Automated Turn-Key Systems in the Library: Prospects and Perils

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DURING THE LAST decade, we have witnessed an upsurge of interest and capital investment in the installation of automated systems in libraries. Functions normally handled by sluggish and error-prone, paper-based systems were seen as prime targets for computerization in the 1960s—particularly serials control, acquisitions, interlibrary loan communications, public service, and circulation control. Presently, we are cautiously feeling our way around the various options made available by computerized systems; by the 1980s, libraries should be able to take full advantage of more than twenty years of systems development and experiences with available equipment.

The trend toward automation follows two main routes: (1) the minicomputer-based, stand-alone system, brought into the library to handle only problems involving local materials and variables; (2) monolithic library information utilities, such as the Ohio College Library Center (OCLC) and Bibliographic Automation of Large Library Operations Using Time Sharing (BALLOTS), that rapidly distribute both local and global data, and distribute costs among participating libraries as well.

One of the most problematic difficulties involving the expanded use of monolithic networks such as OCLC and BALLOTS is that they must be integrated into individually developed systems for each library. This integration has so far been slow, haphazard, and at times only partially successful.

This article will therefore attempt to familiarize the reader with some of the problems, issues, and alternatives in designing individual,

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stand-alone systems for servicing selected library operations—and to analyze potential problems when these minisystems are later connected with a larger network at some future time. Particular emphasis will be on a new mode of operation called *coupling*, and also on various strategies that should be considered when masses of data must be fed into a system retrospectively.

ADVANTAGES OF AUTOMATION: A BRIEF OVERVIEW

Libraries have been turning to automation for the same general reasons as have other organizations: their existing systems cannot keep pace with organizational growth, and previously acceptable inefficiencies turn suddenly into unacceptable impediments to future growth.

From a broad perspective, pre-automation problems take on either or both of these forms: (1) they are "input/output-bound," or (2) they are "compute-bound."

A system is said to be "input/output-bound" when its overall efficiency and capacity to handle growth is hindered by the limited capabilities of its input/output devices, such as keyboarding, storage capabilities, or graphic display devices. Typical examples include needs for repetitive keyboarding of the same data, problems in updating overlapping data bases, generally cumbersome data management routines, and massive amounts of paper printouts that require too much checking or editing. The ultimate result is financial waste for the library.

A system is "compute-bound" when batches of data require additional reformatting and manipulation, but the system simply doesn't have the storage and memory capabilities to do the job. Typical outcomes of this problem are duplication of effort by different library departments; inability of library management to retrieve useful information on various aspects of library operations; and general inflexibility of the entire system to adapt to changing needs or demands. The "compute-bound" system is often a result of poor system design or of simply a previous lack of foresight or resources when the system was originally installed.

THE TURN-KEY SOLUTION

Stated simply, a "turn-key" system can be thought of as a little black box which is purchased for a specific application. Appliances and

systems such as dishwashers and automobiles are thus "turn-key" in nature. Their greatest advantage is that with a bit of alteration, they can be used to do many different tasks.

The idea of purchasing a turn-key automation module to perform various library functions has many advantages. Perhaps the greatest is that most of the costs of research, development, programming, service, and maintenance are born by the supplier or vendor. The library (or local computer center) is thus relieved of a great deal of trial-and-error in the implementation and tuning of the system, as well as of the associated costs of revamping the system when needs are not being satisfied. The prime disadvantage of the turn-key approach is that only the supplier has control of the programs by which the behavior of the system can be modified.

ASSESSING THE NEED FOR A TURN-KEY SYSTEM

Consider a large academic, public, or special library with a history of large and regular growth. Increasing labor costs have disproportionately increased the costs of circulation control, interlibrary loan, cataloging, serials and reference work, and so forth. At some time, library administrators responsible for the cost-effectiveness of operations will seriously tout the benefits of computerization. They will undoubtedly begin by suggesting that the computerized system is necessary because: (1) the increasing workload demands the speed and efficiency of a computerized system; (2) the new system will achieve better cost-effectiveness; or (3) the existing system is obsolete.

