Chapter – 7

Proposed Model of Automated Circulation System

In this chapter we have proposed a model of automated circulation system for university libraries of West Bengal. We have already gone critically through the existing literature available on circulation systems to determine and identify the factors influencing circulation activities in chapter 2, tried to comprehend the existing status the circulation systems of university libraries in West Bengal in chapter 3, made a comparative analysis of the circulation systems of the libraries in the chapter 4, and examined the attitudes of users towards circulation systems in university libraries of West Bengal in chapter 5, then we get a detail comprehension about the factors to be considered for designing an automated circulation system for the university libraries in West Bengal.

2 Objective and Methodology

The objective of this work is to identify the factors influencing the performance, in terms of success and failure, of circulation activities in different university libraries of West Bengal, and to propose a conceptual model of circulation system for university libraries considering those factors duly. However, the model is to be designed to satisfy the needs of the library authority and the users as well, for which we have made long interaction with several stakeholders. Methodology as is described in the chapter 1 introduction (vide Chap. 1, sec(t). 5).

3 Problems Faced in Semi Automated Circulation System in University Libraries
From the analysis of data as shown in chapters 2, 3, 4 and 5, we have summarized the following problems faced by the university libraries.

A. General

1. Compatibility with Barcode/RFID/Biometric: There are good numbers of software used by some libraries which cannot run in all environments. Moreover, the vendors are charging extra money for making a software compatible with the wanted/desired one and it has also been noted that sometimes data may get lost during that very process (vide Chap. 4, sec(t). 4.74, 4.77, 4.78 & Chap. 5, sec(t). 4.22).

2. User friendly: So far our study is concerned it is apparent that user friendly methods are lacking (vide Chap. 4, sec(t). 4.69).

3. Vendor support: Vendor support is not up to the mark. Online help support from vendor is not up to the mark (vide Chap. 4, sec(t). 4.71 & Chap. 5, sec(t). 4.).

4. Manual: Manuals are not well developed (vide Chap. 4, sec(t). 4.70).

5. Troubleshooting: Troubleshooting facilities are not properly addressed (vide Chap. 4, sec(t). 4.71.2).

6. SIP/NCIP protocol: All versions of the software used in different university libraries are not compatible with SIP/NCIP protocol (vide Chap. 4, sec(t). 4.86).

7. Indic scripts: All versions do not support Indic scripts in the circulation module (vide Chap. 4, sec(t). 4.87, Chap. 5, sec(t). 4.36).


10. Alert: No standard alert system is used to inform the users to return the demanded books or arrival of reserved books (vide Chap. 4, sec(t). 4.49.1 & Chap. 5, sec(t). 4.32).

11. Color code: No provision of using color code to specify circulation restrictions is found (vide Chap. 4, sec(t). 4.105).


B. Member Registration
1. **Registration format:** Registration format is predefined and unfortunately not customizable. Library staff cannot include any extra data field in the registration form like registration employee code, roll no., Ph.D. registration no., caution money, subscription, etc. (vide Chap. 4, sec(t). 4.13).

2. **Batch patron images:** SOUL 1.0 has no facility to upload patron’s photograph. No provision for uploading batch patron images in the software is found (vide Chap. 4, sec(t). 4.66).

3. **Renew the membership:** Renewal of membership is problematic as the new card number is not taken directly by the machine. The trigger system is supposed to be followed with a down and up arrow (vide Chap. 3, sec(t). 4.7.7).

4. **General ID card:** User’s general ID card is not used as an alternative identity card for library (vide Chap. 4, sec(t). 4.11 & Chap. 5, sec(t). 4.31).

5. **Card Printing:** Lay out and size of the card printing is problematic (vide Chap. 4, sec(t). 4.14).

6. **Back to previous field:** It has been found that at the time of renewing a membership, if any field is left blank, it is not possible to return to the previous field without entering data on that field (vide Chap. 4, sec(t). 4.14).

7. **Web registration:** Not a single university library adopts registration through web because no university library has the online facility (vide Chap. 5, sec(t). 4.17).

**C. Check-out**

1. **Auto checking in gate:** Not a single university library adopts automated checking system at the gate (vide Chap. 4, sec(t). 4.68 & Chap. 5, sec(t). 4.18).

2. **On-campus lending:** Not a single university library adopts on-campus lending through software (vide Chap. 4, sec(t). 4.90 & Chap. 5, sec(t). 4.38).

3. **Serial circulation facility:** Not a single university library adopts serial circulation facility (vide Chap. 4, sec(t). 4.91).

4. **Self charging/Discharging/Renewal:** No university library follows the self charging, discharging and renewal system (vide Chap. 5, sec(t). 4.15 and vide Chap. 4, sec(t). 4.34).

5. **Web check-in/out:** Not a single university library uses web check-in/out and renewal (vide Chap. 4, sec(t). 4.34.1 & Chap. 5, sec(t). 4.20).

6. **Fast Add cataloguing:** Some software has no facility to enter data of the documents in the circulation module at the checkout time (vide Chap. 4, sec(t). 4.88 & Chap. 5, sec(t). 4.25).

**D. Holds /Reservation**
1. **Reserve in the software:** Provision of reservation is available but most of the libraries (7) do not reserve the documents in their computer system (*vide* Chap. 3, sec(t). 4.7.5 *vide* and Chap. 5, sec(t). 4.17).

2. **On line/Self reservation:** Not a single university library reserves the documents through on line/self by patron (*vide* Chap. 5, sec(t). 4.17).

E. **Fines/ Over Dues**

1. **Payment through card:** Not a single university library adopts payment related to library activities through smart card, debit/credit card and online (*vide* Chap. 5, sec(t). 4.19).

F. **Report**

1. **Not customizable:** Report generation is not customizable. Only the given field you have to opt (*vide* Chap. 4, sec(t). 4.97).

2. **Printing of issue/Return statistics:** There is no page break up and page number in the print record of daily statistic of issue and return. If you want to print from middle or else you cannot print it, which causes problems for many users (*vide* Chap. 3, sec(t). 4.2.5).

3. **Merge circulation report:** So far our study is concerned there is no provision of merge circulation reports with other modules report (*vide* Chap. 4, sec(t). 4.98).

4. **Presentation of report:** It has also been observed that tabular form of presentation is the only form of circulation report, which should be accompanied by bar, pi diagram, etc. (*vide* Chap. 4, sec(t). 4.99).

5. **Satisfaction level:** Not a single university library is fully satisfied with the circulation system (*vide* Chap. 4, sec(t). 4.102).

G. **Inventory**

1. **Stock maintenance:** Not a single university library maintains stock verification and statistics of commercial and in-house binding through software, though these very facilities are available in the software used (*vide* Chap. 4, sec(t). 4.103).

