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Serials Automation: Fact or Phobia - A Progress Report

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Though it is often not common for those outside our field to think of the library taking advantage of technology, it is true that since the early 1930s the library community has indeed been searching for new ways of utilizing the latest technology. This search has included applications of technology to serials, a topic which is the focus of this conference. In this report, I would like to summarize briefly the historical perspective of serials automation from 1930 through the late 1960s and to address specifically the various types of serials automation systems which are now available. I will further contrast two available online serials systems, the UCLA ORION system and Faxon's LINX system, both of which are available today. In comparing these two systems, I will focus on design issues and specific characteristics. Furthermore, I am prepared to offer online demonstrations of the Faxon LINX system following this presentation.

From the 1930's to about 1965, most of the early serials control systems followed a course based on punch card technology and limited to the unit record. This limitation required a separate mechnical device for each operation. Punch cards were used as a mechanism to produce serials lists which could be printed and distributed, thus facilitating the sharing of information.

As software languages advanced to a higher level and unit record equipment became more sophisticated, these punch card systems developed into basic serials check-in and claiming systems. These systems were characterized by serials processing units in libraries which maintained an inventory of punched cards, each representing the next expected issue of a title. As issues arrived at the library, the corresponding punch card was pulled and submitted in a group to a Data Processing Center. From the punched card which contained title and issue-specific information, lists of serials and issues held could be readily produced in a batch mode. After a fixed period of time, the serials librarian could pull all the remaining cards and run these as well to produce a list of the missing issues. Thus, the first serials check-in and claiming systems operated.

These punch card systems greatly facilitated the work of disseminating serials information beyond a single file into the public service departments. Since it was now possible to issue serial printouts to users and to other libraries, the cost effectiveness of such a system could be readily justified.

Indeed, in the 1960s there were an estimated 30 or 40 such systems operating in the United States in different types and sizes of libraries. Notable among these in the United States were Washington University in St. Louis, Purdue University in Indiana, the University of California at Los Angeles and the University of California at San Diego. These early punch card systems were primarily developed by an individual within each library who was solely responsible for analysis and development. At that time the library community had not agreed upon standards for the bibliographic description of serials or for summary or detailed holdings statements. Likewise, a national communications format did not exist. Nevertheless, these systems utilized the latest technology of the day and provided an effective solution to the control of an increasing volume of serials publications.

During the late 1950s and 1960s, this control over serial publications became even more important. The information explosion arrived after the successful launching of the Russian satellite. It was a period of panic in the United States and the federal government made a major commitment to research and development efforts. Federal dollars supporting these efforts grew from 12 billion in 1962 to 26 billion by 1969. An influx of dollars into research and development brought about increased emphasis on dissemination of vital information to the scientific community. Pressure from the scientific and technical community was placed on libraries and research centers all across the United States; and the serials publication was the most demanded form of information. Obviously, the latest research information appeared in serial literature and thus, the highest demand for access came from this community.

At the same time, computer technology continued to advance into what is called the "third generation", a generation characterized by increased online interactive systems. Taking advantage of these improvements, and the significant cost reductions in computer storage, two major universities in the United States developed online serials systems. These systems, developed at Northwestern University in Evanston, Illinois, and the University of California-Los Angeles Biomedical Library, have successfully operated for over a decade. Certainly, it is correct to characterize these online systems as pioneers in online serials control systems. In the ensuing years, we have witnessed actual cost decreases in the operation of the UCLA system. To illustrate the point, let me simply mention that the original terminals purchased for the UCLA Biomedical Library cost $5,000.00 each. Today, that system operates on an ASCII terminal which costs only $675.00. We are all aware that storage costs have decreased significantly since the late 60s and early 70s, and the microcomputer combined with the hard disk will serve to further reduce these costs.

It is not uncommon to locate other punch card check-in systems which have evolved from cards to magnetic tape to online input and maintenance of the file combined with the production of various lists and microform products via sophisticated software control. Indeed, significant enhancements to the early systems developed at Washington University and at University of California-San Diego have been made so that these systems can now be made available in the online environment.

