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A microcomputer-based, net-lending interlibrary loan system*

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A microcomputer-based, net-lending interlibrary loan system was developed at Lane Medical Library, Stanford University. The system, designed to generate the monthly billing invoices and all necessary statistical reports, has reduced the time required for logging-in procedures and compilation of monthly, quarterly, and annual statistics. User menus, help screens, and choice fields were developed explicitly for library staff who have little or no computer experience. The program was written using the DataEase database management software running on IBM PC, XT, AT, or compatible with a minimum of 512K RAM. Described are features of this automated interlibrary loan management system and its use in a net-lending interlibrary loan department. It focuses on data entry in the "Library Directory" and "ILL Log Sheet," details of billing invoices, and statistical reports, and flexibility in modifying tax rates, borrowing fees, and other parameters.

INTRODUCTION

The microcomputer-based, net-lending interlibrary loan (ILL) system was developed at Lane Medical Library, Stanford University in 1987. The purpose of the program was to automate the processing of some 8,000 incoming ILL requests by library staff who have little or no computer expertise. Several software packages designed specifically for interlibrary loans were reviewed; however, of the ILL management software available at the time, none totally satisfied the needs of a net-lending library [1]. Most, including FILLS (Fast Interlibrary Loans and Statistics) [2-3], ILL3

DataFile [4], and EasyLink [5], were written for borrowing libraries.

Development of an ILL management program within the library offered advantages that were not possible in commercially available products. Chief among these was the opportunity for input from ILL staff members. Their recommendations and suggestions focused attention on the characteristics a net-lending library ILL management program should have: comprehensiveness, flexibility, simplicity, and accessibility. It should also enable the ILL unit to eliminate paper files and to reduce the complexity of ILL operations [6].

The ILL management system was developed using DataEase, an off-the-shelf, relational database manager. This program was selected because it was recommended and supported by Stanford University's

* Based on a paper presented May 25, 1988, at the Eighty-Eighth Annual Meeting of the Medical Library Association, New Orleans, Louisiana.

Figure 1
Interlibrary loans log-main menu

```

INTERLIBRARY LOANS LOG - MAIN MENU
1. Add/Delete/Change Library Directory
2. Add/Delete/Change ILL Requests
3. Backup the Database
4. Restore the Database
5. Reports Menu
6. Constant Forms for ILL Policy Changes
7. Go to DataEase Menu
1 to 7 = UP = DOWN = RETURN = END
    
```

computer center. The program combines the power and flexibility of better-known systems, such as dBase III Plus, with ease of use, which allows for rapid application. DataEase was evaluated in the following manner: it offers "prompts and menus as well as programming language; [it] is appropriate for users who need a powerful, flexible database but who do not have extensive programming experience" [7]. The list price for DataEase was \$600.

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A MENU-DRIVEN SYSTEM

In large part, the system is menu driven with eight user menus. Each menu presents a list of the available ILL functions accessible to library staff. The system begins with the "Interlibrary Loans Log-Main Menu" (Figure 1). On this menu, the function and purpose of each selection is well defined.

By selecting item one, "Add/Delete/Change Library Directory," from the main menu, the "Library Directory Institution Record Entry Form" (Figure 2) is displayed on the screen. This is one of the two major record-entry forms. It maintains data, such as address, affiliation, and taxability, for all institutional borrowers. The system also automatically assigns a unique "Library No." to a new institution when it is first entered in the file. This DataEase feature not only helps to avoid duplicate records, it also helps to retrieve all the ILL items requested by the same institutional borrower without writing a report or leaving the "ILL Directory." The process can be done by pressing no more than two function keys.

The user can access the "ILL Log Sheet Data-Entry Form" (Figure 3) either by selecting item two, "Add/

Figure 2
Library directory institution record-entry form

```

Lib Dir
*****
* Institution *
*****
Date: 07/14/88 Time: 08:57:54
Institution Name: _____
Library No. _____ Contact Person: _____
Library: _____ LIBID: _____
Street: _____
City: _____, State: __ Zip: ____ - ____
Country: _____
RLIN ID: _____ Decline ID: _____ OnType Code: _____
RLG member: __ Foreign: __ Affiliated: __ Taxable: __
Purchase Order Number:
Purchase Order Expiration Date: / /
Comments: _____
    
```

Delete/Change ILL Requests," from the main menu or by pressing the F10 function key while the user is still in the "Library Directory Institution" form. The "ILL Log Sheet" contains a record of each ILL request received and processed by the library. The design of the default fields, multiple choice fields, required fields, and help screen enables library staff to enter, retrieve, delete, or modify data in any field on the form with ease.

