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# Acquiring an On-Line System for an Academic Library

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## Background

This article describes the process followed by the J. Murrey Atkins Library in acquiring an integrated library system. The J. Murrey Atkins Library is a medium-sized university library serving the University of North Carolina at Charlotte, one of sixteen campuses of the University of North Carolina system.

Atkins Library has a long tradition of using automation to enhance services. It has been a member of SOLINET/OCLC since 1976 and has had an automated batch process acquisitions system for an equal number of years. It has also used automated techniques to list its periodical and serials holdings.

The library's administration and faculty realized that, unless we took prompt action, we would have to invest heavily in additional card catalogs and human resources to house and maintain an ever-increasing, complex manual file to access the library's collections. This prospect, coupled with our manual circulation system's inability to provide effective control of our circulation process, led us to take a serious look at automation.

Even more compelling was the potential of an automated system for increased service to faculty and students at the university. UNCC's collections are housed in a ten-story tower, and the process of obtaining a location number, going to one of the stack floors only to find the item not on the shelf, and only then finding that it has been checked out, is a frustrating one for many readers. We hoped to find a system that would advise the reader that an item was checked out at the same time it provided the location number. We also anticipated that an automated catalog would give our patrons greater collection access by providing a powerful data base management system that would allow searches not possible in a manual system.

In 1982, the newly appointed director of the library, after reviewing goals with the library staff, established a number of committees to investigate specific areas needing closer scrutiny and planning. One of these was the relationship between retrospective conversion of library holdings and the improvement of services, productivity, and management. Included in the investigation was the idea of acquiring or developing an on-line system for circulation control and access to library holdings.

To perform the investigation, a committee was formed by the director in March 1982. The committee was requested to "develop specifications for an on-line circulation system; to detail what would be required to create an on-line catalog; and to investigate whether or not it would be feasible to utilize an on-line circulation system as an on-line catalog." Eight parameters were given:

- Commercial and noncommercial on-line circulation and on-line catalog systems should be investigated.
- Systems must be compatible with the University's I.D. system, and student, faculty, and staff data bases.
- The system must be compatible with existing machine readable records.
- The system must have on-line access to all files.
- The system must be capable of being shared, if problems involved with sharing can be resolved.
- The operating system should involve minimal staff support outside the library.
- Local programming should be considered only if other options are not feasible.
- Needs and methods of data entry must be addressed, in particular as they apply to circulation control and retrospective conversion.

In addition, the director required that the committee read about on-line systems and arrange demonstrations by major vendors of library on-line systems.

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Prior to appointing the committee, the director asked for volunteers for the project. He asked individuals volunteering for committee service to describe their qualifications for the group relative to their past experience, current responsibilities, and personal interest. As a result, he chose a group of five individuals to serve as the On-line Circulation and Catalog Committee. The committee consisted of two from cataloging, one each from circulation, systems, and reference. Four were members of the library faculty; the fifth was our systems analyst; and a representative from the university's computer center was also included on the committee.

From the beginning, the committee realized that it would have to proceed in a back-and-forth fashion—study the literature, then explore an existing system. The preliminary search of the literature provided the committee with background for the initial encounter with a system. This experience required the committee to expand its expertise prior to examining the next system. The evolution of expertise might be gauged from the fact that the committee first developed a four-page document entitled "Things

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We Need To Know." After myriad additions, revisions, and changes, the end result was a seventy-page document of specifications that was sent to bidders in January 1983. Throughout the process the committee found other libraries willing to share their experience and specifications.

The committee visited four operational systems within a 150-mile radius of Charlotte. Individual members ventured farther afield to Long Island, New York City, Ohio, Georgia, and Iowa. In addition, several vendors sent representatives to demonstrate their products to the committee.

Originally the committee established a list of functions the ideal system should have. It rapidly became obvious that no such system existed. Therefore, expectations were adjusted to take into consideration availability of functions under development. When writing the specifications, this was addressed by allowing the vendor to respond, "Will attempt to develop," as a category under many of the ideal system functions.

During its deliberations, the committee attempted to keep the rest of the staff abreast of its progress. But without the staff's actually encountering this spectrum of functions that were not fully developed by all vendors, it proved almost impossible for them to comprehend the difficulty the committee was having in comparing systems, all of which had components in various stages of development—what some referred to as "buying promises." This lack of comprehension bred a distrust of the system that, surprisingly, the subsequent availability of additional components only served to fuel. Still more recent experience with the system during the time it was being installed and brought into operation has largely dispelled this distrust, but it was a pitfall we would rather have avoided.