Today it is possible to divide the online serials systems which are available in North America and Europe into several broad categories.

1. Large research libraries have independently created systems which are mainly mainframe-based. Examples include UCLA and the NOTIS system at Northwestern University.

2. Vendor-based serials control systems are also mainframe-based. Ready examples of these systems include the Faxon Company's LINX and Ebsco's Ebsconet.

3. Distributed systems utilizing minicomputer-based equipment are widespread as well. A notable example of these systems is the PHILSOM system, with its network of seventeen academic medical libraries. Other systems which offer potential are Warner-Eddison's INMAGIC and the National Library of Medicine's Integrated Library System (ILS) marketed by AVATAR Systems.

4. The newest member of these categories is certainly the stand-alone microcomputer-based system. These systems have primarily been designed for small libraries and are exemplified by the CHECKMATE system, or the META-MICRO system.

It seems true in the United States that the vendor-based systems now hold the primary market share, though it is also important to note that automation has not yet arrived in the serials department of the majority of the libraries in the United States and in Europe as well. Online catalogs, online cataloging systems, and circulation systems have been seen to take a precedence over serials control systems. It appears as well that while the library is willing to invest more than half of its acquisition budget in purchasing serials, it has been unwilling, at least up to this point, to invest funds in the online control of those materials. One must note the increase in the number of conferences which are now focusing on online serials management.

In 1980 the Library and Information Technology Association sponsored a two-day workshop on this topic which was offered in Milwaukee, Wisconsin, and was the first major serials automation conference in the United States. Since that time many other conferences have addressed this issue and I believe that it is meetings such as this one that are vital in spreading the word that serial systems are not only available today, but are cost-effective.

Several preliminary issues should be examined before we pursue a further investigation of available systems and a more specific comparison of the two available systems I mentioned earlier. Certainly serials control is made up of more than one element and it is important to decide what elements are vital to automated serials control. In addition, we must ask ourselves what we expect to achieve in the automation of our serials handling.

It is appropriate to divide serials system activity into two separate and distinct operations. The first operation, bibliographic identification and control, is the process that one uses to locate serials bibliographic information, generally using a utility such as OCLC, RLIN, WLN, and UTLAS in North America.

These large databases contain full bibliographic descriptive information for serials titles. In addition, these records also contain identification of the libraries who own a particular title. Certainly the medical library community is on the forefront in the development of national serials databases for the biomedical community and will include detailed location information as a part of the MEDLARS III project. The bibliographic utilties and NLM efforts have greatly enhanced the bibliographic information available for serials.

As most of us who are attending this conference are aware, the largest and most expensive part of any serials control operation is the labor-intensive activity associated with the issue control and management of the serial. Processing functions generally include check-in or recording of receipt information from new issues, identification of missed issues or records which have stopped coming, claiming of these missing issues, collation and support of information required for the binding activity, recording of payments for fiscal control, generation of new orders, and often a routing mechanism to ensure that the journal is properly forwarded. These functions tend to be labor-intensive and the automation of them offers significant benefit to both technical services and to public services. In addition, the serial offers many challenges because it is a living organism which can die, merge, split, or be born.

The batch processing systems discussed earlier in this paper were successful at controlling some of these processing functions, but they were limited by the number of titles that could be handled in a card environment. Toward the end of the 1960s and in the 1970s, it became clear that batch systems could not provide the response and interaction required to manage a large collection. UCLA's Biomedical Library submitted and received a grant from the National Library of Medicine to develop an online serials processing system at about this time. Using this grant funding, the UCLA Biomedical Library developed and implemented online real-time processing of serials in 1970 controlling the processing activities of some 6000 titles. Today, the UCLA Library System uses the same software, with significant enhancements, to control the processing of 70,000 active serials with online decentralized activity taking place in nineteen branches. UCLA's network includes 150 terminals, of which 90 are used to support technical processing. The additional terminals are available for direct patron access. Nine terminals are dedicated in the University Research Library for serials processing and control.