SPEED AND EFFICIENCY

Generally, this is a point of view that is most convincing. For example, in a library handling 3,000 book loans and returns each day, the manual circulation system must cope with renewals, overdues, holds, fines, and so on. The total amount of paperwork is overwhelming. Acquisitions for libraries with budgets over $1 million a year can suffer from serious backlogs and delays in ordering, checking-in, claiming, searching, and payments.

COST-EFFECTIVENESS

This argument is often accompanied by plausible cost/operations audits of one kind or another. Most probably, the computer is shown to allow a reduced or at least steady-state labor situation—with one person at a computer doing the work of five or more staff members.

It is true that computers can help people perform basic bread-and-butter operations faster and more efficiently. However, they can also allow people to commit bigger mistakes faster. A simple cataloging error can feasibly be replaced by a "failsafe"-type computerized disaster.

Assuming there are no bibliographic Dr. Strangeloves in the department, such catastrophes can be avoided by extremely careful planning and monitoring of the system's design and start-up procedures. Since the turn-key vendor is doing most of the installation work, library personnel are free to engage in continual evaluation and checking. The advantage of this "division of labor" is not to be underestimated—a total in-house operation is comparatively difficult and expensive. Further, one should always assume it is easier to check up on someone else's work than his own.

There is a common misconception that increased cost-effectiveness means immediate savings. This is an unfair expectation of a new system that represents extensive capital investment. Generally, if there are to be any savings with a turn-key system, they will be long-term. Then too, they will not be increasingly beneficial unless the system is designed to handle a significantly greater workload later without major alterations.

In addition, large project cost figures (supplied by in-house talent and the turn-key supplier) are usually incomplete. Some costs may be hidden, but in library situations this should be understandable. Conversion to a sophisticated turn-key system can bring about new demands for services or principles of operations that could have been only approximately predicted. Also, one should not expect complete efficiency from the start—the system will no doubt be upgraded in time, and upgraded again to handle emerging needs and problems.

Finally, optimal cost-effectiveness will result only if as much equipment as possible is purchased in increments, as needs dictate. Disk storage, for example, should be purchased on a slow, continual basis, as the growth of the library warrants; there is no need to have all two hundred megabytes on the first day. Terminals should be bought in quantities that reflect the library's increased ability to provide training, input the data, and afford the total operation.

THE EXISTING SYSTEM IS OBSOLETE

This is a traditional horse-and-buggy argument, inspired perhaps by the notion that anything so fast as the computer must render all previous operations obsolete. While this is a reasonable contention, it

is also true that any system may be superseded by another next year. In fact, the fear of obsolescence can have the opposite effect, by encouraging library administrators to adopt a "wait-and-see" attitude. After all, won't next year's model be even better?

The important point here is that the possibilities of updating hardware and software must be part of the contractual arrangement between the library and the turn-key vendor. The library must be satisfied that the supplier is making the best possible equipment offer at the moment, but that the system should be reasonably compatible later on with improved modules, and even with radical changes in computer systems design and philosophy.

In short, the turn-key system must have the capacity to grow not only in the number of units it contains, but technologically as well.

WHAT TO EXPECT FROM A TURN-KEY SYSTEM

The turn-key systems supplier will undoubtedly impress upon you that he is taking advantage of the latest in hardware/software. He will emphasize that his product is specifically tailored to library needs, that he used to spend hours in the library as a youth, and that a good professional rapport will be forthcoming between his people and library personnel.

Caveat emptor? No; turn-key systems are sophisticated items, and there is no extraordinary need to suspect the salesman and vendor as one would a used-car dealer. However, it is perfectly reasonable to expect the very best from the turn-key system, and there are good and bad ways of making demands upon the dealer.

The supplier, of course, should be kept on his toes and communicated with on a regular basis. One should not assume he will solve all the problems on his own; however, a constructively critical attitude may be occasionally useful. Perhaps most importantly, the same control and attention must be applied to the vendor as to any other library operation. One should not make the common mistake of believing that computer operations are unique and mystical. If given an elite status, the vendor may take advantage by developing what is most beneficial for his system, instead of for the library.