We found the process of developing specifications for an on-line catalog to be more complex than for an on-line circulation system, because on-line circulation systems are more common. The committee had hoped to view an operational on-line catalog for each system under consideration; however this proved impossible. There just weren't enough on-line catalogs in operation. We made a limited number of trips to view systems that the committee understood to be in full operation; however, on arrival, committee members found several systems less than fully operational. Yet, some of our most fruitful conversations were with libraries in the midst of implementing an on-line catalog system.

### **Specifications and Coordination**

We realized that it was of paramount importance to inform and consult with others in our university while formulating our plans for library automation. Assuming that we could present a final document to our business office or purchasing department to be sent out for purchase or bid without some form of review was, we felt, overly optimistic. These offices have the legal responsibility to make certain that purchasing regulations are followed. They would have to understand what the system would accomplish and know its benefits. With that knowledge, they could help strengthen the legal components of our bid document or purchasing contract. Obviously, the individual to whom the library reports would have to support our inquiry both on a philosophical plane as well as a practical one, because institutional resources might have to be shifted in order for the library to acquire a system.

Other groups, such as the library's Faculty Advisory Committee, were consulted so that they

understood what the library hoped to accomplish and why. They then served to help others understand the service benefits that would accrue through automation.

Early in the process the director of the library, working with the committee, prepared a cost analysis of the system, to clarify what benefits were expected for the dollars expended. This analysis served the library in good stead when documentation was required by others during the selection/acquisition process. It did not show an immediate cost savings but outlined the significant increase in services that would outweigh the system's cost. The director took care to avoid showing cost benefits and savings that he knew did not or would not exist, feeling that such items would be counterproductive and do more harm than good in the final analysis. This cost analysis will also serve as a measuring device for comparing early expectations to actual results. Break-even analysis using cumulating costs indicated the lease/purchase arrangement would show true cost savings within seven years. This analysis did not include any new services the library would provide.

The director of the computer center and the director of the library discussed, prior to the initiation of the specifications process, the role that the computer center would have in the development, placement, and operation of an integrated library system and agreed that the center should be involved in the process of developing specifications. Although both were aware that it would be possible to acquire a system that would operate on the university's main computer, a variety of considerations led them to discard that option as unworkable in the UNCC environment. The center's attitude from the outset was both supportive and helpful. A member of the computer center staff became a member of the committee, providing depth and perspective invaluable to a group which, at the outset, had limited knowledge and experience with large computer systems.

## **Bidding**

In developing our specifications, we felt that it was of prime importance to provide a thorough articulation of our library goals and how these related to automation as well as an extensive study and investigation into our library's operations and systems. Using these as a foundation, we developed thorough specifications translating this knowledge into a series of specific system requirements and a listing of questions for vendors to answer. We felt that this process was

essential if we were to receive truly competitive price quotations. It also provided a formal mechanism for distinguishing the differences between the many commercially available systems with varying operating systems, library software, and hardware configurations.

Bidding is a time-consuming process, but it was required. In retrospect, we feel that the process was definitely a positive factor in our deliberations. Making an evaluation without following such a bidding process may save some time in acquiring a system; however, the time savings are more than outweighed by the benefits of formally evaluating a bid response that can become a legally binding document. We feel that the bidding process enabled us to obtain the most responsive system for our needs at the best price.

UNCC was required to prepare bid specifications and have them reviewed by both the university and State Purchasing. In order to understand the legal requirements that relate to such a bid, the director of the library and a representative of the university's business office went to Raleigh several times throughout the entire process to meet with individuals who were assigned by State Purchasing to work in the bid proposal and help UNCC prepare for the bidding process. The individuals in State Purchasing offered helpful insights into the construction of a proposal for the acquisition of the system described in the specifications being developed by the library's committee. They also offered suggestions that clarified the contractual obligations a vendor would be expected to fulfill and what support would be available if these obligations were not met. Finally, their comments and critique helped the committee to better define its system expectations, to articulate the system requirements, and to develop an evaluation scheme. The close working relationships between the committee, the university business office, and State Purchasing facilitated the entire process.