While the UCLA system was designed to control the library's serials, the Faxon system was an outgrowth of the subscription servicing and renewing business which introduced automation in the late 1950s. By the mid-1960s Faxon staff were utilizing online files and systems for the bulk of the work of controlling subscriptions. Today Faxon's employees in our Westwood, Massachusetts base utilize over 400 terminals to process their work, and all branch offices and subsidiaries are connected to the mainframe IBM 3081 computer located in Massachusetts.

The LINX serial control system developed as a logical extension to the automation efforts that were applied by Faxon to its basic subscription services. As a part of this automation activity, Faxon continually compiles an extremely large amount of

valuable data that could be accessed online and utilized effectively by the library community. This factor lead the company to begin its efforts to design online, interactive systems that would be offered to the information services community under the umbrella term LINX.

Separate, yet interrelated services are currently available through the LINX network: DataLinx, including Courier for electronic mail, is a subscription package that allows online access to nineteen different Faxon files containing bibliographic, publisher, and client-specific financial information. Courier is an electronic mail system for online transmission of orders, claims, and queries to Faxon as well as to any other LINX user. SC-10 is the online check-in and claiming module. Route is an online system which streamlines the process of maintaining and creating journal route slips. The Union List system is currently under development and will be market-ready early this fall. Faxon's Union List system features online maintenance of member records and a wide variety of listings and indexes.

For the remainder of this session, I will compare the design philosophies and features of these two mainframe based systems. Specifically, I will describe and compare: building a record, searching, claiming, screen layout, and binding. Furthermore, I will comment on the costs of both systems.

Central to the UCLA sytem is the concept of the master bibliographic record which allows the sharing of bibliographic information while at the same time enabling each library unit to record its own branch-specific processing information. This master record is in fact created at the time of the original order, and additional information, such as full cataloging, is successively built upon this single record, thus upgrading it.

When building a serials record, the user selects from nineteen different patterns of receipt which govern the prediction of the next expected issue and thus control the claiming program. This step is crucial and can be complex, often requiring knowledgeable staff member input. All users of the system will then base their activity against this single master record.

By contrast, the Faxon SC-10 system provides separate databases and records for each user. In this way, users can control all aspects of their records including selection of a main entry. SC-10 records are created from information already available in Faxon's title file. Building a record requires about two seconds, as Faxon's title is downloaded along with the ISSN, frequency, and indexing and abstracting information. A check-in matrix area is automatically created by the system along with a claiming interval, both based on frequency.

The UCLA system offers full Boolean searching of records, which interestingly has created some problems for serials searching. Because serial titles often are common or are even stop words, UCLA staff have been forced to create alternate "Q" titles. These titles are simply the serial title with a Q tacked on, creating unique words and allowing the searcher a better chance for retrieval.

Faxon's SC-10 offers approach to a serial record based on three forms of the title. No Boolean logic can be used, but rather searching is similar to that used in a manual cardex. Once in the file, the user can browse forward and backward alphabetically, or through multiple matches to a particular search strategy.

The UCLA system is a MARC-based system. An early design decision was to encode even local information into MARC fields (the 900 series specifically) using local definitions. These fields held information about check-in, vendors, prices, etc. When the Biomedical Library created its serials system, no standard existed for holdings. The current UCLA system uses the holdings format originally designed for the Biomedical system. Data is entered in specified formats which allow the system to interpret holdings data. The screens tend to be highly encoded, but separate formats are provided for each task which minimize display of unnecessary data.

By contrast, an early design decision at Faxon was to use labels, not codes, so that screens would resemble traditional check-in cards when possible. In addition, since the product would be used by a wide variety of library types having unique needs, it was decided that a free-form volume and issue designation area was best, one which would not require specific standards.