H. **Notices**

1. **Notice templates:** Notices are not customizable. Depending on the importance of the notice it must be designed accordingly. But so far our study goes no software allows redesigning the existing templates for the same (*vide* Chap. 4, sec(t). 4.107).
I. OPAC

1. **Circulation information**: Not a single university library provides circulation information in OPAC. Users really feel helpless when they use OPAC for not providing circulation information like fine, due date, etc. OPAC only shows the availability or the location of the documents (*vide* Chap. 4, sec(t). 4.73 & and Chap. 5, sec(t). 4.35).

2. **Purchase suggestion**: Not a single university library provides suggestion for book purchase in web OPAC, which may help the library authority to take wise decisions while selecting the books to purchase (*vide* Chap. 4, sec(t). 4.76 & and Chap. 5, sec(t). 4.26).

3. **Searching**: When one searches a book by call number, the software considers only the class number not the book number which causes the inconveniences (*vide* Chap. 3, sec(t). 4.2.5).

4. **Proper blinking**: It has been observed that when someone searches data by author/other fields, he/she is not able to link the desired one unless he/she clicks the exact blinking location. It is important to note here that during these types of search several columns are visible in the screen like author, title, access number, call number, etc. Out of which one column is ‘primary key’ that shows in blue unique color and others show different color, which are not primary key. Under these circumstances if someone hit a column other than primary key the system will show data concerned to the last user’s search result (*vide* Chap. 3, sec(t). 4.2.5).

## 4 Proposed Model of Automated Circulation System

So far our research work for the design of a circulation system for university libraries is concerned; the proposed model of automated circulation system for the university libraries should consist of the following characteristic features. The features are categorized under the three heads and presented below for better comprehension:

### 4.1 Basic/Common Functions

There are some general features which are considered as basic/common functions of any software. We are not going details of these very general functions of circulation activities but providing the outlines only. Some functions like set the
library, set the category of documents and users, set calendar, set parameters and password security, etc. are not discussed here.

A. General

- **Multi window**: It should provide the facility to keep several windows of circulation processes open at the same time for multiple accesses and should support the ability to use a patron record at more than one workstation simultaneously (*vide* Chap. 2, sec(t). 4.20.2).

- **System failure**: The system must have the facility of backup or alternative power supply that can help to run smoothly without any hampering of work (*vide* Chap. 2, sec(t). 4.20.2).

- **Import and export**: The system should have the import and export facility for documents and patrons as well as circulation transactions (*vide* Chap. 2, sec(t). 4.4 & 4.20.2).

B. Member Registration

- **Patron card creator**: The system should allow creating of layouts and templates which we design to print a nearly unlimited variety of patron cards including barcodes/RFID/biometrics (*vide* Chap. 2, sec(t). 4.4).

- **Scan and upload**: It should provide the facility to scan residential proof or other important documents so that these are available for future use (*vide* Chap. 2, sec(t). 4.4).

- **Patron lists**: The provision of patron lists which is a means to store a group of patrons for easy modification via the batch patron modification tool or reporting should be available in the software (*vide* Chap. 2, sec(t). 4.4).

- **Patron search**: Provision to search a patron by any part of their name or their card number must be there (*vide* Chap. 2, sec(t). 4.4).

- **Duplicate check**: At the time of new borrower registration, the system must perform a duplicate check to determine if there are existing records that meet the criteria being entered (*vide* Chap. 2, sec(t). 4.4).

- **Patron’s information**: Patron’s full information including patron’s needs and academic qualifications are to be provided for better service like CAS/SDI/Article service, etc. (*vide* Chap. 2, sec(t). 4.4).

- **Guarantor information**: System must support the guarantor information and intimate the guarantor via email or other massaging services (*vide* Chap. 2, sec(t). 4.4).
➤ **Member ID:** The patron barcode number and material barcode numbers must be assigned in such a way that they are easily distinguishable by the system (*vide* Chap. 2, sec(t). 4.4).

➤ **Auto Member number:** Provision to generate member ID number automatically should be there (*vide* Chap. 2, sec(t). 4.4).

➤ **Upper/Lower case surnames:** It should store and display surnames (last names) in upper/lower case according to library preference (*vide* Chap. 2, sec(t). 4.4).

➤ **Address verification:** Interface with address verification vendor to verify patron addresses at the time of entry, and/or in a batch process must be there (*vide* Chap. 2, sec(t). 4.4).

➤ **Mail Merge:** The option to generate an envelope, letter, or label from a patron record should be there (*vide* Chap. 2, sec(t). 4.4).

➤ **Expiry Periods:** It should support patron types tied to different expiry periods (*vide* Chap. 2, sec(t). 4.4).

➤ **Authorization:** The system must be able to authenticate users by user name & password/Barcode/SIP and retain user’s authorization as he or she navigates among databases (*vide* Chap. 2, sec(t). 4.4).

➤ **Patron record display timeout:** Patron records display should be timed out and close automatically after a system-scheduled idle period (*vide* Chap. 2, 4.4).

C. **Check-out**

➤ **Checkouts on one receipt:** The system must treat each checkout as a separate transaction but be able to list all checkouts for each person on one receipt by which we can avoid excess use of papers (*vide* Chap. 2, sec(t). 4.20.2).

➤ **Checking facility:** The system must check all items for outstanding holds, charges, and circulation restrictions before allowing them to be checked out (*vide* Chap. 2, sec(t). 4.20.2).

➤ **Expiry dates:** Circulation system must have support for determining expiry dates for borrower privileges and must automatically warn library staff when that date is approaching and not to check out items beyond that date (*vide* Chap. 2, sec(t). 4.20.2).

➤ **Extension of expiry dates:** Circulation system must have support for extension of expiry dates with a simple keystroke at the time of checkout or access to the user's record (*vide* Chap. 2, sec(t). 4.20.2).

D. **Document/Item Status**
Different rules for different documents: The system must enable staff to define special loan and fine rules for different documents that can override standard circulation defaults (vide Chap. 2, sec(t). 4.20.2).

Replacement: It should have support for determining missing or long overdue items being added to “Consider for replacement” list (vide Chap. 2, sec(t). 4.20.2).

Automatic batch status: The support for real-time and automatic batch status changes (e.g., location, collection, and other fields) with capability to make status changes from central administration and individual service location should be provided (vide Chap. 2, sec(t). 4.20.2).

Check-out limits: The ability to define check-out limits by item type and number of days, of course for the temporary type’s flexibility in terms and conditions should be there (vide Chap. 2, sec(t). 4.20.2).