## **Evaluation and Bid Process**

We submitted final specifications to State Purchasing in mid-December 1982. That office released bids in late January. Approximately 140 vendors were invited to bid; the bidders' conference was held in February 1983 at UNCC. Bids were formally opened in Raleigh on March 7, 1983; nine companies responded.

The committee first reviewed proposals regarding mandatory specifications. As a result, one vendor failed to survive this stage of the process. We then scrutinized the remaining eight vendors' proposals using the evaluation scheme developed



earlier. As a result of this process, we recommended that Hewlett-Packard, bidding the Virginia Tech Library System, be awarded the contract. The initial cost of the system was about \$165,000.

### **Implementation**

As the implementation began, approximately 50 per cent of the library's bibliographic records were in machine readable form. Because of the staged availability of various system functions, the time required to complete retrospective conversion, and fiscal constraints on our ability to purchase the system hardware required to utilize all of the VTLS capabilities, we expect the overall implementation to span three to five years.

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Long before bids were solicited and a final decision made on the system to be acquired, we began to plan for actual installation. The single most difficult and long-term decision was the placement of the future computer within the library. Space provided for computer installation when Atkins Library was built in 1972 proved inadequate to the needs of 1983's computers. Alternative space had to be located, and library functions occupying that space had to be relocated before we could begin to prepare the space for our computer.

Based on available data, we initially estimated the cost of site preparation at \$24,000, and projected a completion date of June 30, 1983. Because of the differences in vendors' equipment requirements, we could finalize our plans only after the system was selected. The room was not ready for equipment installation until almost a month later than we originally projected, and the final cost was 33 per cent higher than we anticipated. The renovation included wiring for all terminals, special air conditioning and humidity control, new flooring, telephones, security system, and specially conditioned electrical service.

As specifications neared completion, the committee began to consider the implementation process. As early as December 1982, the committee recommended to the director that he appoint

task forces to increase staff involvement in system implementation and to increase overall acceptance of the automated system. In addition, task forces could ensure inter-unit cooperation and participation while utilizing more fully the special skills and expertise of staff in various units of the library.

The committee, working with the director, organized the task forces, appointed the members, prepared the charges and set deadlines for the completion of the assignments. The task force members were a cross-section of library employees who were assigned to study or implement particular portions of the anticipated library automated project. At least one committee member served on each task force, frequently as the chair.

After an award was made and the task forces were established, the On-line Circulation and Catalog Committee was dissolved. As task forces made their recommendations, an Implementation Group was formed to guide the implementation of the task forces' recommendations and the overall system implementation. This group consisted of the associate director; the library systems person; and representatives from cataloging, circulation, and reference documents. This Implementation Group is still very much in operation.

While preparing the site for the physical placement of the system hardware, we made an extensive review of the system documentation and a visit to the vendor's facility, and we prepared to load data into the system. During this process, we discovered that VTLS cannot load copy-specific information about an item. This discovery required significant revision in the way we labeled and linked the collection. Originally, we planned to have numbers assigned to each copy, volume, etc., as identified in each machine readable record on the OCLC archive tapes. Barcode labels were to be generated in shelflist order, eliminating the need for a linking project in which each title is retrieved on-line and connected with its appropriate barcode number. The inability of VTLS to load copy-specific data necessitated a more labor intensive labeling and linking method and required changes in the way SOLINET processed UNCC's records and in the way the labels themselves were produced. This change in type of labels caused a 33 per cent increase in the cost of the labels.

The library, Hewlett-Packard, and Virginia Tech mutually agreed that the first phase of the actual system implementation would be the installation of the system hardware. This oc-

curred approximately ninety days after the bid was awarded. The hardware included the computer itself, two disk drives, a tape drive, two modems, a printer, and eight terminals. All the heating and air conditioning, electrical work, and data cables had to be in place before the vendor would install the equipment. Hewlett-Packard installed the hardware and its operating system in about two days. A two week hardware "shake-down" period was programmed into the implementation schedule; only after that would library-specific VTLS software be installed.

As a result of unforeseen delays, the VTLS software was not installed until six weeks after the hardware and operating system were in place. The actual VTLS software installation took only a few hours and was combined with the initial VTLS training session. At this session, VTLS representatives trained one group of staff members who would be responsible for overall system operation and another group that would deal with data base maintenance. These two groups included staff members from the circulation, sys-

tems, and cataloging units. At these initial training sessions, which lasted approximately two days, instructors covered such topics as logging onto the system, tape loading, data backup procedures, and record editing. The Virginia Tech Library System comes with extensive documentation, and the system is relatively easy to use, but the initial training was very important to familiarize staff with the basic system operation.