ROUTINE PROCESSING

The "Library Directory" and the "ILL Log Sheet" are the major record-entry forms in the system, and are used frequently by the ILL staff each day. Data entry typically involves bringing data from the "Library Directory" to the "ILL Log Sheet," adding transaction data to the "ILL Log Sheet," and then returning to the "Library Directory." The processing procedures are as follows:

- Log on to the ILL system from DataEase by typing in the database name, user name, and user password to bring the "Interlibrary Loans Log-Main Menu" on screen.
- Press one, "Add/Delete/Change Library Directory," after the main menu appears on the screen.
- Type in the first one or two words of the institution name followed by an asterisk (a truncation symbol) on the "Institution Name" data-entry field. Then press the F3 function key to retrieve the record of the institution from which requests were received. If no record is found in the "Library Directory," this institution is a first-time borrower. In this case, enter

Figure 3
ILL log sheet data-entry form

```

: ILL Log Sheet
:
: * ILL Log Sheet *
:
: Log No. L87-000550      Date 07/13/88   Time 13:51:12
:
: Date Received: / /   Request ID: _____   from: _____
:
: Library No.           =
:
: Transaction type: _____   Material type: _____
:
: Item Description: _____
:
: Patron Name: _____
:
: Action: _____   Date: / /   Due Date for Loan: / /
:
: Turn around Time: 00   Referral Location: _____
:
: Cost: $ 0.00           NLM/DOCLINE Non-Availability Reasons: _____

```

the institution's data into the "Library Directory" and press the F2 function key to save the record in the file.

■ After the institution record is retrieved or saved, move to the "ILL Log Sheet" by pressing the F10 function key. Create one record for each request received from that institution.

■ When all the requests are entered, press the F4 function key to leave the "ILL Log Sheet" and switch back to the "Library Directory" to work on the next institution's requests (i.e., back to step three).

MONTHLY BILLING REPORTS

Billing preparation is the most time-consuming and complex procedure for most net-lending libraries. One of the most difficult problems encountered in processing a large number of monthly invoices is accurately calculating fees that may vary with the type of material requested and with characteristics of the requesting institution. With the microcomputer-based ILL system, it is necessary only to type the starting and ending dates of the billing period (Figure 4). Fees are calculated automatically from data in the "Library Directory" institution files and the "ILL Log Sheet." For example, as a member of the Research Libraries Group (RLG), Lane Library provides free interlibrary loans to other RLG members. Some institutions are subject to state sales tax while others are not. The system can also accommodate different fees for affiliated institutions. Other variables can be added as needed. The system takes this all into account automatically and eliminates a large number of tedious clerical tasks by generating both "detailed" and "summary" invoices. The generation of invoices, in addition to keeping statistics, is a unique aspect of the system. None of the other software packages reviewed included this feature.

Figure 4
Data-entry form for the monthly billing report

```

: Monthly Invoice
:
: * MONTHLY BILLING REPORT *
:
: Please enter the starting and ending
: dates to be covered by this billing
: report:
:
: Starting Date: / /
:
: Ending Date: / /

```

A detailed invoice gives a brief title for each filled request, patron name, and date of request, in addition to itemized charges (Figure 5). A summary invoice is printed on a form that lists subtotal, sales tax, and total amount owed. Due to the efficiency of the system, the staff needs only a few hours to collate, fold, and mail invoices. In the past, it took twenty-two to twenty-four hours of staff time to process over 100 invoices for over 800 borrowed items each month.

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QUARTERLY AND ANNUAL STATISTICAL REPORTS

Manually keeping up with the ILL statistics requires a large amount of clerical work. Formerly it took three to four hours of detailed work to complete a quarterly ILL statistical report. The system now generates all statistical reports on lending activity in approximately fifty minutes. The time required by the system to generate statistics depends somewhat upon the size of the database and the model of microcomputer used. Statistical reports include all information required by the Pacific Southwest Regional Medical Library Service (PSRMLS), in addition to locally required information. To run any of the statistical reports, one selects a desired item on the "Quarterly and Annual Statistics-Interlibrary Loans" user menu and then enters the beginning and ending dates of coverage.