These design decisions affect more than screen layout. UCLA's use of a standard, encoded holdings format combines with the pattern code to allow the system to predict the next expected issue. Users simply hit the enter key, with a single keystroke, if the system is correct. Claiming is then based on this next expected concept. If the expected issue is not received by its specified date, a claim is generated. Or, if issues arrive out of sequence, a gap is created and the claim is generated.

SC-10's free form volume/issue area precludes issue predition and requires that a completely different approach to claims detection be adopted. The core design concept for SC-10 is centered on expected activity against each title record within a given span of days, regardless of the type of action entered or the specific volume and issue being inventoried. For example, the system will automatically establish a fourteen day interval for any weekly publication. Translated to the operating claiming system, these fourteen days must elapse between the time of entry of an issue on the file before the system considers the title to be potentially lapsed. Claims are generated as a feature of SC-10's claims warning system. Titles that need claiming action are detailed in a series of printout reports, arranged according to the source of acquisition for each title. Those placed through Faxon appear first and action is automatically taken by Faxon personnel. At Faxon, we call this full-service claiming since Faxon staff actually research, process, and post all claims activity for those titles on subscription order through Faxon. Greatly increased claiming control is thus achieved. Statistical analysis of specific customer claiming activity before and after implementation of the system has shown nearly 100% increases in number of claims resolved, decreases in claims outstanding, and siginificant increases in total claims processed, all without additional staff at the library site. In fact, users have found that by transferring labor to Faxon, they are able to utilize their own staff more effectively.

Binding and updating of holdings statements is also affected by the decision to use a standard, encoded holdings format. UCLA's predictive system allows an automatic notification upon receipt of the last issue of a volume and a subsequent updating of the holdings string. SC-10 must take a different approach to binding since issues are free-form. Though a binding module is under study at Faxon, it is not yet available for use.

Statistical, administrative, and simple listing reports are available from both the UCLA system and SC-10. These reports are essential to the administrative control of the serials collection, and enable the user to share information about serial holdings in a ready access format. We should remember that one of the first reasons for providing punch card serials control was the ability to provide holdings lists to public services areas.

Today's library should not be constrained by technical problems or even economics in obtaining online control of its serials collection. Technology has advanced to a high state of reliability; availability costs are reasonable and affordable. These facts are especially recognizable when you examine the cost of your manual serials operation. Staff and manual labor continues to rise in cost year after year. Furthermore, in recent years, we have seen that staff are vulnerable in an era of library budget cuts. In addition, the services which you are able to provide with a manual serials control operation are limited. Consider then the costs of this manual operation when compared to an online system, which will provide enhanced control over your valuable serials collection and the opportunity to provide vastly improved service.

We estimate that the UCLA serials control system costs approximately $2.00 per title per year. These costs are associated with storage and computing power used to manipulate title records and the batch products which are produced from the system. These costs in relation to the cost of the journals themselves seems reasonable. Faxon now offers a single annual fee, much like a subscription, to its LINX system. We encourage you to make as much use as possible of the system within that subscription. There are no usage charges associated with LINX and libraries are encourage to select the components which best meet your specific needs. No additional charges are incurred for components which you do not use. In addition, Faxon recognizes that volume pricing is required for larger institutions and larger users, and we take these facts into consideration when quoting this annual fee. I would be happy to discuss this matter further with anyone who is interested following today's presentation.

We find ourselves on the frontier of serials management once again. In the near future, all systems will evolve and as microcomputers become even more widely available, we will want to make increased use of them. Certainly, we will want to network our microcomputers in local, regional, or national networks in order to reap the benefits that come with shared data. Leadership and direction in this networking effort is required and we at Faxon are commited to remaining closely involved with these directions.

In the coming age of full text transmission, both the vendor and the library must work together to adapt to the changes which will

indeed allow us to better serve our users. Automated serials systems must be designed so that it is possible to link to full text distribution services. It is important for every library to begin to consider serials automation now. We are not faced with technological unknowns at present, or even serious economic restraints. Today any library can have an online serial control system in operation. It is only a matter of priority which will prevent us from implementing these systems.