Immediately after installation of the VTLS software and the initial training sessions, we began the loading of the OCLC archive records from tape. SOLINET extracted UNCC's records from its master file, eliminated duplicate records from the extract file, and converted earlier records to AACRII. The tapes produced by SOLINET contained the library's OCLC records produced from 1976 through May 1983. One hundred eight thousand records, or approximately 50 per cent of the collection, were loaded from these tapes. SOLINET also generated printouts of these records in shelflist order.

The Virginia Tech Library System loaded these full MARC records at the rather slow average rate of one per minute. The system required this large amount of time to index every record. It utilized another six hours per eight thousand records loaded (or 0.5 minutes/record) to make backup copies of the data base. The backups will be used to re-create the data base in case of system failure.

While this OCLC tape load was taking place, very little else could be done on the system. Staff were encouraged to experiment with searching on the system. As records were loaded into the system, the catalog maintenance staff checked for duplicate titles, possible author and subject heading conflicts, and duplicate call numbers. After each group of eight thousand records was loaded, a printout of problem records was generated and given to the catalog maintenance staff. They reviewed these records and made appropriate changes to the records in the system. Because of the time required for this activity, the catalog maintenance staff limited the amount of maintenance work it performed on the card catalog. This decision was made in anticipation of closing the card catalog.

In the early part of the tape load, a disk drive failed. The problem was caused by defective materials in the drive unit. Because this failure occurred before the first data base backup run, the entire tape load had to be restarted. The hardware vendor responded quickly, but the failure added a total of six days to the tape load. While warranties and maintenance contracts



Dr. Lester Asheim was awarded an Honorary Life Membership at the 1984 ALA conference in Dallas. Asheim is William Rand Kenan, Jr., Professor of Library Science, Emeritus, at the University of North Carolina at Chapel Hill.

ensured that the vendor would repair the system components, the loss of data was not covered by these agreements. The disk failure reinforced the library's decision to adhere to a frequent backup schedule.

While the tape load was in progress, designated library staff worked with the university's computer center to convert student, staff, and faculty records to the VTLS format. The computer center supplied these records on tape. The OCLC tape load was interrupted, and the ten thousand patron records were loaded in about three hours. This patron file was rechecked and reloaded a month later because there were problems with duplicate records in the university's file we had used to create our patron file.

### Labeling

Concurrent with the loading of the OCLC records, the entire library staff occupied itself with labeling items in the collection for which there were records on the OCLC tape. The labeling project also identified problems that would have to be resolved by the cataloging department. These problems consisted of errors in call numbers and incorrect location indicators. Both the tape load and the labeling project spanned a period of about three months.

The barcoding procedures evolved largely from a report submitted to the director by the Barcoding Task Force. This report also included recommendations on labeling newly acquired materials. The Task Force decided to label that part of the collection already in machine readable form, rather than to follow the "quick and dirty method" of labeling items and linking records at the time of their initial circulation on the automated system. As mentioned earlier, the discovery that the Virginia Tech Library System could not load item-specific information brought us to the realization that the linking process would have to be performed manually. The Barcoding Task Force recommended that we use duplicate labels for those items already in the collection. One copy of the label would be placed on the item; the other, on the list of titles which SOLINET had produced in call number order. While the use of duplicate labels increased their cost, it eliminated the need to key in the ten-digit identification number for each record manually, since light pens could be employed for this purpose.

The printouts of the titles being loaded into the system from the SOLINET tapes were sorted first by OCLC holding library code and then by call number. The printout was formatted so there was sufficient space under each entry to attach a

barcode label. Each entry on the printout consisted of the OCLC number, the call number, title, and format. Each person on the labeling project was instructed to find the book on the shelf using the call number on the printout, verify that the title of the book and that on the printout matched, and then label the book and the entry on the printout with matching barcode labels. The actual labeling procedures were more complex because they specified the handling of such problems as call numbers or titles not matching, books in a different holding library, books in circulation, or books missing. The labeled print-outs were then used for linking the barcode number to the record in the system.

Preparation of instructions for the labeling teams consumed unexpectedly large portions of the committee's time and resulted in many drafts without ever fully eliminating the ambiguities in the instructions. Part of the problem was that the instructions were lengthy, so that people did not read them thoroughly to begin with and did not consult the instructions while labeling in the stacks.