An example of a statistical report is shown in Figure 6. It lists the total number of requests received, filled, referred, and returned. Other statistical reports include "Disposition of Serials/Monographs," the PSRMLS reports, and several other miscellaneous statistical reports providing information that may be

Figure 5
A detailed monthly invoice*

Lane Medical Library Stanford University Medical Center Stanford, California 94305		ACCOUNT NO. 13441	Date: 10/03/88
TO: WEST VALLEY HOSPITAL MEDICAL CENTER MEDICAL LIBRARY ILL P. O. BOX 1600 LANCASTER, CA 93534			
Contact Person: M. Smith			
Billing Period From: 09/01/88 To: 09/30/88			
Log No	Item Description	Amount	
88-000273	DIABETIC MED VOL.3 #2 1986 P.170- Photocopy; Patron: JOHN LEE	\$6.50	
88-000274	J MED EDUC VOL.57 #10 1986 P.1- Photocopy; Patron: MARCELLA LIU	\$6.50	
88-000275	BULL MED LIBR ASSOC VOL.72 #1 1984 P.31- Photocopy; Patron: CHRIS KEILY	\$6.50	
88-000276	SOC SCI MED VOL.15A 1981 P.781- Photocopy; Patron: DIANE CHAN	\$6.50	
88-000278	SPRENKLE DH. DIVORCE THERAPY. 1986 Loan; Patron: Donna Murphy	\$6.50	
Subtotal:		\$32.50	
Tax rate:		.070%	
Sales tax for 4 photocopies:		\$1.820	
Grand total:		\$34.32	

* All names and billing amounts are fictitious and are provided for illustration purposes only.

used later in evaluating the interlibrary loan service. With DataEase, it is very easy for a nonprogrammer to generate specialized report formats. A printed report can be done within several minutes. Once started, the system can be left unattended. The amount of time required to generate a report depends on the size of the file.

FORMS FLEXIBILITY

The ILL management system has the ability to modify various parameters to conform to ILL policy changes, e.g., changes in the sales tax rate, the basic ILL fee, and the fee charged to affiliated institutions. The process of modifying fees or tax rates is very easy and can be done within a few seconds. In addition, DataEase allows a system of password protection to prevent these variables from being changed accidentally.

LIMITATIONS

The ILL Management System has several limitations. It is not integrated with any other system in use at Lane Library. Most ILL requests are received at Lane Library through DOCLINE and RLIN; the ideal ILL management system would be capable of downloading requests directly from these systems. Integration

Figure 6
Statistical summary of ILL activity

* STATISTIC SUMMARY *					
	Total Requests Received	Action = Filled	Action = Referred	Action = Returned	Total Unfilled
count:	2,309	1,667	67	575	642
percent:	100%	72%	3%	25%	28%
Time Period: From 07/01/88 To 09/30/88					

with LOIS, Lane Library's integrated library system, was considered from the early phases of development, and remains the long-term goal of automation in the ILL department. Possible benefits include the ability to create transaction records from existing bibliographic records and to search, charge, and discharge items from a single work station.

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At Lane Library the ILL department is responsible for both borrowing and lending. However, the ILL system is designed only for lending because the borrowing function was to be integrated into the LOIS system. Borrowing procedures are currently performed manually at Lane. While the most burdensome tasks of interlibrary loan are associated with lending activities, the ideal automated ILL system would handle both borrowing and lending.

Certain other limitations exist in the current design. Although information such as the sales tax rate, the basic ILL fee, and the affiliated institutions' fee can be modified easily, changes in these values must be considered carefully when creating and interpreting annual reports, since these modified values will be used by the system as if they had been in effect all year.

Despite time-saving features in data-entry forms, the ILL system does not save a substantial amount of time in the process of creating transaction records because more information is recorded in the automated system than in the manual system. The item description, for example, was not recorded previously.

Finally, data storage presents a potential problem. As the size of the file increases, so does the time required to generate bills and statistics. At some future point, it will become necessary to copy older

records to floppy disks for storage and delete them from the working file; a twenty MB fixed disk can easily contain one year's data. Currently, Lane Library does this on an annual basis. The storage of disks containing older data and retrieval of records from these disks are problems that still need to be considered.

CONCLUSION

The Lane Library's ILL management system has proven beneficial by eliminating the need for maintaining paper records of ILL lending. It has eliminated many of the tedious and repetitive tasks associated with billing and statistics. It provides multiple access points for finding records of ILL transactions (the older paper files were arranged by date of receipt only). The system gives the borrower more information on bills than was possible in the old manual system (i.e., new bills give a brief item description and a patron name). In addition, new reports and lists can be created and generated easily. For example, if Lane Library wanted to notify all the ILL patrons of a policy change, the system can generate mailing labels. The system enhances the effectiveness and efficiency of ILL lend-

ing processing at Lane and is capable of handling a large number of ILL lending requests; it could potentially be used by all types of libraries.

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