Transforming a Traditional Library to Modern Library using Barcode Technology: An Experience of Central Library, PEC University of Technology, Chandigarh

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ABSTRACT

The article appraises the transformation of central Library of PEC University of Technology, Chandigarh into a modern library using barcode technology. Appraisal has been made by comparing the prerequisites and practices of the method used earlier with the prerequisites and practices being followed these days. The benefits incurred by adapting the barcode technology have also been discussed along with the future plans for the Central Library, PEC University of Technology.

Keywords: Barcode technology, modern libraries, tradational library, PEC University of Technology

1. INTRODUCTION

Computer technology has helped libraries to perform their jobs efficiently and to the ultimate satisfaction of their users. Computers have revolutionised the work culture of modern day libraries. The growth in number and variety of computer-based technologies are playing important role in the efficient working of a library. Barcode technology is one such technology being implemented in the libraries at an accelerated pace. Barcodes are self-contained machine-readable identification labels with information encoded in a series of black bars and white spaces of varying widths that represent digits and other punctuation symbols. These are readable only through a reader or a scanner. A basic barcode scanner consists of a decoder and a scanner. The basic operation of a scanner is to scan a barcode symbol and provide an electrical output that corresponds to the bars and spaces of a barcode.

Barcode scanner acts in much the same way as a keyboard. As the pressing of a key on the keyboard sends a signal to the computer, reading the barcode results in the same kind of signal sent to the processor in the similar manner. It is necessary to understand here that barcode by itself is not a system but an identification tool that provides an accurate and timely support of data transferring for sophisticated management systems.

There are three basic types of barcode scanners: fixed, portable batch, and portable RF. Fixed scanners remain attached to their host computer or terminal and transmit one data item at a time as the data is scanned. Portable batch scanners are battery operated and store data into memory for later batch transfer to a host computer. Some advanced portable scanners can operate in non-portable mode too, often eliminating the need for a separate fixed scanner. Portable RF scanners are battery operated and transmit data online in real time. More importantly, the real-time two-way communication allows the host to instruct the operator what to do next, based on what has just happened.

2. OBJECTIVE

Present article appraise the transformation of a traditional library into a modern library with the help of barcode technology. Appraisal has been made by comparing the pre-requisites and practices of the method used earlier in the Central Library, PEC University of Technology with the pre-requisites and practices being followed these days.

3. PAST SCHEMA

The pre-requisites and practices followed in the past were:

3.1 Pre-requisites

Most important pre-requisite is to prepare a book for the issue. Earlier soon after the receipt of a new book, the details were entered in the accession register. Technical processing like cataloguing and classification were done and routine practice of preparing book card for each and every book was followed.

3.2 Issue/Return System

In the old system, Brownie System of issuing books was being followed. Borrowers' passbooks were given to the users. However, there were different kinds of passbooks for staff (faculty as well as administrative staff) and students so as to easily distinguish between them. All the records of issue/return were also maintained in the duplicate borrowers card, which were arranged according to membership number and kept at the circulation counter.

4. PRESENT ENDEAVOUR

Present system is a conglomeration of various equipment, computer hardware and software.

4.1 Library Management Software

The software acts as an interface between the computer and printer/scanner. Central Library, PEC University of Technology uses LSEase Library Management Software. According to Info-Tek Consultants Pvt. Ltd, LSEase is an offshoot of LibSys, the most popular and widely used library software in the country. LSEase has a mixed blend of functionalities and technology that abundantly meets the automation requirements of any growing library which may not need some special functionalities required in large universities, public libraries, and special libraries.

LSEase covers all the operations of libraries of different sizes including web-enabled search facility. It continues to be outstanding in this market segment because of international standards such as options for MARC implementation, client-server architecture, facility to run on various operating systems, multimedia support such as images, videos, music, etc., from its parent system LibSys. Easy to operate with user-friendly worksheets, LSEase does not require any pre-requisite programming or computer skills. LSEase, with an excellent user interface, is interactive, screen-oriented, and is menu driven. It has the facility to set user-defined security at function level. The system is not only easy-to-operate, but also easy to implement. LSEase operates effectively in different environments resulting in higher productivity. The proprietary indexing features inherited from LibSys give remarkably good response time for bibliographic searches even for large databases.