Edit item records from any item record access point: The ability to edit item records from any item record access point should be there (vide Chap. 2, sec(t). 4.20.2).

Edit in batch: Item records should be edited in batch (vide Chap. 2, sec(t). 4.20.2).

Deleted item records should remain accessible: Ability to delete individual or batch of records, with sufficient privileges should be there with an option to view deleted item records in future for reporting and research purposes (vide Chap. 2, sec(t). 4.20.2).

Temporary location reverts to original location: The provision to set an item temporarily to a new location, and later reverts to original location should be there (vide Chap. 2, sec(t). 4.20.2).

Browse only: It must have the ability to set an item to 'browse only' and set a date for item to begin accepting holds automatically (vide Chap. 2, sec(t). 4.20.2).

Hold shelf location: Item record should include a field for 'hold shelf location'. When item status is 'On Hold Shelf,' record location it should retain hold shelf location until item is checked out or goes to another hold shelf (vide Chap. 2, sec(t). 4.20.2).

Views: Ability to see number of copies, check-out status, and number of holds all in one screen (Staff interface and patron interface) should be there (vide Chap. 2, sec(t). 4.20.2).

Link to hold list: Item record screen should include link to hold list (vide Chap. 2, sec(t). 4.20.2).

Unlimited items: It should have the ability to add unlimited items to a single bibliographic record. For example, magazine titles which may comprise thousands of items per year (vide Chap. 2, sec(t). 4.20.2).

Branch staff can add barcode numbers: Provision should be there so that a branch staff can quickly add barcode numbers for non-catalogued items to existing...
bibliographic records (e.g. a generic bibliographic record for paperbacks) \textit{(vide} Chap. 2, sec(t). 4.20.2).\

E. Loan Period\

\begin{itemize}
  \item \textit{Flexibility of time:} The system must allow any item to be checked out for any period of time (days, hours, or minutes) \textit{(vide} Chap. 2, sec(t). 4.12).\
\end{itemize}\

F. Check-In\

\begin{itemize}
  \item \textit{Batch check-in:} Circulation must support a batch check-in that does not message and require action for each fine transaction calculated during check-in \textit{(vide} Chap. 2, sec(t). 4.20.2).\
  \item \textit{Retention of the last two or more borrowers’ records:} The system must support retention of the last two or more borrowers’ record for each item in order to manage problems such as damages \textit{(vide} Chap. 2, sec(t). 4.20.2).\
  \item \textit{Checking facility:} System must check the reserve, fine, damage at the time of check in \textit{(vide} Chap. 2, sec(t). 4.20.2).\
  \item \textit{Return after expiry:} Preference should be given to patron to return the items after expiry of membership \textit{(vide} Chap. 2, sec(t).4.20.2).\
\end{itemize}\

G. Renewals\

\begin{itemize}
  \item \textit{All items or individual items:} The system must allow renewing all items or individual item those are permitted according to the privileges assigned to borrower with a single command via telephone, via access to the user’s record from any location \textit{(vide} Chap. 2, sec(t).4.20.2).\
  \item \textit{Calculation of dates:} The system should calculate and display the new due-date for renewals \textit{(vide} Chap. 2, sec(t). 4.20.2).\
  \item \textit{Authorized staff to renew:} The system should permit authorized staff to perform renewal activities \textit{(vide} Chap. 2, sec(t). 4.20.2).\
  \item \textit{Checking facility:} The system should check the circulation record for holds on items being renewed and blocks renewal if holds are found. The system checks the patrons’ record for exception (for example, fines) during the renewal transactions \textit{(vide} Chap. 2, sec(t). 4.20.2).\
  \item \textit{Renewal receipts:} Renewal receipts include the same information as the check-out receipt \textit{(vide} Chap. 2, sec(t). 4.20.2).\
  \item \textit{Renew:} The system should have the provision to renew their checked out materials. The patrons can renew their checked out materials via their checked out history in the OPAC \textit{(vide} Chap. 2, sec(t). 4.20.2).\
\end{itemize}
- **Renewal Notice**: Patrons will receive a notice when they renew materials. Library can set up a new notice with the code of renewal with custom text for renewing items (*vide* Chap. 2, sec(t). 4.20.2).

H. Holds /Reservation

- **Hold from any library or remote location**: Circulation must allow library staff to place holds from staff workstations or borrowers to place holds as part of the user portal from any library or remote location if that facilities are provided (*vide* Chap. 2, sec(t). 4.20.2).
- **Alert the operator when placing holds that a borrower is blocked**: Circulation must alert the operator when placing holds that a borrower is blocked, their privileges have expired, or if materials have restrictions against holds and allow the operator to proceed with a single keystroke (*vide* Chap. 2, sec(t). 4.20.2).
- **Remove a hold**: The system should allow library staff to remove a hold by a simple straightforward action. Librarians must have the ability to move a copy up or down in the hold list and define a priority for filling holds (*vide* Chap. 2, sec(t). 4.20.2).
- **Specify limits of hold**: Provision should be there for the library to specify limits on the total number of hold requests any patron may have at any given time; limits to be set according to the category of patron (*vide* Chap. 2, sec(t). 4.20.2).
- **Delete or cancel**: Ability to automatically delete all cancelled, unfilled or expired hold requests after a library specified period of time should be there (*vide* Chap. 2, sec(t). 4.20.2).
- **Patron hold position**: Current hold position should show 'nth hold on x circulating copies' or 'Ready for Pickup'. Additional status like 'In Transit' should be hidden from patron’s window but visible in staff interfaces (*vide* Chap. 2, sec(t). 4.20.2).
- **Patron error messages**: Patron error messages should be specific and unambiguous. For example, if a hold request is unsuccessful, the error message should show why it is so (hold limit reached, no available copies, etc.) (*vide* Chap. 2, sec(t). 4.20.2).
- **Patron hold list**: System must show patron's holds list, including active and recently cancelled holds (*vide* Chap. 2, sec(t). 4.20.2).
- **Items to be hold**: The system should allow holds to be placed on all items in the circulating collections according to library rules (*vide* Chap. 2, sec(t). 4.20.2).
- **Authorized staff to manually override**: The system must allow an authorized staff to manually override all hold/recall processing (*vide* Chap. 2, sec(t). 4.20.2).
- **Choice of notification method**: It should address the patron’s choice of notification method, e.g., telephone, mail, e-mail, text message; with capability
for patron to change this preference at any time without intervention of staff (vide Chap. 2, sec(t). 4.20.2).

- **Display**: System must show activity dates, source branch, and most recent status of holds and cancellations (vide Chap. 2, sec(t). 4.20.2).