Dr. Edward G. Holley recently announced that he will step down from the deanship of the School of Library Science at the University of North Carolina at Chapel Hill.



We had initially planned the project for the two-week break between the end of the summer session and the beginning of the fall session. But problems with the supplier of the barcodes forced us to delay the project until after the fall session had begun. To compensate for the delay, we offered staff overtime pay or compensatory time off for working nights and weekends, although the major portion of the project was completed during normal work hours. We set quotas for each unit based upon the number of staff in that unit. Each two-person team was expected to label 180 books per hour, but the actual average rate achieved was 150 books per hour.

The cataloging unit cleaned up the bibliographic problems (primarily call number and/or title inconsistencies), and the circulation unit searched a second time for the very significant number of volumes not located in the initial search. We located a large percentage of the more than five thousand volumes marked "missing" on the initial search when they were searched a second time in February and March 1984. One thousand one hundred twenty volumes remain unaccounted for.

After we had loaded both the patron data base and more than 50 per cent of the bibliographic data base, the VTLS staff returned to conduct more extensive training for another two-day period. These training sessions were broken up into functional units for those involved in system operations, circulation, cataloging, and general searching. Of necessity, each group included staff members with varying levels of experience with the system. After the training sessions, we encouraged staff members to work with the system, since we judged the effectiveness of the training would be related more to the amount of work staff members did with the system after training than to the amount of experience they had before training.

Many other planning activities occurred while the tape load and labeling were being done. Task forces reviewed the following procedures: how new books were to be entered into the system and how the data base was to be maintained; how circulation parameters should be determined and their effect on policies; procedures for retrospective conversion of items not in the system when those items circulated, a process known as "rolling conversion," and how public access to the system was to be addressed, including terminal requirements, signs referring patrons from the system to the card catalog and vice versa, and preparation of a guide to using the system.

During this period we chose a logo and local name, "Aladdin" (Atkins Library Automated Data Distribution Information Network). We decided that ten to twelve public access terminals would be required before the card catalog could be closed.

We began the linking project only after the OCLC tape load and labeling project were completed. In this process, the barcodes on the books were linked to the records in the system, a process requisite to circulating materials on-line and to allowing the reader to identify the location of each item within the library: general collection, oversize, reference, etc. Before linking, a book's location is given only in the 049 field on the MARC screen, a screen not ordinarily available to the reader.

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The linking procedures utilized the labeled printouts from the labeling project. To link a record, a staff member first retrieved the record from the system using the OCLC number. The title and call number of the entry on the printout was compared with that on the record in the system. If they matched, the number was read into the record by reading the label on the printout with a light pen attached to the terminal.

Four terminals distributed throughout the library were used to link the book label and the appropriate bibliographic record. This project began almost as soon as the initial labeling project was completed and again included all library staff. Each unit had an appointed coordinator for the project, who was trained to answer the kinds of questions and problems that would arise in the linking process. These coordinators checked all print-out sheets as the linking was completed, before the sheets were sent on to cataloging for the resolution of problems that were discovered during the linking process. For all records, except those still in circulation, the linking was completed by the target date, which was three months after the completion of the labeling project. The circulation unit linked the remaining items in a gradual process, largely finished before the library began to use the system for circulation control. Based on the complexity of the bibliographic requirements for multivolume sets, we decided that it would be both easier and wiser for

the cataloging department to handle the linking of those items.

A short time after the linking project was begun, we received and installed a new release of the VTLS software. This new release included the authority control module, which brought us to the realization that about eight thousand of the library's authority records would also require a retrospective conversion project. At this point, we are still discussing how extensive our authority records need to be. The capabilities of the system allow for very extensive records, but we have to balance this against staff resources and the need to perform other tasks.

The terminals assigned for linking were usually heavily used for that project during the normal work day. As a result, the library experienced response times greater than ten seconds during these periods of heavy linking activity. To the system, linking is equivalent to cataloging; during these periods, then, the staff "cataloged" (i.e. linked) more than eight thousand records per day! The resulting slower response time slowed the completion of the entire linking project.