4.2 Laser Printer

For printing barcodes, high quality of printing is required. Defects in printing will lead to wrong reading or nil reading of data, so laser printer is essential to achieve the required precision in the barcodes.

4.3 Barcode Labels

Labels are printed on a customised A4 sheet of self-adhesive labels. These sheets have 65 labels per page format and give a better quality and durable labels. Lamination of bar-coded label is done with the help of cello tapes. Although it is somewhat costly and laborious, but it is necessary for the protection and long life of the barcodes.

4.4 Barcodes

By and large one dimensional numeric barcodes are prepared, except for the special collections like bookbank. Figure 1 presents a typical numeric barcode generated in Central Library, PEC University of Technology.

4.5 Spine Labels

Figure 2 illustrates a typical spine label. It is placed on the spine of the book about 1½ inch above from the bottom. These label are also called smart labels as these have both the call number and accession numbers.

4.6 Hand-held Barcode Scanner

Central Library PEC opted for a Charged Coupled Device (CCD) hand-held barcode scanner (Welch Allyn Model FBC-3820) for scanning the barcodes of the ID cards and the books (Fig. 3).
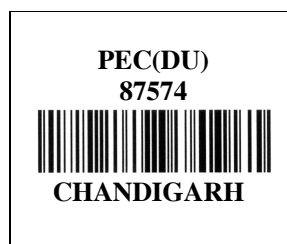
PEC(DU)
87574

CHANDIGARH
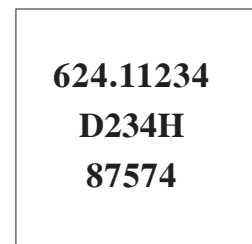
Figure 1. Typical barcode

624.11234
D234H
87574

Figure 2. Smart spine labels

Figure 3. Hand-held barcode scanner CCD

It is also referred to as a LED scanner, CCD is a photosensitive component, often used in fax machines, page scanners, and video cameras. To scan, the 'nozzle' of the scanner is simply placed on top of the barcode symbol and a trigger on the underside of the scanner is depressed. The scanning is automatic, although the scanning range is seldom more than an inch or two. Small size, lightweight and low cost than laser scanner are the basic advantages of CCD scanners. Moreover, CCD scanners have no moving parts whereas laser scanners have oscillating mirrors that are subject to wear and mechanical failure. CCD scanners use LEDs for illumination, which is quite safe for direct viewing. Further, CCD scanners have scan rates of 45 scans per second or faster, which is as good as their laser counterparts. Usually a keyboard wedge is used as an interface between the CCD scanner and the computer. The CCD scanner is plugged in between the keyboard and the computer using a Y cable. The data from the barcode appears at the computer's keyboard port just as it has been typed manually.

4.7 Portable Barcode Scanner for Stock Verification

Use of portable scanner for the stock verification is ideal. It serves the dual purpose of scanning the barcodes and storing that data in its memory. Central Library, PEC University of Technology has bought a hand-held portable scanner (PDA Model No. PT630DWA-0L00A S/N-5201552002) with a memory chip of 4.5 MB (Fig. 4).

Figure 4. Hand-held portable scanner

It is an ergonomic, rugged, and lightweight terminal weighing only 245 g and withstands 4-feet drops to concrete floor. It will be used to store the accession numbers of scanned documents. Once its memory is full, the stored data, i.e., accession numbers can be transferred to the computer to clear its memory and further scanning work can be continued.

