be rare in North America, where classification theory may be less advanced.

Chinese academic libraries are certainly less developed than similar libraries in North America, but this situation is changing rapidly as more librarians are trained and library buildings are constructed. There will probably remain a shortage of western books and journals due to the high cost of this material, but Chinese libraries do have a strong core of subject experts.—*Xiong Dizhi, Director of the Library and Dean of the Faculty of Medical Library and Information Science, China Medical University, Shenyang, China; and David S. Crawford, Senior Librarian, McGill University, Montreal (Visiting Research Librarian, China Medical University, Shenyang).* ■■

Computerizing communication for interlibrary loan

By Amy Chang

Coordinator for Interlibrary Loan
Texas Tech University Libraries

Electronic mail for faculty and students solves the ILL crunch at Texas Tech.

An electronic mail system, designed by the staff of Interlibrary Loan (ILL) at Texas Tech University Libraries, allows faculty and students to request materials from their offices and homes via the E-Mail system any time of the day. Users can choose different request forms from the menu. The staff of ILL receives the request accordingly. Several options have been programmed for the menu-driven E-Mail system: book, article, dissertation, renewal requests/status checking, and questions-and-answers. Instructions for using the E-Mail system and a short form for patron information were also programmed into the system.

The statistics for the borrowing unit of Interlibrary Loan at Tech Libraries had shown a steady growth during fiscal year 1987/1988 (an average 14% increase). This was followed by a 36% increase the first seven months of 1989. Approximately 700 messages are sent to patrons monthly, notifying them of arrived materials, problems with requests, overdues, and charges. The staff constantly interacts with patrons by phone or in person about request forms, renewal of books, checking the status of their requests, etc. Since the number of requests increased dramatically, a more efficient way to communicate with library users was required. The staff concluded that an electronic mail system would meet the demand for quick and reliable communication. The VAX was chosen for installing the E-Mail system.

The VAX system is one of the mainframe systems in the Advanced Technology Learning Center

(ATLC). The VAXcluster can be used for many purposes: database management, graphics, programming in a variety of languages, and text processing (such as papers, theses, and dissertations with mathematical and scientific formulae). The cluster consists of two Central Processing Units; a VAX 8650 and a VAX-11/780, so that when one VAX is down, users can log on to the other computer system.

Several VAX terminal rooms are located in various places across campus. Hard-wired terminals and dial-up terminals are distributed among departments, colleges, and dormitories. Each department can sub-assign access to their faculty and students. Connections are available to the IBM 3081s through the Academic Computing Network from any terminal. In addition, there are 3,000 individual users on campus who have their own access to the system. The number of individual users has doubled since 1988 and is still increasing. Users can not only access the mainframe but also the VAX-Mail system. Professors give class assignments, make announcements, or answer questions using the VAX-Mail system. Students can turn in an exercise, report, or program, or ask questions via the VAX-mail system. Networking with the system in ATLC for individual users requires a modem for the microcomputer, a phone line, software (such as Smartcom or Procomm), and a password.

Electronic mail system

Public E-Mail connections are made through the telephone system. Modems connect the computers and the phone system and convert the message into a form for transmission over a telephone line. Each subscriber to the E-Mail system has a unique identity number or a password for the "mail-box" where mail can be received or sent. Messages are stored and forwarded through a large computer system, the VAX mainframe. The sender communicates his/her message by entering it at a terminal or microcomputer through a modem. The message is sent over a telephone line to a central computer where it is stored, ready to be accessed by the recipient.

Developing the ILL E-Mail system

Programming the E-Mail system for ILL begins with system analysis and system design. During the system analysis process, the staff had studied and analyzed the inconvenience and the time-consuming process of communicating between the staff and the patron. After the problem was identified, the staff started investigating the availability of networking the electronic mail system on campus. Procedures for developing the system for ILL were planned and the VAX system was chosen. An outline for the program was drawn. In designing the system, five options for requesting ILL materials and a main menu screen format were programmed, and detailed guidelines for writing the program were listed). An output layout was also drawn so that a readable form would be received by the ILL staff.

