated, were: provides more control over the circulation records, ability to provide access both on and off-campus, much easier to update the catalog, and reference services were enhanced.

The data gathered also revealed that automation effected the budget by increasing maintenance costs, the need for more equipment, and the need for more computer supplies. The study also revealed that automation fostered growth in the total library budget.

In personnel matters, the analyses revealed that a well-planned transition and thorough training are necessary for the staff. It is vital for personnel to become computer literate, and on-going training is necessary for survival. There was a consensus, too, that the total workload for personnel increased.

The analyses of data revealed that users have found searching greatly facilitated, they enjoy access from a variety of places, and they like being able to see if an item is checked out. The data also revealed that circulation is increased as a result of automation.

These findings revealed a consensus from library directors and substantiated the effects automation is having on academic libraries in the areas of development, budget, personnel, and users. In addition, the findings revealed a consensus regarding benefits resulting from automation.

Conclusions

The following conclusions were drawn from this study:

1. Academic administrations and academic library directors should not anticipate financial savings when developing and implementing an integrated automated library system. There will be increased efficiencies in record keeping, but generally, the results of automation will be a more effective operation of library procedures.

2. Academic librarians tend to focus on the preparation and process of automation. There also seems to be an emphasis placed on the processing of materials and their prompt return to the library. This focus on doing things correctly may mean a de-emphasis of providing information to users. Librarians, therefore, may need to spend more time in training and assisting users in how to use the library, especially in the area of automation.

3. With the better management of records through automation, circulation of library materials have increased. The automated circulation system is also allowing librarians the opportunity to evaluate their collections and is therefore assisting in the area of collection development. The increase in circulation may indicate that patrons find much more than they actually need. Librarians will now have to instruct users on how to be more selective with the information they are seeking.

Recommendations

The following recommendations were presented as a result of the study:

Further study and research should be conducted to determine the actual impact automation is having on personnel workload. The importance

of such a study was supported by the fact that the results of the study indicated an increased workload, although there were contrasting views suggesting that a smaller staff was needed in some libraries.

In addition, it is suggested that a study be conducted to determine the primary focus of an academic library. The review of literature suggested that academic libraries in the past focused on collection development. It appeared, though, that automation may be bringing about a shift towards utilization, circulation, and making available a variety of information sources. In other words, accessibility may be the main concern of academic libraries.

It is further suggested that a longitudinal study be conducted of the effects of automation on the total academic library budget. Specifically, does the increased budget, as revealed in this study, provide computers and computer software for delivery of information, or does it help increase funds for materials, personnel, and services?

It is further recommended that a study be conducted to determine effects automation is having on the design and construction of new and/or remodeled academic library buildings. A study such as this would aid librarians in planning for the future.

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APPENDIXES

APPENDIX A
FIRST MAILING

June 5, 1991

Dear Colleague:

This is an attempt to determine the hindrances, obstacles, and deterrents, as well as the favorable and beneficial factors you found as you worked toward the automation of your library procedures. The survey will take very little of your time but it is expected to be an important addition to the data accumulated in the process of computerizing libraries.

Brad Robison, library director at Oklahoma Christian University of Science and Arts, is conducting this study as a part of his doctoral program at Oklahoma State University. He asked me to serve on his advisory committee and, of course, I am glad to do so. We hope you will give your cooperation to this undertaking and will respond to the brief survey instrument enclosed with his letter. The mailing list for this survey is not a long one, so we do need your response.

Thanks very much for your help with this important project.

Sincerely yours,

Roscoe Rouse, Jr.
Dean of Library Services Emeritus

June 5, 1991

Dear

I am writing to ask your participation in a study I am conducting of academic libraries belonging to the AMIGOS Bibliographic Council. This research is part of my doctoral study in Higher Education Administration at Oklahoma State University. Your institution was selected from a list of libraries that currently utilize automation in at least three areas of library procedures. I believe that the study will be useful to all of us involved in the administration of academic libraries, and I would deeply appreciate your participation.