- **Intervention of staff**: When a hold is mistakenly cancelled, staff member should be able to access when the hold was originally placed and should have the capability to insert patron record into correct place in hold sequence (vide Chap. 2, sec(t). 4.20.2).

- **Automatically restarted**: If a hold item is checked out to the wrong patron, the hold should automatically restart (vide Chap. 2, sec(t). 4.20.2).

- **Allow holds on damaged items**: This parameter which is a binary setting that controls whether or not hold requests should be placed on items that are marked as "damaged" (vide Chap. 2, sec(t). 4.20.2).

- **Allow holds on patron’s possessions**: The system should prevent patrons from placing holds on items they already have out, thus preventing them from blocking anyone else from getting an item (vide Chap. 2, sec(t). 4.20.2).

- **Allow hold policy override**: The system must allow hold policy override (vide Chap. 2, sec(t). 4.20.2).

- **Auto resumes suspended holds**: Suspended holds to be automatically resumed by a set date should be there (vide Chap. 2, sec(t). 4.20.2).

- **Maximum reserves**: Patrons should only have a specified number of holds at once (vide Chap. 2, sec(t). 4.20.2).

- **Holds queue**: The system should have provision of hold queue to fulfill the demand of hold to the patron (vide Chap. 2, sec(t). 4.20.2).

- **Holds to pull**: The system should prepare a report that will show all hold items and that are available at the library for pulling (vide Chap. 2, sec(t). 4.20.2).

- **Holds awaiting pickup**: The system should have provision of holds awaiting pickup from the hold list (vide Chap. 2, sec(t). 4.20.2).

- **Hold ratios**: The system should have provision to prepare hold ratios to calculate items needed in the library. The report will tell how many additional items need to be purchased to meet this quota (vide Chap. 2, sec(t). 4.20.2).

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I. **Blocks**

- **Library defined**: Item and patron blocks must be library-defined. The system should allow the operator to easily display blocks, detailing reasons for block(s). All blocks must have the option to be overridden by an authorized operator (vide Chap. 2, sec(t). 4.20.2).

- **Privileges**: Automatic blocking of borrower privilege should be there (vide Chap. 2, sec(t). 4.20.2).
Clear old blocks: The system must clear patron records of old blocks after a scheduled time period. Cleared records may be purged. Staff must be able to delete blocks using a single command (vide Chap. 2, sec(t). 4.20.2).

J. Fines/Overdue

Fine calculation: Circulation must support library defined fines and fees with automatic calculation of fines when items are checked in late. The late fine for all checkouts will only go up to library defined amount of fine (vide Chap. 2, sec(t). 4.17).

Fine calculation on real time: It should have the provision to account for closed days and holidays or grace periods in the calculation of overdue fines; grace period etc. as determined by the library (vide Chap. 2, sec(t). 4.17).

Notifications: It must generate e-mail/sms notifications of overdue notices to patron (vide Chap. 2, sec(t). 4.17).

Parameters: System must allow the library to set the parameters for overdue and bill notices (vide Chap. 2, sec(t). 4.17).

Mode of payment: System must allow full or partial payment of fines with receipts (vide Chap. 2, sec(t). 4.17).

Exempt of fee and fine: Only the authorized staff members should have the capability to exempt fees and/or fines (vide Chap. 2, sec(t). 4.17).

Patron history: System must keep a history of patron’s fine and fee paid or to be paid (vide Chap. 2, sec(t). 4.17).

Print receipts: The system must support a cash register function and print receipts for collections of fines, fees, lost books, and miscellaneous fees assessed such as photocopies and printing etc. (vide Chap. 2, sec(t). 4.17).

Overdue notice: The system must produce an overdue notice for the hold shelf so that library staff can manage those items not retrieved by borrowers in a timely manner following library defined parameters (vide Chap. 2, sec(t). 4.17).

Manually add a charge to a patron: It should have the ability to manually add a charge to a patron record and for staff to be able to select a reason for the added charges from a list originating from the library (vide Chap. 2, sec(t). 4.17).

History of overdue notices: It should store and display a history of overdue notices and invoices sent to the patron for all items currently overdue or billed, and include an item’s title, date of notice sent and method sent (telephone, email, or text message) (vide Chap. 2, sec(t). 4.17).

Overdue with fines: The system should have provision to prepare report on overdue with the amount of fines (vide Chap. 2, sec(t). 4.17).

K. Reports
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- **Parameters:** The system must have the ability to generate reports for all data relating to the use of library materials, borrowers, and other data needed for operations of a library (*vide* Chap. 2, sec(t). 4.31).

- **Number and type of transactions:** Circulation must provide reports of the number and type of transactions on a variety of library defined criteria, such as daily, weekly, monthly, annually, according to time, location, workstation, user type, material type, classifications, reciprocal borrowers, etc. All reports must be sorted out by library defined parameters (*vide* Chap. 2, sec(t). 4.31).

- **Generated by any authorized staff:** The system must allow reports to be generated by any authorized library staff (*vide* Chap. 2, sec(t). 4.31).

- **Duplicate Report:** The system should have provision to prepare duplicate reports from the saved reports (*vide* Chap. 2, sec(t). 4.31).

- **Patron statistics:** The system should have the provision to choose the parameters to prepare statistics of patrons’ holds, patrons with the most checkouts, most circulated items, patrons with no checkouts, and items with no checkouts and average loan time (*vide* Chap. 2, sec(t). 4.31).

L. **Inventory**

- **Items missing:** System must provide a list of missing items in the inventory. The date from which the item is missing needs to be specified (*vide* Chap. 2, sec(t). 4.20.2).

- **Status of lost item:** Circulation system must support item status of lost, which is automatically invoked after a library defined period of time of being overdue, or can be invoked by library staff, at which time the borrower is to send a bill for lost item (*vide* Chap. 2, sec(t). 4.20.2).

- **Mobile devices:** It should support inventory processes on mobile devices (*vide* Chap. 2, sec(t). 4.20.2).

- **Cancel the lost status:** System must automatically cancel the lost status when an item is found (*vide* Chap. 2, sec(t). 4.20.2).

- **Lost and damaged item:** Provision should be there so that the patron can pay price of the item and handling charge for lost and damaged item (*vide* Chap. 2, sec(t). 4.20.2).

M. **Notices**

- **Pickup notice cancellation:** It should have the-
  - Ability to cancel unsent notices before they are sent.
  - Ability to search pending notices by item barcode (*vide* Chap. 2, sec(t). 4.20.2).
 Consolidate multiple notices: It should have the ability to consolidate multiple notices within a single email, phone call, or mailing per patron per day, if required (vide Chap. 2, sec(t). 4.20.2).

