WANG LABORATORIES CORPORATE LIBRARY'S ONLINE CATALOG: OVERVIEW

Sarah L. Warner*

ABSTRACT

The Charter of the Wang Laboratories Corporate Library is to provide information to its patrons efficiently and cost-effectively in order that business decisions can be made. To better meet this goal, in June 1987, the Library implemented an integrated library system using Wang's own database management system, PACE. This new system has unified into a single system the data from a traditional card catalog, electronically stored catalogs, and the library administration files both in electronic and paper formats. With the new system, a single record is built for each new item to be added to the collection. The initial record is created when the request is made for the Library to purchase an item or for each new item as it is received. The subsequent information, from acquisitions, cataloging, technical processing, and final data for circulation, is added to this original record to build a complete catalog record.

BACKGROUND

Providing fast and efficient access to information, both internal and external has always been central to the development and growth of Wang Laboratories Corporate Library. Information and online fee-based service requests come from primarily the Research and Development Organization in the United States. There are also requests from manufacturing, sales, marketing, human resources, and all levels of the executive management.

*Sarah L. Warner, Corporate Librarian, Wang Laboratories, Inc. Lowell, Massachusetts, U.S.A.
teams. Outside the Merrimack Valley, both our subsidiaries and the international offices are active users. With the expanded user base, the requirements to have an integrated library catalog system with remote access becomes more evident. Unfortunately, such a major undertaking does not happen overnight.

The first step to automate the collections began shortly after the establishment of the Corporate Library in 1980. It became an alpha site for a new Wang product, Visual Memory, running on Wang OIS hardware. This new product was an office systems application software package, which stores information electronically and provides a simple office tool to extract and update information. The information is stored in electronic cabinets with drawers, and can be searched, sorted, edited, and printed with a few keystrokes. To enhance access to the library collections, separate Visual Memory cabinets were created for various collections – technical reports, Wang technical product documentation, and industrial standards and specifications. The technical and marketing documentation from competitors, also received its own cabinet. Access to each collection included keyword, call number or document number. However, cataloging materials for the book collection was handled differently. The decision was made to participate in the OCLC Library Network locally with NELINET, for not only cataloging, but also for interlibrary loan and document delivery capabilities. As a participant, we contracted for the machine-readable copies of our local cataloging records from the OCLC system for future use. Until June 1987, the monograph collection of approximately 6,000 records was accessible through look-up in a traditional card catalog.

The marketplace has become more competitive, and corporate information requirements are exploding. Although over the years, several attempts were made to enhance the access to the corporate library by designing and implementing an integrated library system, it was not until the summer of 1986, that formal discussions began with an MIS project team. During
the preliminary design phase, the project team evaluated several third party packages. These were rejected because of the customized requirements that would have been needed. Again we were privileged to have available to us a new Wang leading-edge database management software package and a top-notch in-house team to develop a customized application for an integrated library system.

REQUIREMENTS

During the initial discussions, with the design team, a number of requirements for the systems were agreed upon. The first was to integrate the already existing eleven disjointed Visual Memory files into a single online catalog. This would require converting from the OIS to a new format on the VS-100 minicomputer. Secondly, the conversion of the magnetic tape equivalent of the card catalog, and integration of these records into the online system would be needed. Thirdly, in order to support the library goals, the system would need to be made available remotely throughout the Wang network. Fourthly, with ever expanding services and collections, there had become a greater need to integrate the library administrative functions, such as acquisitions, cataloging, budget data, and financial tracking into the total package. System hardware and additional software requirements reviewed included allowance for future growth, capacity planning, and response time.

DESIGN

During the design phases the decision was made to divide the project into two major sections. The first phase would include consolidating the various online catalogs and the OCLC cataloging records into a single integrated catalog. As part of this process,
we also decided to integrate the administrative functions related to acquisitions, budgeting to the system with the very important functions of cataloging and technical processing. We chose to begin with the design and implementation of the catalog and administrative functions, rather than with circulation for several reasons. The library was already sixty percent integrated, but in a very disjointed fashion. The master record would become the acquisitions, and all others, including the circulation record, would hang off that record. The library patrons would most benefit from enhanced access to the many collections through a single online catalog. The second phase, designing and implementing the circulation and serials control, would be initiated when the online catalog was in place with all the converted files. The circulation record will hang off the master record.

The success of the design phase has been attributed to the fact that both sets of the team players, MIS team and the Library staff put many hours into discussing how the librarian conduct their day-to-day business activities. This made it possible for the MIS team to apply most successfully all the functionality of the software to our application. Work flow diagrams were essential to this part of the development process.