4.8 Issue/Return System

The circulation module of the library management software supports front desk operations like check-outs and check-ins, renewals, students/membership records keeping, etc. It provides an option to generate and print barcoded ID cards (with an optional 'add-on' facility to attach members' photograph thereon). The system monitors overdue items and generates reminders for the same. Whole organisation provides greater flexibility in operations. It also keeps a complete log of all circulation transactions for future reference.

5. PLANNING FOR PRESENT ENDEAVOUR

Proper planning was needed to initiate such an endeavour and its successfull implementation. Various ways and means were used for completing barcoding of all the already accessioned books. Central Library PEC has different collections nomenclatured as

✂ Main collection.

✂ Bookbank (general).

✂ Bookbank (SC/ST).

As the accession register of these collections have parallel sequence in accession numbers, prefixes like GB and SB have been used to segregate different collections of Bookbank (General) and Bookbank (SC/ST), respectively. After the application of computers to automate the procedures of library, all bibliographic details of documents received were entered in the database. Barcodes were generated for each book and pasted at the back of book along with the date slip. Side by side, new books processed by Technical Processing Section were also barcoded before release. Comprehensive bibliographical databases for the available documents have been prepared.

Barcodes were prepared using the accession number as the keyfield and the labels were printed in-house using HP Laserjet printer. All the books in the library are barcoded now. For the purpose of entering books in the database, two Data Entry Operators were employed. It took around three years to complete the process as collection of the library is more than one lakh. The process of data entry is still going on as new books are being added regularly.

5.1 Passbooks

As soon as the list of new students admitted into various courses in the first year is received, data is fed into the computers and barcodes are generated. Every registered user is issued a passbook. Personal details like Name, ID number, Class, Department, etc., with a photograph are given in the first page. Photograph is attested by the incharge. The circulation staff assigns a unique membership code and activates users' borrowing status in LSEase. Barcode label is pasted on the passbook. Barcodes on passbook have Roll Number as the keyfield. Barcoded passbooks are issued to students only after registration. These labels correspond to following information in the user database:

✥ Name.

✥ Member code.

✥ Department.

✥ Address.

6. ISSUE/RETURN OF BOOKS

As already mentioned, CCD scanner is used for reading the barcode from the borrowers' card and the book instead of punching the accession numbers using a keyboard. When the barcodes are scanned, the details of both borrower and the book are displayed on the screen. This reduces the error percentage at the circulation counter, which may be resulted due to manual processing. When a book is issued or received back from a user, the counter staff scans the barcoded membership number from the members ID cards. Then the barcode from the book is scanned. The software computes the due date for return and accordingly the entire details are displayed on the monitor. Due date is put on the date slip and book card. With this the transaction is completed and the book is issued to the member. The whole transaction is automatically updated in the database.

7. ISSUE OF NO DUES CERTIFICATE

When a user leaves the institute, his/her membership is cancelled and library issues no dues certificate. This process is time consuming and error prone in a manual system. With the use of barcode technology, the member will surrender his/her bar-coded Library Membership Card. The library Management Software will scan the database for any document issued in his/her name or even any fine due. If nothing is due, no dues certificate will be issued. Else, he/she will be asked to clear the dues to get no dues certificate.

8. FUTURE PLANS

(i) *PVC cards will be issued:* PVC cards are an attractive choice for printing Library Membership Cards quickly and economically. Magnetic encoding or two-dimensional barcodes printed onto the PVC cards provide data entry and tracking. This practice will also result in saving a large amount of stationary for making borrowers cards and also saving of staff time which would have otherwise been spent for filling those cards. Figure 5 presents a typical PVC card.