 Long wait notices: It should have the option to send emails to patrons who are 1) near the top of the holds queue and 2) have been waiting a long time, to see if they still waiting for the same (vide Chap. 2, sec(t). 4.20.2).

 Billing notices: The provision to send billing notice to patron when account balance reaches a configurable threshold limit should be there. An item is billed to the patron account when it is overdue by a configurable number of days (System should calculate and assess the correct charge to the patron's account) (vide Chap. 2, sec(t). 4.20.2).

 Notifications (Print/Email/SMS): Circulation must support printing of date due slips, fine and fee payments, hold flags, or other system alerts to an assigned printer that prints formats (vide Chap. 2, sec(t). 4.20.2).

 Mailing list from the borrower's file: The library must have the ability to create a mailing list from the borrower's file and to create its own message for notification to the users accordingly (vide Chap. 2, sec(t). 4.20.2).

 Hold cancellation notices: Provision should be there so that patrons can receive hold cancellation notice and expiry of hold notice (vide Chap. 2, sec(t). 4.20.2).

 N. OPAC

 Automatic update: Provision of an automatic update in the catalog of item status when it is checked in or checked out, lost, missing, not found, hold, block, bind etc. should be there (vide Chap. 2, sec(t). 4.20.2).

 Resource sharing through ILL: The system should provide the list of libraries those are sharing resources with this library (ILL) and link to their OPAC. Provide automatic check against the Library holdings and flag requests that match an owned item. Library can specify the method and introduce some points according to their choice (vide Chap. 2, sec(t). 4.20.2).

 Material and patron look up:
  o The system must allow a material look up by simply typing in a partial or complete title, author, call number, or subject etc.
  o The system must allow a patron look up by simply typing a partial or complete patron name or patron number (vide Chap. 2, sec(t). 4.20.2).

 Auto e-mail OPAC user: Provision to access an email to newly created patrons with their account details should be there (vide Chap. 2, sec(t). 4.20.2).

 News: System should allow the librarians to post important/necessary news to the OPAC, staff interfaces and circulation receipts (vide Chap. 2, sec(t). 4.20.2).
- **Placing holds**: Provision to place holds to the patrons via OPAC should be there *(vide Chap. 2, sec(t). 4.20.2).*
- **Comments**: Provision of providing comments/suggestions in the OPAC by the patrons must be there *(vide Chap. 2, sec(t). 4.20.2).*
- **Patron flags**: If you have flagged (for a specific reason) your patron’s account they must see the different messages *(vide Chap. 2, sec(t). 4.20.2).*
- **Patron fines**: Provision should be there so that patron can see entire fine history in the OPAC *(vide Chap. 2, sec(t). 4.20.2).*
- **Change password**: Provision should be there so that a patron can change their password to login in the OPAC *(vide Chap. 2, sec(t). 4.20.2).*
- **Patron search/reading history**: Patrons should access their search history/reading history in OPAC. Patrons can choose their own privacy settings for their reading history *(vide Chap. 2, sec(t). 4.20.2).*
- **Patron privacy**: The access should be provided to the patrons so that they can decide how the library keeps their circulation history data *(vide Chap. 2, sec(t). 4.20.2).*
- **Patron messaging**: Patrons should be able to choose which messages they receive from the library (with the exception of overdue notices which the library controls) *(vide Chap. 2, sec(t). 4.20.2).*
- **Patron lists**: Access should be there for Patrons so that they can review public lists and create or edit their own private lists *(vide Chap. 2, sec(t). 4.20.2).*
- **My OPAC**: The system should have the provision of my account detail in OPAC. Patrons can see their summary, flags, fines, details; tags, search history, reading history, messages and lists from my account of OPAC *(vide Chap. 2, sec(t). 4.20.2).*

O. Display Features

- **Display**: Display item must be library configurable *(vide Chap. 2, sec(t). 4.20.2).*
- **Status of materials**: The system should indicate the status of materials as in or out of Library, reserved or lost. This information should be available on the first accessed screen *(vide Chap. 2, sec(t). 4.20.2).*
- **Card catalog format**: The system must have an alternate option to display records in the traditional card catalog format also *(vide Chap. 2, sec(t). 4.20.2).*
- **Records with tags**: The system should display records with tags for specific fields (for instance, author, title, etc.) as an option *(vide Chap. 2, sec(t). 4.20.2).*
- **Print the results**: The system should provide the option to the user to print the results of the search at a printer attached to the search terminals in screen display or bibliographic format *(vide Chap. 2, sec(t). 4.20.2).*
Privacy of users: Patron record screen should not display confidential/sensitive information (e.g. date of birth, phone number etc.) to maintain the privacy (vide Chap. 2, sec(t). 4.20.2).

Holds are visible: Holds/reserves “suspends” and vacation holds should be visible in patron records from patron view and staff client view (vide Chap. 2, sec(t). 4.20.2).

Option to view: The system should allow for the option to view a specified number of circulation transactions (vide Chap. 2, sec(t). 4.20.2).

4.2 Feedback from the Library Staff and Users

Problems identified by library staff and users and their suggestions are analyzed to design the proposed model.

A. General

Backup: The system must allow automatic remote mirroring and periodic backup of data and program files, if necessary (vide Chap. 4, sec(t). 4.100).

Barcode/RFID/Biometric: The system must compatible with the barcodes/RFID/Biometrics as defined by the library (vide Chap. 4, sec(t). 4.74).

User friendly: The software must be user friendly (vide Chap. 4, sec(t). 4.69).

Vendor support: Vendor support must be up to the mark. Online help support from vendor will also up to the mark (vide Chap. 4, sec(t). 4.71 & Chap. 5, sec(t). 4.).

Manual: Manuals must be well organized (vide Chap. 4, sec(t). 4.70).

Troubleshooting: Troubleshooting facilities must be properly addressed (vide Chap. 4, sec(t). 4.71.2).

Batch record: The provision to provide option for batch record processing for item (documents and patron) transfers, deletes, status changes should be included in the software (vide Chap. 4, sec(t). 4.82).

SIP/NCIP protocol: The system must support the SIP/NCIP protocol (vide Chap. 4, sec(t). 4.86).

Indic scripts: The software must support Indic scripts in the circulation module (vide Chap. 4, sec(t). 4.87).


Article service: The software must support article service facility to the patrons (vide Chap. 4, sec(t). 4.94).

Library-configurable alerts: Provision should be there to enable the librarian so that he/she generate audible and/or visible alert, whenever necessary (vide Chap. 4, sec(t). 4.49).
 **Color code:** There should be provisions of using color code to specify circulation restriction (*vide* Chap. 4, sec(t). 4.105).