Before direct loading of records began, system backups, which take six hours, were performed during normal work hours, during which time the system was unavailable for other activities. Once we began direct loading from OCLC, we could no longer afford such long periods during which our catalogers could input nothing into the system. Direct loading required the OCLC terminals to be interfaced with the VTLS. When the person updated or produced a record on OCLC, the record was simultaneously added to our VTLS. Because of the nature of the interface, if the VTLS was unavailable, the OCLC terminals were also unavailable. Therefore, we hired two student workers to perform the system backup operation on Sundays before the library opens. The library's systems analyst is available via telephone at home during this time in case a problem arises; thus far, this arrangement has worked well.

We ran a second and final OCLC tape load about three months after the initial tape load was completed. The second tape included all OCLC records generated from the time the first tape was produced to the time we began direct loading of OCLC records. This tape consists of 17,800 records and was loaded at night in small segments, so that the loading process would not interfere with normal library operations. The second tape load necessitated a second labeling and linking project.

In addition to adding each record to our data base, we have saved each transaction, such as adding or modifying a record, or linking an item, on a log tape. We can combine these log tapes with the last data base backup tapes to reconstruct our data base in case of a system failure. The OCLC tapes were loaded at times when few or no other transactions were being performed on the system since, with only one tape drive, logging transactions could not be performed while OCLC tapes were being loaded.

### **Circulating Materials**

We began circulating materials on the system about one year after it was installed. At first, we used dual circulation systems: some items circulated on-line while others were circulated manually. This provided the circulation staff with options while they became familiar with the system. It also provided the cataloging unit with more time to prepare for handling the conversion of items circulated but not in the system. The circulation staff was trained to generate various notices (e.g., overdue, holds, recalls). Our goal was to train each library unit to be responsible for the system functions that are directly related to its activities. Thus, we eliminated the need for the library units to be totally dependent on a central operations staff for routine operations and reports.

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Our public access plans for the system include both terminals and dial access. Public access terminals were installed in the summer of 1984. We rearranged the public catalog in order to obtain space to accommodate the public access terminals. Patron acceptance of the public terminals has been quite high.

As we added terminals to the system, the internal memory of the computer had to be increased to maintain acceptable response times. Within one year after installation, we increased the memory from .5 MB (megabytes) to 1.5 MB to 2.0 MB. At the beginning of that year, we had nine devices such as terminals and printers, on the system; one year later, there were twenty-nine such devices on the system.



Dial access will allow patrons with appropriate equipment to access the system via telephone lines. This dial access will operate through the university's campus-wide data communications network. An important aspect of dial access is systems security. Before we can make dial access available, we will either have to acquire or write in-house programs to eliminate terminal-generated character sequences that would allow the user to enter the computer's operating system.

Six months after the system implementation began, the director appointed a select committee to review our goal of closing the catalog, a recommendation reviewed and endorsed by the library's Faculty Advisory Committee. We plan to close the card catalog within the year.

Before the card catalog can be closed, we must have a backup COM (computer output on microform) catalog. Staff have developed the specifications for a backup COM catalog on fiche, which will not need extensive displays or frequent updates. The COM catalog will utilize records from the library's system. We hope to have as many COM catalogs with fiche readers as there are public access terminals.

One of the more immediate ways in which the on-line system has had an impact upon the library user is through the circulation of library materials. The Circulation Task Force, charged in part with examining existing policies and procedures regulating the borrowing of library materials, was one of the first to begin operation. It undertook to rethink existing policies with a view toward improving services to users as well as increasing control and accessibility of materials far exceeding what is possible with a manual system.

The Circulation Task Force surveyed faculty opinions and canvassed other universities for comparative information on circulation policies. Surprisingly, the task force retained many of our policies. We effected major changes in regulations governing faculty borrowing: we established a limit to the number of times a faculty member may renew an item; we now allow renewal from a list of items checked out for faculty (the change most requested by faculty); and we were able to strengthen the library's means of enforcing recall of library materials by instituting a process made up of notices, billings, and fines for lack of response. The capabilities of the system made these changes possible.

We have already mentioned that we did, for some time, operate dual circulation systems: manual and automated. This allowed the circula-

tion staff time to develop techniques for loading, managing, and updating the patron data base. This is a major task and proved a major roadblock to a smooth transition at the circulation desk. During the transition period, we found that performance of the circulation routines required two to three times the normal amount of time.