RESPONSIBILITY, PREDICTABILITY AND LIABILITY

In practical terms, who is responsible for the eventual success of the turn-key system? Since the turn-key supplier is responsible for almost

all of the installation, maintenance, and operations aspects of his wares, the responsibility for success clearly lies with him. The turn-key system is subject to review and control, as is any other item in the library budget.

What are the odds of success of the computerized turn-key system? The chances of success can be said to be enormously positive, because these systems have accrued a long history of acceptable performance in many institutions. Some libraries, of course, may wish to experiment with variations of the equipment and systems, and should be prepared to accept the headaches and risks that accompany the pioneer role.

What if something in the system goes wrong? To avoid problems in liability, library managers should let their legal counsel and purchasing agents examine contractual arrangements carefully. If the library reasonably follows the supplier's recommendations for usage, and something does go wrong, then at the very worst liability is well distributed.

All in all, the turn-key approach to library automation allows management to proceed with courage and confidence. Lately, however, a topic of concern has been the possibility of financial default on the part of the supplier. In this case, the library is simply in the "buyer's market" and will have to try to salvage what it can. The seasoned purchaser knows that it is the horizontally developed (i.e., diverse-product-oriented) companies that will run the least risk of default, all other factors being equal.

MISSED OPPORTUNITIES IN LIBRARY TURN-KEY APPLICATIONS

Surprisingly enough, some libraries continue old habits despite new flexibilities made possible by the installation of turn-key systems. For example, the circulation librarian might be able to discontinue fines because of new ways of rigorous control made possible by the new system, but not do so. Similarly, the acquisitions department may be able to order books directly from publishers instead of from a number of dealers, but not do so, despite the savings possible. Old habits die hard, of course, but a possible reason for missed opportunities is that the computer can offer the appearance of progress without the substance. The possibilities of new operating procedures created by the turn-key system should be explored at every opportunity. Old procedures that required a great deal of paperwork (e.g.,

direct ordering from publishers) may no longer present the same obstacles.

MONOLITHIC TURN-KEY SYSTEMS

So far, turn-key systems have been discussed in a way that gives the impression that they only take the form of individualized, "plug-in" modules, relatively small in size and self-contained in the library they serve.

In fact, systems like OCLC and BALLOTS are also "turn-key" in nature. Despite their size, they also function as "black boxes" which a library can "plug into" for the execution of specific functions.

Inasmuch as turn-key users do not have direct programming control over their systems, OCLC and other networks further operate in a "turn-key" fashion. In fact, OCLC recently announced tentative plans to begin programming applications for serials control, acquisitions, interlibrary loan communications, public service, and circulation control. All five of these operations are also prime "turn-key" prospects, and the possibility of utilizing OCLC or other network programs to aid in these library automation functions looks particularly attractive. The situation would almost mimic a public utility such as the telephone company, where various functions may be purchased just by dialing a certain number, and agreeing to pay for a certain amount of message units for services rendered. In this respect, networks like OCLC can be considered potential library "utilities," with many library departments replaced by a monthly utility bill.

However, there are no handbooks or guidelines to aid individual libraries in utilizing the capabilities of OCLC-type networks. Certainly, a library can decide to invest a certain amount of time, effort, and money for this purpose—but how much of this "research and development" will actually pay off, and how much will be wasted effort? Remembering that computerized mistakes can be like flicking the first in a row of dominoes, the library manager must keep a careful balance between creative exploration and applied (or inapplicable) research. The safest route is to pick out areas of operations which represent the least risk in case something goes wrong.

CHOOSING AREAS FOR UTILIZATION OF MONOLITHIC TURN-KEY APPLICATIONS

On the surface, it would seem that the "safest" areas are those operations that rely only on internal variables. For example, circula-

tion control and the acquisitions system rely mainly on factors involving the library collection itself and the budget. If OCLC headquarters were bombed, the impact of the blast would seemingly be minimal compared to the effect on cataloging and serials control, where a great deal of data was obtained from the OCLC data-base.