 **Offline circulation:** Remote users face inconveniences when server is down because not a single university library provides offline circulation facility. The system must support offline circulation facility (*vide* Chap. 4, sec(t). 4.67 & Chap. 5, sec(t). 4.27).

 **Library transfer limits:** The provision to set the limit to transfer items between libraries based on the status of sending library and receiving library, and the collection code involved should be there (*vide* Chap. 4, sec(t). 4.80, 4.86).

 **Delinquency:** The software must support delinquency facility (*vide* Chap. 4, sec(t). 4.93).

 **Circulation cloud:** There should be provisions for generating circulation cloud from reading history (*vide* Chap. 4, sec(t). 4.106).

 **Free SMS:** There are so many service providers who can send SMS free of cost. The university libraries can avail these facilities to give better services to its users (*vide* Chap. 4, sec(t). 4.50).

B. Membership

 **Registration format:** The software should have the provision of customized field in registration format. So, that library staff can include any extra data field in the registration form like registration employee code, roll no, PhD registration no, caution money, subscription etc. (*vide* Chap. 4, sec(t). 4.14).

 **Photograph:** The system must adopt batch/single photograph of the borrowers in the LMS and the photograph should display in the patron record (*vide* Chap. 4, sec(t). 4.48).

 **General ID card:** User’s general ID card can be used as an alternative identity card of the library (*vide* Chap. 4, sec(t). 4.11 & Chap. 5, sec(t). 4.31).

 **Back to previous field:** There should be provision of back to previous field from later field without entering data on that field (*vide* Chap. 4, sec(t). 4.14).

 **Web registration:** There should be provision of web/online registration (*vide* Chap. 5, sec(t). 4.17).

 **Renew the membership:** The software should have the provision of hustle free renew of membership process (*vide* Chap. 3, sec(t). 4.7.7).

 **Card printing:** There should be provision of designing lay out of the card and printing facility (*vide* Chap. 4, sec(t). 4.14).

 **Renew from one category to other category:** There should be provision of renew members from one category to another category with the same/existing ID number (*vide* Chap. 3, sec(t). 4.2.5).
Fee and caution money: The system must define the caution money and library fee for different categories of patron (*vide* Chap. 4, sec(t). 4.4.5).

Alert on mandatory field: It should alert when data is not entered in a particular field (*vide* Chap. 4, sec(t). 4.49).

Sequence of member: The system must have different sequence for different categories of the members (*vide* Chap. 4, sec(t). 4.15.1).

Restriction of access: The system must have the restriction of access to local or remote databases based on the IP address of the user and User’s log-in ID (*vide* Chap. 4, sec(t). 4.83).

Show patron image in web based self check: The patron’s picture should be visible at the time of web-based self checkout (*vide* Chap. 4, sec(t). 4.45).

Privileges: During the registration process the system automatically should assign the privileges available to the patron depending on its category. There should be the provision of library defined privileges in the software (*vide* Chap. 4, sec(t). 4.83).

Smart card facility: The system must support for use of smart card or general ID card for library as well as all other purposes (*vide* Chap. 4, sec(t). 4.16 & Chap. 5, sec(t). 4.19).

Patron self registration: The system should provide the option to register an account via online (*vide* Chap. 5, sec(t). 4.17).

C. Check-outs

Auto checking in gate: There should be provision of automated checking system at the gate.

On-campus lending: There should be provision of on-campus lending facility through software (*vide* Chap. 4, sec(t). 4.90 & Chap. 5, sec(t). 4.38).

Serial circulation facility: There should be provision of serial circulation facility (*vide* Chap. 4, sec(t). 4.91).

Fast add cataloguing: At the time of circulation if find that some books are not entered in the data base then there should be the provision to enter the data within circulation module (*vide* Chap. 4, sec(t). 4.88 & Chap. 5, sec(t). 4.25).

Self charging/discharging/renewal: There should be provision of self charging, discharging and renewal system (*vide* Chap. 4, sec(t). 4.34 & 4.40).

Web enable: There should be provision of web check-in/out and renewal (*vide* Chap. 4, sec(t). 4.75).

Circulation messages: Circulation messages, short messages that librarians can leave for their patrons or their colleagues, should appear at the time of check-out (*vide* Chap. 4, sec(t). 4.49).
Item circulation alerts: Provision should be there for libraries to decide if they want to have patrons automatically notified of circulation events (check-ins and check-outs) or not (vide Chap. 4, sec(t). 4.49).

Alert already checked out items: The system must alert (audio and text) concerned staff if the item being checked out is already issued to another patron (vide Chap. 4, sec(t). 4.49).

Check out messages: A message should pop up when we check out the item informing the number of copies available (vide Chap. 4, sec(t). 4.49).

Check out warnings: The warnings need to be acknowledged before we proceed to continue checking items out (vide Chap. 4, sec(t). 4.49).

Gate pass: The system must print the gate pass for single or group check out. The information on the gate pass must be customized (vide Chap. 4, sec(t). 4.30).

D. Documents

Types of documents to be borrowed: It should provide the option to the library authority to specify the kinds of materials and the number of items be borrowed to a patron depending on the category of the patron (vide Chap. 4, sec(t). 4.17).

Restrict checking out: Circulation process must restrict checking out of materials marked as non-circulating and allow intervention of library staff to proceed as and when necessary (vide Chap. 4, sec(t). 4.17).

Borrowed through ILL: It should flag the list of books/documents which the library has to be borrowed through ILL by the demand of patron (vide Chap. 4, sec(t). 4.96 & Chap. 5, sec(t). 4.41)

E. Loan period

Adjust loan periods: The system must allow and adjust loan periods for holidays and closed library hours. Provision to change the loan length for items that have many holds on them should be there (vide Chap. 4, sec(t). 4.19).

F. Check-In

Allow self check returns: Provision should be there so that patrons can return items through web-based self checkout system, which will be followed by courier service or postal service or may be sending messenger (vide Chap. 4, sec(t). 4.40).

G. Holds/Reservation
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- **Reserve in the software:** There must be the provision of reservation in the software (*vide* Chap. 3, sec(t). 4.7.5 *vide* and Chap. 5, sec(t). 4.17).

- **On line/self reservation:** There should be provision of reserve the documents through on line/self by patron (*vide* Chap. 5, sec(t). 4.17).

- **Notices:** The system should be ready to prepare and print recall notices to patrons stating that items on hold are available. The notices must include name and address in a mailing format (*vide* Chap. 4, sec(t). 4.107).