An even more critical factor in the switch-over process is the interface of automated circulation with those materials in the collection that are not in the data base. There are various ways to accomplish the conversion of these materials. We chose a "rolling conversion" in which barcode labels are placed on such materials when they circulate. Duplicate barcode labels are placed on the book cards, from which the cataloging unit converts and links the books. Given the loan period, the cataloging staff feel that they can have the bibliographic records in the system before any overdues need to be run.

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## **The best way to determine a system's capabilities is to see it in actual operation.**

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The library is beginning to see various efficiencies gained from using the system. The implementation of an integrated system involved the review of virtually every operation in the library. Some streamlining of operations evolved simply from the review. Already the acquisitions staff can do a significant amount of initial pre-order checking without leaving the acquisitions area. As the implementation progresses, the library anticipates eliminating redundancies that a manual system required.

System implementation added to the total work burden during the transitional phases. For example, until cataloging could load records directly into VTLS from OCLC, the system created additional work for the catalogers without eliminating any of their other work. The direct load capability eliminated most of this additional work, and we began to realize some efficiency. Of course, when the card catalog is closed, significant gains in efficiency will be made. As staff began to use the system, their acceptance of the system often reduced the time of the transitional period from manual to on-line processes.

The implementation process has also heightened each of the library units' awareness of other units' activities. Both through planning discussions and through every unit's access to the

library's central file, everyone has become more involved in what everyone else is doing.

We expect the implementation process to last three to five years. New functions such as keyword searching, serials control, and acquisitions with fund accounting may be added to the system during this period. The system offers many possibilities for handling collections that could not be fully integrated into the library's record systems before they were automated. Documents and audiovisual materials collections are still controlled by separately maintained manual records, but we plan to bring these into the on-line system. The system also provides opportunities for a more sophisticated collection development effort. We will be analyzing and discussing these possibilities throughout the implementation process, reviewing them as each new function or collection is added to the system. The integrated library system will, in fact, integrate the library.

### Summary

The staff of the J. Murrey Atkins Library have learned many things from this system's acquisition and implementation process that may be of help to other libraries about to embark on the same type of undertaking.

- Maintenance of ongoing communications with the entire library staff throughout the system acquisition and implementation process is essential to the success of the process. Low pressure, gradual involvement of many library staff members in task force activities, training, and general discussions allow people to become familiar with the system in a non-threatening way.

- The best way to determine a system's capabilities is to see it in actual operation in a library.

- The best way to ascertain that a system's capabilities will suit your needs is by taking reference questions, searches, and other transactions from your own library and trying them on the system being examined.

- Pay particular attention to the sequence and type of screen displays the user must work through when doing bibliographic searches on the system. An on-line catalog is different from a manual one in many aspects. The system's handling of bibliographic searching may require both changes in cataloging operations and in the user's approach to a search. Small details, such as the occurrence of the system vendor's name on the screen, can result in confusion for the user.

- Contact other libraries that have been through the system acquisition and implementation process. They are the most valuable sources of information on the subject. However, be sure to do background preparation by reading the literature and establishing your own goals for a system first.

- Realize that the cost for an automated system includes much more than the cost of the hardware and software. Other costs include space renovation, supplies, processing of the library's existing machine readable data, data conversion, and necessary system upgrades. A hidden cost, not often considered, is that of the extensive staff time required for acquiring and implementing a system.

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## Be prepared to be unsettled during the system implementation.

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- Despite your best efforts to word specifications so as to elicit unambiguous responses from the vendors, be prepared for misinterpretations to occur. Again, the best way to evaluate a system's capabilities is to work with the system.

- Be prepared to be unsettled during the system implementation. Because of the complexity of library operations and of the systems themselves, it is virtually impossible to have all the answers ahead of time. Unexpected problems and the need for unexpected decisions will arise.

As more systems are installed and operate for longer periods of time and as the literature — particularly the literature relating to on-line catalog systems — becomes more plentiful, the problem of selecting a system will become less adventuresome, though probably even more complex. While involved with the selection process, the group given the responsibility for selecting the system must also communicate its procedures to staff not involved in the selection process. Keeping such lines of communication open is important not only because it will affect the whole staff attitude toward the system as it is brought into operation, but because staff input to the selection committee will point up areas of concern and importance that will ultimately become primary concerns of the entire group of users of the system.

The installation of an on-line system is a major undertaking for any library and one that

can be both satisfying and frustrating. This article could only highlight briefly some of these experiences from the perspective of one North Carolina academic library. Any one aspect could be described in significantly greater detail. The authors welcome questions and comments.

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