THE ONLINE CATALOG

The Corporate Library Integrated System is a Wang developed library software package utilizing its own fourth generation application tool. Professional Application Creative Environment (PACE), is a relational database, which allows simplified data access by using common screen sets and Program Function Keys (PFKeys). These numeric keys are located along the top of the keyboard, and allow the system to perform predefined internal processes and functions. These PFkeys can be uniquely assigned to the system, and remain consistent throughout. For example, PFKey 4 has been assigned to mean "previous page" and PFKey
15 defined "Print".

A collection of tables make up a database and data in a PACE system is organized as a collection of tables. PACE provides a set of common screens for each table in the database. These screen sets — "Query", "List", and "Display", refer to the record viewing and selection screens. For the record processing screens — "Add", "Delete", and "Modify" are the basic types. "Help" is also a PACE function to provide an explanation of a current function.

The connection PFKey exists for each relationship between the related tables. The purpose of the connection PFKeys is to move from a screen set that represents one table to another screen set of a related table. Figure 1 shows the relationships established between the Corporate Library System and the tables. The relationships between the source tables (the table from which the relationship originates) and the target tables (the table to which a connection points) are indicated by the arrows.

The system is designed to be very user-friendly and is menu driven with two main user menus – the patron menu and librarian menu. (Figure 2 and 3) System uniformity is a key to the design of this system. There is consistency in the screen design and logical flow from one to another. The fields displayed in the Query Patron Catalog view (Figure 4) remain in the same order as the full record screens viewed after a specific query is made and displayed.

THE PATRON MENU

Due to the global nature of the Wang library audience, a major design consideration that the system have ease of use with menu driven screens and plenty of online "help screens". There is not the feasibility for major customized training for the users, although patron documentation can be ordered from the library. Currently, the online catalog is available in the Corporate Library at three public terminals, and information can be
extracted from two terminals at the reference desk by the library staff in direct response to a patron request. The public access provides simplified bibliographic information. The text has been modified to provide only the key fields pertinent to our patrons. (Figures 1 and 4)

Patrons can create individual inquires using the PACE Query function. From the "Catalog Selection" on the Patron Menu a catalog record for a specific publication can be identified or a customized bibliography can be created. The PACE Query operations include: SPECIFIC VALUE, ALPHAGENIC (partial) VALUE, RANGES OF VALUES OR VALUE, "OR" VALUE WITH A RANGE, "NOT" value, NOT VALUE with a range and WIT (words-in-text) fields. An additional Query operation, to assist the patron in defining a search, is "List Material Types." This function allows list of material types codes and their corresponding descriptions to be displayed. Included types are BOOKS — monographs, TECHREPTS — technical reports, WNGMANS — Wang technical documentation manuals, and WNGANS — Wang product announcements. The patron can use the system to query, list, display, and print customized bibliographies from the Catalog or the New Acquisitions List. To provide the ability to have complex searching user friendly instructions and straightforward defining of the search query criteria are a key to this system.

To assist the searcher, catalog view tools are displayed at the top of the screen. These include "? = any value", "; = or" "& = and", and ": = range." For best results when using the alphagenic (Partial) value, the searcher can key in a partial alphabetic character string followed by the "?" and press ENTER. The system will display the list screen showing partial record. For example, "comput?" entered into the title field will display a list of title that contain "comput" as part of the title in such words as computers or computing or computation.

The system functionally includes full Boolean capabilities. The OR value can be used in two ways. Either the semicolon
character ( ; ) or the PFkey 5 denotes OR. The PFKey 5 on the Query Screen allows the addition of another line to the screen to permit additional selection criteria. This same function will permit NOT EQUAL conditions. Again this requires keying the value to be included in the screen list. After pressing SHIFT and PFKey 5, on the BUT NOT line, the value to be excluded from the list created from the first search value is selected. Not only does the system allow for range of value searching, but an expanded range searching is also allowed. For example, a searcher can define a search, requesting items with a published range "1984:1987, but not 1986". The system will display a "List Catalog Screen" of all the material titles published between 1984 and 1987, but not 1986. The operation requires the simple entering of the range and pressing Shift and PFKey 5. (Figure 4)

The use of word-in-text fields are fundamental to user-friendliness and success in identifying all the cataloged material that is relevant to a particular search strategy. The WIT fields are indicated by the field name followed by an asterisk "*", i.e. "Material Title" or "Call Number". (*) WIT fields allow searching of more than a single value. These fields are not case sensitive. To use this feature, the key words are entered with an ampersand "&" separating each word in the field. For example to enhance searchable of "local area networks and marketing", the search phase would be "local&area&network?&marketing" in the subject field to identify all the materials on that topic.