- **Reserves maximum pick up delay:** This preference puts an expiry date on an item a patron has on hold. After this expiry date the staff will have the option to release the unclaimed hold which then may return to the library shelf or issue to the next patron on the item’s hold list. Items that are ‘expired’ by this preference are moved to the ‘Holds Over’ tab on the ‘Holds Awaiting Pickup’ report should be there (*vide* Chap. 4, sec(t). 4.44).

- **Reservation alert:** The system should flag/mark those items which are already reserved (*vide* Chap. 4, sec(t). 4.49).

**H. Block**

- **Delinquent:** The system must allow library defined blocks of renewals if the patron is delinquent, the title has a hold registered against it, the renewal limit has been reached, or an item is restricted in some other way (*vide* Chap. 4, sec(t). 4.93).

- **Automatic alert:** The system must automatically alert the operator of a patron or item block. The operator must acknowledge the block before the renewal can proceed (*vide* Chap. 4, sec(t). 4.49).

- **Display message:** The system must allow library staff to quickly and easily place manual blocks with explanation note ("need address update," etc.) with a display message with the entire reason for the block without the need for library staff to conduct other inquires, and with the ability for the operator to proceed with a single keystroke (*vide* Chap. 4, sec(t). 4.49).

**I. Fine**

- **Charge or forgive fine if lost an item:** The system must have the preference to charge or forgive fine if the item is not returned in due time by the patron (*vide* Chap. 4, sec(t). 4.55.1).

- **Accept debit/credit card/smart card:** The system must be able to accept debit or credit card for payments of fines and fee and other costs (*vide* Chap. 5, sec(t). 4.19).
J. Report

- **Printing of issue/return statistics**: There should be provision of page break up and page number in the print record. If there have the provision of online print file creation that solve the above problem (*vide* Chap. 3, sec(t). 4.2.5).
- **Customizable report content**: Provision should be there so that contents of the report can be customized (*vide* Chap. 4, sec(t). 4.97).
- **Merge circulation report**: The system must able to merge circulation reports with other modules report (*vide* Chap. 4, sec(t). 4.98).
- **Presentation of report**: System must support different form of presentation of circulation report like bar, chart and pi diagram etc (*vide* Chap. 4, sec(t). 4.99).
- **Satisfaction level**: Report generation must be fully satisfied with the circulation system (*vide* Chap. 4, sec(t). 4.102).
- **Notification**: The system must allow for a variety of library defined reports to be generated for notification using mail, e-mail, phone or SMS (*vide* Chap. 4, sec(t). 4.49.1).

K. Inventory

- **Displayed in the OPAC**: Library staff should have the ability to define whether or not lost items are to be displayed in the Online Public Access Catalog (*vide* Chap. 4, sec(t). 4.73).
- **In processing/book cart locations**: Software should allow for handling temporary locations like the processing center and/or book carts throughout the library (*vide* Chap. 4, sec(t). 4.95 & Chap. 5, sec(t). 4.40).

L. Notice

- **Alerts/notices**: The system must allow printed/email/SMS of various alerts/notices (*vide* Chap. 4, sec(t). 4.49).
- **Courtesy notices**: The option to send courtesy notices via email in a configurable number of days before due date, depending on loan period of item should be there (*vide* Chap. 4, sec(t). 4.107). (Patrons may opt out courtesy notices.)
- **Notification schedules**: It should have the ability to schedule different types of notices on a daily basis or several times in a day (*vide* Chap. 4, sec(t). 4.49).

M. OPAC
Searching: Software must support the facility to search by book number or other Indic scripts (vide Chap. 3, sec(t). 4.2.5).

Purchase suggestion: The system must support suggestion for book purchase in web OPAC, which may help the library authority to take wise decisions while selecting the books to purchase (vide Chap. 4, sec(t). 4.76 & Chap. 5, sec(t). 4.26).

Proper blinking: It has been observed that when someone searches data by author/other fields, he/she is not able to link the desired one unless he/she clicks the exact blinking location. It is important to note here that during these types of search several columns are visible in the screen like author, title, access number, call number etc. Out of which one column is ‘primary key’ that shows in blue unique color and others show different color, which are not primary key. Under these circumstances if someone hit a column other than primary key the system will show data concerned to the last user’s search result not the current search. Software must support the facility to search by column other than primary key of the desire search (vide Chap. 3, sec(t). 4.2.5).

4.3 Additional Features that Must be Included in the Proposed Model

In addition to above problems identified by the library users and general features which are inbuilt in nature; we have experienced and identified some additional problems that must be included in the software to run the automated circulation system smoothly following our model. These very additional problems are given below:

A. General

- Cancel in-process: If some wants to change/alter his/her choice after the process started as per his/her first choice, the system should allow changing/altering having cancelled the first choice (vide Chap. 2, sec(t). 4.20.2).
- Error detection of data: Provision of error detection of data before system accepts the patron circulation record should be there (vide Chap. 2, sec(t). 4.20.2).
- Portable handheld device: Capability for basic circulation functions (check-out, check-in, and renewal) to be conducted from wireless PDA or portable handheld device (vide Chap. 2, sec(t). 4.20.2).
- Color templates: Each functional screen should assign a unique color palette, to provide a visual clue in which function is used. Color palettes are to be assigned on a system in such a manner that functions like check-in, capture holds, backdating, fine waiving, check-out, and pull list are differently colored. Moreover, in some special cases like unpaid fines, fines above block limit, known
bad email address and known bad address color changes may require (vide Chap. 2, sec(t). 4.20.2).

- **Circulation activity history**: Log in facility should be assigned ensuring some restrictions in such a manner that circulation transactions log to the concerned clerks/officers are accessible to a permissible limit only. This will ease the library management and library services as well (vide Chap. 2, sec(t). 4.20.2).

- **Signature and verification**: It should support electronic signature and verification in online patron services (vide Chap. 2, sec(t). 4.20.2).

### B. Member registration

- **Batch loading of patron records**: The system should accommodate batch loading of patron records of data supplied from another database (vide Chap. 2, sec(t). 4.4).

- **Views**: Holds/reserves “suspects” and vacation holds should be visible in patron records from patron view and staff client view as well (vide Chap. 2, sec(t). 4.4).

- **Display record**: Members should be able to see different types of need based information like fee due, fines, overdue, number of books retained; reserve, circulation history etc. (vide Chap. 2, sec(t). 4.4).

- **Link with other member**: System must support the link with other patron according to their preference (vide Chap. 2, sec(t). 4.4).

- **Notes and messages are retained indefinitely**: The provision to retain notes and messages indefinitely in the patron record, until it is asked to remove (vide Chap. 2, sec(t). 4.4).

### C. Check-outs

- **Status must automatically revert**: If a missing, or lost items are scanned during inventory, in library use, or at check-in or check-out, the status must automatically revert to on shelf or checked out status without requiring staff intervention. It should not be required to change the status first (from some other option) and then move to check-out option (vide Chap. 2, sec(t). 4.20.2).