The purpose of the study is to identify the effects automation is having on academic libraries. You are one of 40 library directors who has been selected as the most knowledgeable in the area of library automation.

As a participant in the study, you will be asked to:

1. Respond to the attached questionnaire.
2. Evaluate the information submitted as part of the questionnaire response from all 40 participants on two separate occasions.

All information will be treated anonymously. When the study is completed, you will be the first to receive the results. Thank you for your consideration.

Sincerely,

Brad Robison
Library Director

cc: Dr. John Gardiner
Administration and Higher Education
Oklahoma State University

QUESTIONNAIRE

1. Please outline the steps followed in the development and implementation of the automation of the library procedures now being used, such as an on-line catalog, circulation, acquisitions, serials check-in, and cataloging. For example, how did you decide on the system you now have? Did you have to solicit support from the administration of your institution?

2. What were the major benefits, both anticipated and unanticipated, resulting from the automation of the library? Were all your expectations of the system met by these benefits?

3. What effects did automation have on the following:
 - a. The library budget?

 - b. The library personnel?

 - c. The library users?

APPENDIX B
SECOND MAILING

July 10, 1991

Dear

I would like to take this opportunity to thank you for taking the time to respond to the first of several steps in the Delphi study regarding the effects of automation on academic libraries.

To identify the effects automation is having on academic libraries, I am asking you to evaluate the various responses I received to the three questions in step one of the Delphi study. You will find attached a list of the responses which appeared more than once.

Please select the items you feel to be most important. Through this method, I hope to determine a consensus of opinion among library experts regarding the effects automation is having on academic libraries.

Please complete the attached form and return it in the enclosed self-addressed, stamped envelope as soon as possible, or feel free to transmit by using FAX number (405) 425-5316. I am very thankful for your willingness to participate in this study.

Sincerely,

Brad Robison
Library Director

Encl.

cc: Dr. John Gardiner
Administration and Higher Education
Oklahoma State University

C. Brad Robison
Doctoral Study
Oklahoma State University
Delphi-Study
Step Two

Listed below are the responses to the original three questions in step one of my doctoral Delphi study.

Statements receiving more than one response are listed.

Original Question One: Please outline the steps followed in the development and implementation of the automation of the library procedures now being used such as an on-line catalog, circulation, acquisitions, serials check-in, and cataloging. For example, how did you decide on the system you now have? Did you have to solicit support from the administration of your institution?

Instructions: From the following responses, please check the eight most important steps in the development and implementation of the automation of the academic library.

Responses: (not listed in any particular order)

- 1. Select a committee of librarians to create a want list of what they want an automated system to do.
- 2. Create a new position of Systems Director based on mainframe and library applications experience.
- 3. Determine grant sources.
- 4. Make on-site visits to libraries having integrated systems.
- 5. Have vendors bring demonstrations to the library.
- 6. Hire an outside consultant to help write specifications.
- 7. Draft lengthy requests for proposals to be sent to major vendors.
- 8. Become a member of AMIGOS/OCLC.
- 9. Implement over a short period of time (6 months).
- 10. Select a committee of librarians and computer center people to study the systems.
- 11. Convince the administration of the necessity to automate.
- 12. Implement over a long period of time (3-4 years).
- 13. Select a committee of librarians and administrators to review various vendor proposals and systems.
- 14. Have a dedicated staff and highly experienced person in technical services.
- 15. Have full support of the administration.
- 16. Vendor selection based on functionality, cost, existing local hardware and support, speed and user friendliness.

Original Question Two: What were the major benefits, both anticipated and unanticipated, resulting from the automation of the library? Were all your expectations of the system met by these benefits?

Instructions: From the following responses, please check the four major benefits both anticipated and unanticipated, resulting from the automation of the library.