The result of the query appears on the "List Patron Screen". (Figure 5) The PFKey 4 and PFKey 5 permit scrolling back and forth through each sequential screen. It only requires several consecutive keystrokes from the list screen to complete the bibliographic information for each material view screens. From the "List Catalog Screen", the patron can review the created bibliographic information, and display the individual catalog entries for full bibliographic information, "Display Catalog Screen" (Figure 6) and print some or all the records displayed. A message flashes in the upper left corner of the screen indicating
the task has been completed. The bibliography can be sent to print from either the “List Catalog View” or “Display Catalog View”. PFKey 2 will mark all of the items of the bibliography and PFKey 15 will print the list.

LIBRARIAN SYSTEM ADMINISTRATION

A success factor, that cannot be overlooked when reviewing the capabilities of the online catalog for patrons and librarians, is the system’s user friendliness. During the initial testing of the prototype, the librarians had reservations concerning the user interface. We are fortunate to bring in a human factor’s team of experts to review the user interfaces. Due to the flexibility of the PACE Application Builder software, the design team were able to design a front end so that each of the menu picks corresponded directly to the library function that is to be performed. (Figure 3)

The acquisitions record becomes the foundation for the building of the complete catalog record. The total acquisitions cycle has been streamlined with the installation of the integrated catalog system. It is designed to track and monitor the total acquisitions’ process through to the cataloging and final processing. This is facilitated by providing data entry, inquiry, and reporting functions that allows visibility to decisions made throughout the process. Due to this integration of processing, the flow of paper has practically been eliminated. As a security check only the original request is filed. In the future, we anticipate that the patrons will be able to request new library purchases electronically through Wang’s own electronic mail, Wang Office.

A catalog record and requisition for a new material can be added by using PFKey 1 – Add Catalog/Requisition. (Figure 7) If after querying the catalog, the item does not appear, a catalog and requisition record can be added. The catalog can be queried from a number of access points – full title or keyword in the title, subject, publication number, or ISBN number. If the item record
appears, a requisition record can simply be added to indicate an additional copy is being requested or possibly a replaced copy is needed. The vendor purchase order and completion of the bibliographic information can be added. A Notes field is provided for special ordering or requestor information. PFKey 2, the Verify Requisition function allows the Acquisition Librarian to check the order information, and the completeness of the citation. When the citations have been verified and purchase price has been obtained, the requisition is ready for approval. The approval process has been radically streamlined. No longer do the paper requests pile up waiting for verification or authorization, rather the Corporate Librarian is now able with two key strokes to approve or deny a request for purchase. PFKey 3 – Authorize Requisition will display a list of all the verified requisitions. From the List Screen a full bibliographic record along with the completed ordering information can be displayed. The system generates a copy number based on the number of records for a single title. The status can be changed to either APPROVED OR DENIED. If approved, the requisition will be displayed in the Order Materials; denied requisitions will appear in the Denied Requisition queue. The Acquisition Librarian can use PFKey 5 to process the Denied Requests. The function will allow for modifications to requisition record, and the status is changed to REJECTED. Currently, the requestor is notified by phone, however, in the near future the system will allow for electronic mail message. The PFKey 4 will display the Authorized Requisitions and the Acquisitions Librarian can print the orders from the Authorized Requisitions queue. A final check of the requisition, as to the accuracy of the bibliographic data, can take place at this time. The system will allow modification or deletion on this record. When the material requisition is complete, the system will convert the orders to a word processing document file (WPPLUS). They are then ready for mailing to the appropriate vendor.

To streamline the receiving process, the book jobber includes
the unique requisition number on the packing slip and the invoice, allowing material to be received through a single PFK 6 — Receive Material by Requisition. This Random Key (RSN), an arbitrary order number is attached to the Material Requisition when added to the database. From RECEIVE MATERIAL BY REQUISITION, the material requisition record is displayed in order to verify the shipping and ordering information. Each item is barcoed when it is received. The material can be received against a requisition using either a barcode reader, or by keying the bar code identifier. The bar code will also be the key to inventory control, and will be the unique key for circulation process module, which is now in the design phase.