COBOL (abbreviation for Common Business Oriented Language) was chosen to be the program language. Reasons for choosing COBOL included: COBOL is a English-like program language; it can be interpreted by other programmers; the logic of the program can be easily traced down; and COBOL provides an interactive processing option which assists in the construction of the screen and the dialogue of an online application. This program option allows users to key in data and the computer responds with a display on a screen.

The process of programming

Before the program was coded into the computer, a flowchart was used to map out the structure. Mapping program structure allows the programmer to oversee the logic of a program and decreases the coding errors. The structured chart for the E-Mail system has not only simplified the complexity of the program but also maximized the efficiency of the program. After the structure had been drawn, a set of instructions for the computer was ready to be coded onto the VAX. The next step was to compile the program. A program will not be executed by the computer until it has been translated into the machine language. This translating task in the computer is named compile, which is done by a compiler of the computer or software. As the computer translates the program language, the compiler of the computer detects errors from the program. In most cases, it will list the errors for further corrections. Normally, the compiler only lists the syntax errors which have violated the programming rules. The program cannot be executed until the listed errors are corrected. Following all the programming rules will only allow the computer to compile the program easily. It still will not guarantee the program can be executed, because logic errors may cause the failure of the performance. Such an error is caused by a mistake in the sequencing of instructions as one codes a program. Besides, logic error will not be caught nor listed by the computer. The error is detected after the program has been compiled, that is during the execution. These errors have to be located by the programmer. After logic error is corrected, the program is ready to run. Rarely can a program be executed successfully the first time.

Needless to say, debugging and testing the program were the most time-consuming tasks in programming. Debugging is finding errors (syntax and

logic errors) in the program and correcting them. Testing is required when a program is ready to run. Testing involves running the program with the actual data and examining the results that are carried out by the program. If the results are not satisfactory, modification of the program will be needed. For instance, during the testing stage of the Tech ILL E-Mail system, users found that the request form on the E-Mail system did not provide enough space for certain fields, the output did not provide the data from the input file, the screen display was not satisfactory, etc. Each time a modification was made in the program, the staff had to go through the procedures of coding, compiling, debugging, and testing, until data could be entered in the desired place, data could be stored onto the data file of the computer, and the recipient could actually receive the information in readable form.

Three major parts of the ILL E-Mail system were included in the program : screen display, data saving, and output. The main program written for the display screen, saving data, and filling in the request form has 21 modules, 6 data divisions, and 20 working storage sections.

The ILL E-Mail system was implemented in May 1989. An announcement was made to faculty in the library newsletter (*ACCESS*) and on the VAX information directory by ATLC. The reduced traffic in ILL in May and June allowed ILL staff to monitor the system closely, and modify the program when necessary.

System performance

As the user enters the VAX system, the user types ILL after the $ prompt. As soon as the ILL E-Mail system is logged on, the screen displays, "Do you need instructions?" If the user enters Y, a set of instructions will be displayed on the screen. These instructions were written for the first time user and explain briefly how the system will work. When the user finishes reading the instructions, he/she may press any key, and the system will bring a short form on the screen. When the user finishes filling out the form, the main menu will be displayed, and the user is able to choose a request form (book, article, dissertation, or renewal request/status checking) to fill out on the computer. If the user enters N to the instruction option, the system will immediately bring the short form on the screen.

When a request form has been completed, the system will ask the user: "Do you have another request?" If the user enters Y, or yes, the main menu will be displayed again, otherwise the system will be logged off instantly.

The fifth option on the main menu is Questions-and-Answers. It answers questions such as "How long will it take?" and "How much will it cost?" Once finished reading the answers, the user may choose to go back to the main menu or log off.

The sixth option on the main menu is EXIT which allows the user to exit from the ILL E-Mail system.

The staff checks the E-Mail twice a day. Requests can be printed out from a laser printer in ATLC.

The advantages of using the E-Mail system

The following are some advantages of an ILL E-Mail system:

1. The same message can be sent to any number of recipients simultaneously.
2. It saves money and time over processing the message through the regular mail service or a phone call.
3. Users can access the system from anywhere—home or an office at any time of the day.
4. Users need not walk to the library to fill out request forms, nor do they need to wait until the library is open.
5. Delivery of mail via E-Mail is immediate to the recipient. Normally, campus mail takes at least 24 hours and regular postal mail takes 48 hours for users to receive the mail or notice from ILL.
6. It is reliable. The mail cannot be lost.
7. Repetitious questions, such as "How long will it take?" can be answered using the ILL E-Mail system.