Responses: (not listed in any particular order)

- 1. The automation system proved to be a good recruiting tool.
- 2. Created a reputation of the library as being a leader in technology.
- 3. Permits staff to be moved easily between work areas.
- 4. Provides on-line access of the holdings to home and office off campus.
- 5. Able to do more with fewer or some number of staff.
- 6. Library materials are processed faster.
- 7. Has reduced paper work.
- 8. Provides more control over circulation records.
- 9. Enhances reference service.
- 10. Faster, error free circulation.
- 11. Increased circulation.
- 12. Ability to create bibliographies.
- 13. Updating catalog much easier.
- 14. Automation focused attention on library.

Original Question Three: What effects did automation have on the following: The library budget; library personnel; and library users?

Instructions: From the following responses, please check the four major effects automation has on the library budget, personnel and users.

Responses: (not listed in any particular order)

Budget

- 1. OCLC costs increased.
- 2. Mail costs increased.
- 3. Funds had to be transferred from materials to yearly maintenance.
- 4. Heavy increase in funds needed to travel to vendors yearly user meetings.
- 5. Automation helped foster growth in overall library budget.
- 6. Needed to increase line item for personnel.
- 7. Fostered an increase in materials budget.
- 8. Significant increase in funds for computer supplies.
- 9. Maintenance costs are considerable.
- 10. Increased need for equipment.
- 11. Has not changed budget that dramatically.

Personnel

- 1. Increased work load.
- 2. Needed to hire more personnel.
- 3. Freed up time for staff to do other things.
- 4. On going training is necessary to survive in an automated system.
- 5. Requires fewer people.
- 6. A well Planned transition and thorough training are necessary for staff.
- 7. Personnel must become more computer literate.
- 8. Created among staff a stronger sense of unity within the library.
- 9. Led to greater flexibility and cross-training of professionals.
- 10. Processing operations have been greatly deprofessionalized.

Users

- 1. Users enjoy access from a variety of points.
- 2. More faculty bring classes in for bibliographic instruction.
- 3. Users are very impressed with the system.
- 4. Able to find more information.
- 5. Circulation has increased.
- 6. Find it easy to use.
- 7. Some prefer old card catalog.
- 8. Like being able to see if an item is checked out.
- 9. Searching has been greatly facilitated.
- 10. On-line searching of remote databases, interlibrary loan.

APPENDIX C

THIRD MAILING

July 19, 1991

Dear

Thank you for participating in the second step of the Delphi study regarding effects of automation on academic libraries.

In the third and final step of the study, you will find a tabulation of responses received in step two of the Delphi study which were responses to the original three questions. The instructions for participation in the third step are attached.

Once again I thank you for providing your expertise in this Delphi study. I will mail you the results soon after the completion of the study.

Sincerely,

Brad Robison
Library Director

Encl.

cc: Dr. John Gardiner
Administration and Higher Education
Oklahoma State University

C. Brad Hobison
Doctoral Study
Oklahoma State University
Delphi-Study
Step Three

Listed below are the responses to the original three questions in step two of my doctoral Delphi study.

Please review this list carefully. If you feel that one or more of the statements listed should be left out or replaced with one not listed, please so indicate and mail your suggestions to me in the self-addressed envelope before July 29, 1991, or transmit by using the following FAX number, (405) 425-5316. If you have no recommended changes, your participation in this study will be completed.

Question One: Please outline the steps followed in the development and implementation of the automation of the library procedures now being used such as an on-line catalog, circulation, acquisitions, serials check-in, and cataloging. For example, how did you decide on the system you now have? Did you have to solicit support from the administration of your institution?

Tabulation of Responses: (Not listed in any particular order)

1. Select a committee of librarians to create a want list of what they want.
2. Make on-site visits to libraries having integrated systems.
3. Have vendors bring demonstrations to the library.
4. Have a dedicated staff and highly experienced person in technical services.
5. Vendor selection based on functionality, cost, existing local hardware and support, speed and user friendliness.
6. Have full support of the administration.
7. Draft lengthy requests for proposals to be sent to vendors.
8. Select a committee of librarians and computer center people to study the systems.

Question Two: What were the major benefits, both anticipated and unanticipated, resulting from the automation of the library? Were all expectations of the system met by these expectations?