With the elimination of unnecessary mechanical processing steps and the duplication of data entry for each new acquisition, our cataloger is able to engage in material analysis to greatly improve public access. This is particularly important in a small library, where the professional cataloger must be responsible for a variety of the cataloging functions. Again it is important to reiterate the value of an integrated online catalog. When the cataloger receives a new item for cataloging, the basic record of information has already been entered. From the Query Material screen to the Display Material screen, the date the material was received, Material Status, and shelf data are viewed and can be modified along with the cataloging information. The system will display the catalog record with the material title that is selected from the LIST Screen. Material can also be cataloged which does not have a barcode. (PFKey 10) From the Query screen, the catalog table can be searched for a material record requiring cataloging. Modification to each record can be made pressing PFK 9 to complete the record and add full subject headings. The final technical processing of adding the shelf date, status and the printing of the spine and book labels are generated by the system. The message "spine labels printed" is displayed in the upper left hand corner.

A final double check generated by the system is a redisplay-
ing of the List Materials screen with the message "Shelf date and material status updated." The system automatically added the current date as the Shelf Date and "A" denoting availability for patron viewing.

The function tables of Vendor, Invoice, Purchase Order, Material Returned to Vendor, and Requisition Invoice can also be maintained in the integrated system. (PFKey 11 and 12) Maintenance functions include add, modify, delete and inquiry.

Library Staff use the Process Invoice function to track accounts and monitor invoices processed. Material received can be received against outstanding requisitions. Purchase orders can be tracked along with the specific invoices attached to them to provide enhanced budgetary processing.

BENEFITS

The transition to the new online catalog has been met with success by our patrons. They like the simplicity of use and the more sophisticated search capabilities, as well as the ease of printing out their customized bibliographies from of either the New Acquisitions List or from the full catalog. The library staff finds that the system is faster and more efficient for identifying information for patrons, and most important the processing is more efficient.

Both the library patrons and the librarians have derived considerable benefit from the new integrated online system:
1. The key to the success of the system is that there is improved control and efficient processing of materials. Building a single record is timesaving and a productive use of time. It reduces the duplication of data required for each record.
2. There is a common lookup facility to access the different document types with bibliographic information.
3. The card catalog items, which are fully integrated into the PACE catalog, have full interactive search capability.
4. Redundant data entry to multiple Alliance Visual Memory system with shared data elements has been eliminated.
5. The timeliness of preparing the "New Acquisitions Report" has been reduced considerably. Cost savings have been derived by eliminating production and distribution of this report. The content information is centralized and the patrons have immediate access interactively online through the "New Acquisitions".
6. Provides an integrated system to handle the acquisitions of all library materials.
7. Expense tracking is provided for effective budget tracking along with other key decision support capabilities for a librarian to make appropriate budgetary considerations.
8. Both patrons and librarians can be more productive. The networked system will allow patrons 24-hour access and there will be a reduction in the need for patron support. The librarians will be able to concentrate on in-depth research requests.

FUTURE ENHANCEMENTS

The project team is currently reviewing feasibility of integrating a newly announced product Wang Integrated Image System (WIIS) into the Library System. This will permit internal documents with images to be transmitted throughout the Wang network. This is a PACE-based integrated software with optical disk and microfilm storage and retrieval. This will allow both the librarians and patrons to use images with the data and text. These could be quite valuable for Wang market and technical product documentation. Of major concern is a design and immediate implementation of an online thesaurus for enhanced document access. The library staff will continue to work closely with the MIS team to provide future enhancements to the system, such as network access to the customized bibliographies downloaded and
accessible as word processing documents, as well as many other enhancement in order that the system will remain state of the art.

SUMMARY

In review, this project can be classified as a success story. The well-designed and efficient integrated system can be attributed to not only to PACE and the flexibility of its Application Builder, but also to the expertise of the design team members. The library staff has a clear picture of this specific library's business, how functions should be performed and the workflow. The MIS team combined their creativity, with an understanding of the capabilities of PACE, and they designed a winning integrated library system.

Equally important to the technical expertise is the management of the project to insure total success. It is advisable to keep management completely informed of the system’s progress each step of the way. This will help reduce the number of surprises. For example, when more hardware is required than indicated in the original specification, this can be explained in context. It is likely, that during the design and implementing of the project, justification will be required more than at the initiation of the project. It is valuable to be conscious of the particular corporate culture and current business conditions, in order to be prepared for making design modifications if called upon. Particularly, with a small staff, there is a delicate balance that must be controlled between maintaining a continuous high standard of excellence for library services, and devoting staff time to participating fully in a new system development and implementation. Morale of both the staff and patrons during the transition period should be watched. Although the benefits of a new system may be clear, the frustration level may be high if unexpected delays and downtime are to the excess. It is important to be prepared to notify staff and patrons of downtime, and determine
alternative access for the catalog if required. Finally, I strongly recommended, when possible, that all the library staff participate in the design of the online catalog. I know that this is one of the key factor that has led to the success in the design and implementation of the Wang Laboratories Corporate Library integrated online catalog system.