(ii) One barcode sweeping machine will be positioned at entry gate of library to maintain user statistics. Making entries in a register are usually time-consuming. Users also show indifference towards entering their particulars. Such kind of statistics is
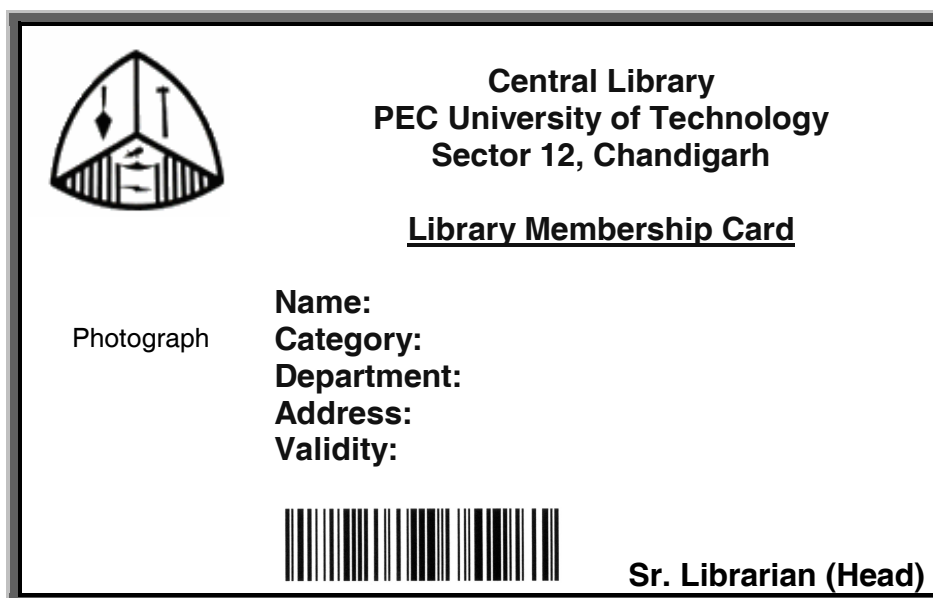
**Central Library
PEC University of Technology
Sector 12, Chandigarh**

Library Membership Card

Photograph   **Name:
Category:
Department:
Address:
Validity:**

Sr. Librarian (Head)

Figure 5. PVC card

useful for various purposes, particularly for improvement in library services and to start a new service.

(iii) *Checking at the gate check post:* When a user leaves the library with the issued document, these are checked at the exit gate. A terminal will be installed at the Gate Check Post to efficiently utilise the barcode technology. Since issue/return is done online, the database is being updated automatically. When user will leave the library, accession number of document carried by the user will again be scanned at the gate. In case of issued document the computer will approve the exit. But, in case, someone is carrying a document that has not been issued the computer will given alarm or a message to that effect.

(iv) Barcode printer will be purchased to have more precise barcodes.

9. BENEFITS INCURRED FROM BARCODE TECHNOLOGY

Barcode technology is most accurate and least expensive way to identify and get data into the computer. The extent of achievement in the library after introduction of barcode technology is quite high. The following are the benefits of the barcode technology:

- *Improved operational efficiency:* Manual charging/discharging of documents is very cumbersome. Operational efficiency has improved a lot after using the barcode technology as barcodes permit faster recording of information.

- *Accuracy:* In the manual system, the writing of accession number and member code may result in charging/discharging a wrong book to a wrong member. But barcode scans accession number and member code at the time of charging/discharging to ensure the accuracy in transactions. It leads to an error free data entry.

- With the help of barcode issue/return of documents can be done faster, which helps in saving the time of both the user as well as library staff.

- Barcode helps reducing in cost of preparing duplicate borrowers card.

- Barcode technology is fast and user-friendly.

- Barcode will help in stock verification expeditiously and easily.

- Barcode will help in maintaining duplicate borrowers' card, which were occupying more space on the issue counter.

- Issuing of no dues certificate will become easy; it was very cumbersome to verify from a manual system.

- It will facilitate preparation of reminders and fine lists for overdue books.

- It provides reliable statistics.

- It adds to elegance and aesthetics of the front office and its activities.

10. CONCLUSION

After barcoding the borrowers' passbooks and the books, the operations of circulation section have become efficient and error free. Implementation of new technology has certainly improved the image of the library among users and developed a positive attitude towards library.

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