Tabulation of Responses: (Not listed in any particular order)

1. Provides on-line access of the holdings to home and office off campus.
2. Provides more control over circulation records.
3. Updating catalog much easier.
4. Enhances reference service.

Question Three: What effects did automation have on the following: The library budget; library personnel; and library users?

Tabulation of Responses: (Not listed in any particular order)

Budget

1. Increased need for equipment.
2. Maintenance costs are considerable.
3. Significant increase in funds for computer supplies.
4. Automation helped foster growth in overall library budget.

Personnel

1. A well planned transition and thorough training are necessary for staff.
2. Personnel must become more computer literate.
3. Increased work load.
4. On-going training is necessary to survive in an automated system.

Users

1. Searching has been greatly facilitated.
2. Users enjoy access from a variety of points.
3. Circulation has increased.
4. Like being able to see if an item is checked out.

APPENDIX D

COMPILATION OF RESPONSES

COMPILATION OF RESPONSES

Question 1

1. Without the burden of in-house subject headings or special call numbers, conversion was far less of a burden.

Question 2

1. More work at more sophisticated level for staff.
2. Some duplication of work in ordering, claiming materials.
3. Barcoding of serials is an issue.
4. Better able to tackle large projects.
5. Automation showed which areas the collection is deficient.
6. Value of the collection can be determined by placing cost of books in subfield.
7. Able to conduct collection development analysis every year.
8. Biggest problem was the long time it took to implement the system.
9. Inadequate support from computer center.
10. Did not anticipate adequate number of ports.
11. Distributed intellectual access to library's collection.
12. Students don't ask as many questions.
13. Automation is a plus in the area of bibliographic instruction by allowing us to educate our users.
14. Drew academic community into a tighter unit with the library.
15. Improved image of the library.
16. Provided greater use of government documents.
17. Able to produce customized bibliographic for users.
18. Automation helped focus attention on the library.
19. Centralized access to the library's holdings.
20. Distributed processing and the development.
21. Creation of a reputation for technological leadership in the libraries.

Question 3

-Personnel-

1. Processing operations have been deprofessionalized.
2. A stronger sense of the library created among staff.
3. Global change capabilities and ease of changing large quantities of subject headings are pluses for technical services.
4. One drawback is time spent in front of a terminal (eye strain).
5. The specific duties of library staff change with automation.
6. Staff dependencies on equipment alter the work flow.
7. Greater interaction among staff is required.
8. Automation adds a more exciting component to their jobs.
9. While job expectations have been elevated with use of automated systems, salaries and job classifications have not kept pace.

- Users -

1. More faculty bring in classes for bibliographic instruction.
2. Users are very impressed and happy with automated system.
3. Some users prefer old card catalog.
4. Boolean searching is a real plus.
5. Enjoy putting holds on books, though confusing.

- Budget -

1. Increased travel funds.

VITA

C. Brad Robison

Candidate for the Degree of
Doctor of Education

Thesis: EFFECTS OF AUTOMATION ON ACADEMIC LIBRARIES

Major Field: Higher Education

Biographical:

Personal Data: Born in Paris, Texas, September 25, 1951, the son of Mr. and Mrs. C. B. Robison.

Education: Graduated from John Marshall High School, Oklahoma City, Oklahoma, in May, 1969; received Bachelor of Arts degree in History from Oklahoma State University in 1973; received Master of Library Science degree at the University of Oklahoma in 1974; received Master of Arts degree in History from Central State University in 1981; completed requirements for the Doctor of Education degree at Oklahoma State University in December, 1991.

Professional Experience: Assistant Archivist and Head of Records Management Program, State Archives of Oklahoma, 1974-79; Director of the Library, Oklahoma Christian University of Science and Arts, 1979 to present.

Professional Organizations: Metropolitan Libraries Network of Central Oklahoma, Association of Library and Learning Center Directors, Oklahoma Council of Academic Library Directors, Phi Kappa Delta, AMIGOS Bibliographic Council.