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FIGURE 1

(Corporate Library System Tables and Relationships.)
Wang Corporate Library Catalog System

PF 1) Catalog Selection
PF 2) New Acquisitions
PF 16) Exit Library System

PATRON MENU
FIGURE 2

Wang Corporate Library System
Librarian Menu

PF Key Function
1) Add Catalog/Requisition
2) Verify Requisitions
3) Authorize Requisitions
4) Order Materials
5) Process Denied Requisitions
6) Receive Material (by Requisition)
7) Receive Material (by Catalog Info)
8) Catalog Non-requisitioned Mats/Complete Mat Processing
9) Catalog/Complete Material Processing (w/Bar Code)
10) Catalog/Complete Material Processing (wo/Bar Code)
11) Process Invoice
12) Patron Requisitions
13) Return

LIBRARIAN MENU
FIGURE 3
Query Patron Catalog View

? = any value  = or  & = and  : = range  See 'Help' for Instructions

Material Author: ?
Material Title: database
BUT NOT management
Call Number: ?
Publication Number: ?
Subjects: ?
Material Type: ?
Publishing Year: ?
Publishing Date: ?
Publisher: ?
Series: ?
Edition: ?
Notes: ?
ISBN Number: ?
Publication Random Key: ?

Enter) List  6) List Material Types  16) Return
3) Down  /16) Menu
4) Clear / All
5) Or / Not  13) Help

Query using the NOT Value

FIGURE 4

List Catalog

Choose by cursor position or X's

Material Title  Volume
x Speech recognition & and voice synthesis
x Voice store and forward : the exploding market!
x Probe on integrated voice/data terminals : the market to
x The U.S. Integrated voice/data terminal market 1985-1990 : a
x Top 100 DP almanac for 1984
x Data Decisions Microcomputers.
  x The complete European PABX market to 1990 : small and large
x Special Report : Competing Against Wang Office Systems : the
x CAD/CAM management strategies.
  x The U.K. PABX market : markets, products, strategies.
  x Digital PBXs in Europe: the next five years.
  x The U.S. Computer Systems Market.
  x Making Sense Out of the Latest Bond Market Rally.
  x The End of a Most Unusual Experience.
  x More on Why the Yield Curve Can Remain Steep.

Enter) Display Catalog Info  10) List Material Reqs  15) Output
2) Mark / Clear  6) Add Catalog and Req  11) List Materials / Send
  7) Query
  8) Delete Catalog Record
5) Next / Last  9) Modify Catalog Record  12) Add Material Req  16) Return
  16) Exit

EXAMPLE OF PF2) MARK / CLEAR OPTION

FIGURE 5
**Display Catalog**

- **Call Number:**
- **ISBN Number:** 0871953164
- **New Acquisition:** N
- **Material Author:** Lewis Jordan

- **Material Title:** The New York Times Manual of Style and Usage
  A Desk Book of Guidelines for Writers and Editors

- **Series:**
- **Publisher:** Times Books
- **Publishing Date:**
- **Notes:**
- **Subjects:** Style guidelines, usage guidelines, reference definitions, policy and objectives of the New York Times, proof reading

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**DISPLAY FIGURE 6**

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**Add Mat-Req-for-Cat-Emp-Vend-PO**

- **Author:** J.C. Mathes and Dwight W. Stevenson
- **Title:** DESIGNING TECHNICAL REPORTS

- **Requisition Date:** 05/22/87
- **Date Material Required:** 06/15/87
- **Status:** VERIFIED
- **Verification Date:** 05/23/87
- **Charged RDB:** 8787

- **Req Source:**
- **Req Reason:**
- **Req Comments:**

- **Patron ID:** 27306
- **Telephone:** 858-6121
- **Mailstop:** 025-G9C
- **RDB:** 6332

- **Order Qty:** 2
- **Material Cost:** $15.00
- **Shipping:** 2.56

- **Vendor:** A3321
- **Telephone Ind:** N

- **Enter Add Req**
- **Pick Vendor ID**
- **Pick Patron ID**
- **Pick PO**
- **Return without Adding**

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**ADD Requisition with Vendor Pick**

**FIGURE 7**