However, the deciding factor is really whether or not the operation will be under pressure from patron use. Cataloging and serials control are not under public pressure to be continually operating. They can afford to interconnect with the monolithic system, with relatively little risk in case of external disruption of services. Circulation control, on the other hand, must be continuously running to satisfy the everyday needs of the library. This system should be comparatively independent of outside needs, and should also be run on the smallest, simplest, and most self-contained system possible. The acquisitions system similarly does not have to be running continuously for daily library use. Its future with monolithic external turn-key systems, however, is limited by the simple fact that many library philosophies will not allow for the external management of book acquisition.

COUPLING

Coupling is a term used to describe information-sharing among separate computerized functions. For example, bibliographic coupling occurs when an acquisitions system operator searches the cataloging data base to retrieve bibliographic information necessary for ordering a certain item from a book dealer. After a purchase order is created, information from the book dealer (via his invoice to the library accounting department) will create information that can be tapped for either checking-in or claiming operations. After receipt of materials, cataloging information not previously available can be fed into the cataloging system after a simple check of what the system currently holds. Meanwhile, the circulation system (also coupled into the system) can even be programmed so that high demand of a special title alerts the acquisitions department that insufficient copies had been ordered, or that replacements are necessary. Low demand in other areas can alert library management that funds are being spent for little-used material, and perhaps even that weeding of certain sections of the library may be in order.

The net effect of coupling is the elimination of duplication in the input and output of the total system. Data is constantly updated, and

its accuracy monitored. Coupling allows two or more computers to share workloads, resources, and backup capabilities. Aside from saving labor costs in terms of eliminating duplicate keyboarding of data already entered elsewhere, coupling can ensure interaction of different library departments in the way that library management wishes them to interact, i.e., on a continual basis.

RETROFIT COUPLING, OTHER PROBLEMS, AND THE ROLE OF THE SYSTEMS OFFICE

Obviously, there are many libraries which would jump at the chance to automate their entire operation by way of a turn-key system, but are deterred because of the massiveness of their collection. The enormous amount of keyboarding necessary is, to non-computer-oriented administrators, akin to digging a hole to China. Particularly awesome is the fact that the data must be provided in a format that is acceptable to the software of the system for which it is intended.

Two practical matters often come to the forefront when retrospective inclusion of data into a turn-key system is considered. First, the library may wish to modify one or more of its operations which the turn-key system will be controlling. In such a case, the vendor of the system will be the first to remind the library that this is the library's responsibility, and not his; fair enough. However, the situation is not as clear when the supplier "upgrades" his turn-key software to such an extent that portions of the library's existing data are rendered unusable. Here the library must take responsibility in re-massaging data that can be fed automatically into the turn-key system.

In this case, the library systems office must exert creative authority by preparing a coupling program that will refit the available data into the turn-key system. This assumes, of course, that there will be: (1) another computer available, (2) a programmer, and (3) capability on the part of the turn-key system to be coupled in this way.

Suppose, for example, the library knows that approximately 5,000 of its book users have already dropped out (or perhaps graduated) from the university, but are still listed on the circulation file. This data is available at the school's registration office in machine-readable form, but is not usable in its present form for the library's turn-key system. Here, the systems office must create a coupling program between the school's registration system and the library's circulation system to bring the library's data base up to date. Truancy notices

need not be sent to vacant dormitory rooms, and massive rekeyboarding of data is not necessary.

In essence, the role of the systems office for the creation of temporary or permanent coupling systems is very important because the systems vendor will simply not know ahead of time which of the library's data may become obsolete, incorrect, or unusable. Collections can be merged or split; entire libraries can be physically moved; new weeding programs can be initiated. In all these conditions, the library systems office is an essential element in creating coupling programs that reflect continual changes in institutional goals and operations.