The ILL E-Mail system, like any other automation project, will be an ongoing project. The program always has been revised and improved in response to users' needs. The major concern with electronic messaging is that users may neglect to check their electronic messages. Educating patrons and publicizing the new system may very well be a long process. ■■

ULS: Where to volunteer

The listing for the University Libraries Section was inadvertently left out of the article on "ACRL seeks volunteers for committees" in the October 1989 issue. To be considered for appointment as chair or member of a ULS section committee, contact the ULS Vice-Chair/Chair-Elect: Janice T. Koyama, Head Librarian, Moffitt Undergraduate Library, University of California, Berkeley, CA 94720.

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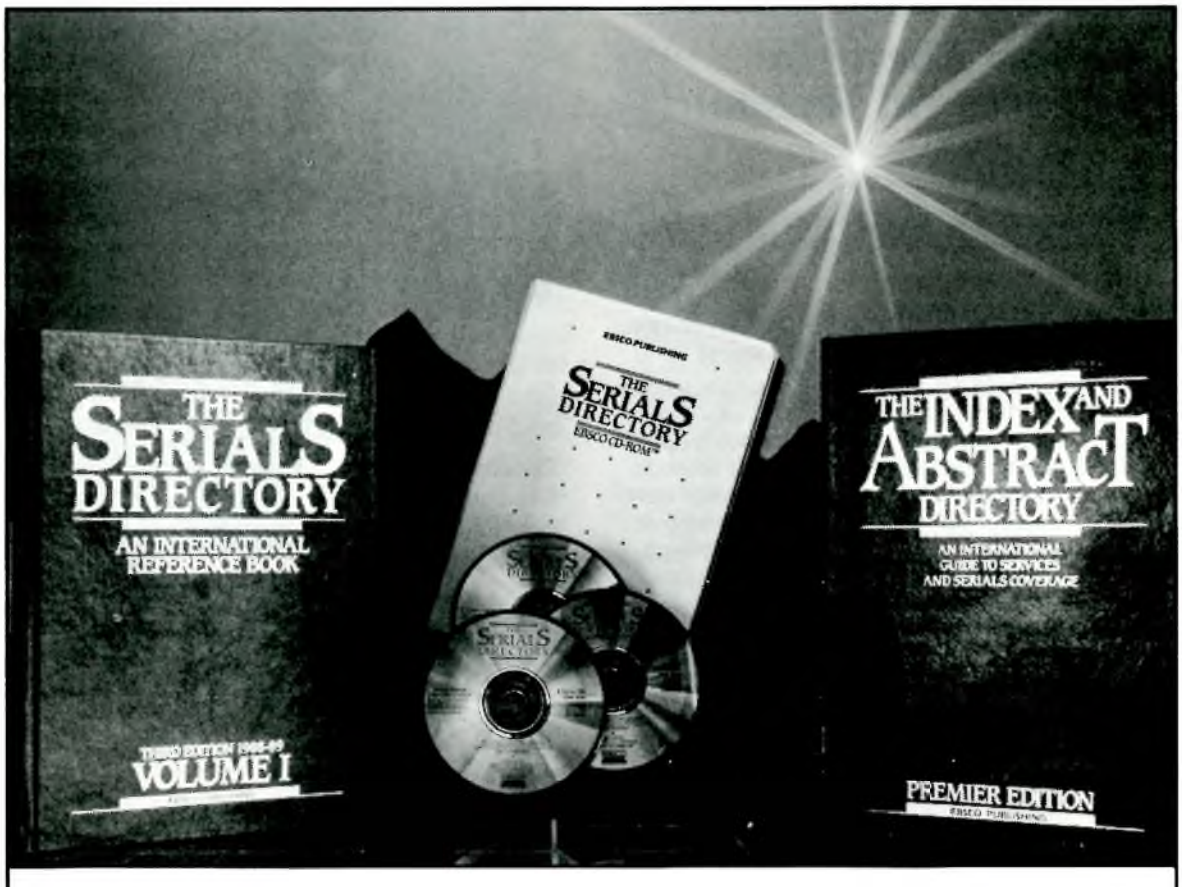

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