### D. Documents

- **In-Transit**: The support for “In Transit” or “route” status with a window of time for re-shelving at receiving location should be there. In-transit status needs to be tailor-able and variable to take into account varying transit periods. In-transit messages should include date, check-in location, and destination (vide Chap. 2, sec(t). 4.20.2).
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- **Status messages can be different:** It should have the capability to customize status messages so that what the staff sees and what the patron sees can be different; for example, staff message says “In transit” while patron sees “Not currently available” *(vide Chap. 2, sec(t). 4.20.2).*
- **Last change:** Item record should include a separate date field for last change to item status *(vide Chap. 2, sec(t). 4.20.2).*

**E. Loan Period**

- **Grace period:** The system must allow the library to define the grace period used in circulating overdue items; fines, notices, etc. *(vide Chap. 2, sec(t). 4.12).*
- **Alert the operator:** The system must alert the operator if the loan period of the item is not the patron’s standard period, so that the library staff can be given the correct date of due *(vide Chap. 2, sec(t). 4.12).*

**F. Check-in**

- **Manual reset of check-in date:** Circulation must allow manual reset of check-in date to accommodate book of drop box check-in and unexpected closures *(vide Chap. 2, sec(t). 4.20.2).*
- **Message to borrower for damage:** If an item is deemed to be damaged, the system must allow the operator to identify the responsible borrower and invoke a message to be sent through standard notification parameters *(vide Chap. 2, sec(t). 4.20.2).*
- **Never checked out but received:** It should support for “never checked out but received” option for irregular patrons *(vide Chap. 2, sec(t). 4.20.2).*
- **Check-out record:** It should not delete item from patron’s check-out record *(vide Chap. 2, sec(t). 4.20.2).*
- **Check-back:** The provision to support automatic check-back with patrons who remain inactive for a specified period of time should be there *(vide Chap. 2, sec(t). 4.20.2).*

**G. Renewal**

- **Renew from anywhere:** Provision should be there so that patrons can renew from anywhere (in the library or out of the library). The option regarding the number of times a patron can renew the same item should also be there *(vide Chap. 2, sec(t). 4.20.2).*

**H. Holds/Reservation**
- **Tracking materials on hold**: It should support for tracking of materials on hold like where and when it is checked in (vide Chap. 2, sec(t). 4.20.2).

- **Course Reserves**: Provision should be there to move items temporarily to ‘reserve’ and assign different circulation rules to those items while they are being used for a specific course (vide Chap. 2, sec(t). 4.20.2).

- **Allow on shelf hold**: Hold requests to be placed on items that are not checked out should be there (vide Chap. 2, sec(t). 4.20.2).

- **Email librarian when hold is placed**: The option to send an email to the library whenever a hold request is placed should be there (vide Chap. 2, sec(t). 4.20.2).

- **Suspend holds through Intranet/OPAC**: Provision should be there so that holds can be suspended from the intranet/OPAC (vide Chap. 2, sec(t). 4.20.2).

I. **Block**

- **Passkey**: The system must give the option to provide a passkey when staff members attempt to override a block on certain borrower transactions. These transactions must meet any of the specific situations that are set by the library: number of items out, overdue, claims returned or lost, pending requests made, and the amount of fines (vide Chap. 2, sec(t). 4.20.2).

- **Restriction marker**: The system must restrict the patrons from checking out restricted materials. This restriction should be configurable by system parameter (vide Chap. 2, sec(t). 4.20.2).

J. **Report**

- **Report must be automatically routed**: When copies are flagged/marked as missing, claims returned, or lost, a report must be automatically routed to the technical staff as defined by the library (vide Chap. 2, sec(t). 4.31).

K. **Inventory**

- **A notation of inventoried**: A notation in the item record containing the date the item should be inventoried (vide Chap. 2, sec(t). 4.20.2).

- **Search field**: The system should be able to search the customized field (vide Chap. 2, sec(t). 4.20.2).

- **Tracking in-house use**: Libraries should have the provision to track the use of items within the library (vide Chap. 2, sec(t). 4.20.2).
L. Notice

- Customizable notice content: Provision should be there so that contents of the notices can be customized as it has mentioned in the case of report generation (*vide* Chap. 2, sec(t). 4.20.2).
- Manage bounced emails: The System should provide the facility for managing bounced email messages by sending to alternate email IDs (*vide* Chap. 2, sec(t). 4.20.2).

5 Conclusion

Here, we have proposed a model of automated circulation system for university libraries. We have analyzed the circulation system of different university libraries and comparative analysis of circulation system. After accumulating the merits and demerits of circulation systems of different university libraries, we have analyzed them carefully. For example: Most of the university libraries (7) install library software of different potentialities. It is very interesting to note that RBU has not yet installed any library software to provide modern library services, especially in the circulation activities. We are surprised to record that about 25% university libraries are not using the circulation module of the library software already installed in their system. Around 67.5% university libraries are using circulation module but in most cases above mentioned facilities, as we have suggested in our model, are not fully available. Not a single library has fully automated circulation system. We have made a model for automated circulation system that can solve the problems faced by the semi automated circulation systems run by different university libraries. With the help of these findings, critical remarks of the library staff and patrons in various university libraries and concerned literature of circulation systems this very model is designed. The characteristic features of our proposed model may be summarized as follows:

There are so many service providers who can send SMS free of cost. The university libraries can avail these facilities to give better services to its users. Capability for basic circulation functions (check-out, check-in, and renewal) to be conducted from wireless PDA or portable handheld device. The system must be compatible with the barcodes/ RFID/ biometrics as assigned by the library. Log in facility should be assigned ensuring some restrictions in such a manner that circulation transactions log to the concerned clerks/officers are accessible to a permissible limit only. This will ease the library management for the authority and library services for the patrons as well. The system must support the SIP/NCIP protocol. There should be provisions for
generating circulation cloud from reading history. The system should allow creating of layouts and templates which we design to print a nearly unlimited variety of patron cards including barcodes/RFID/biometrics. The patron’s picture should be visible at the time of web-based self checkout and the system should provide the option to register an account via online. The System must support smart card or general ID card for library as well as all other purposes. System must support the link with other patron according to their preference. The support for “In Transit” or “route” status with a window of time for re-shelving at receiving location should be there. In-transit status needs to be tailor-able and variable to take into account varying transit periods. In-transit messages should include date, check-in location, and destination. It should have the capability to customize status messages so that what the staff sees and what the patron sees may be different; for example, staff message says “In transit” while patron sees “Not currently available.” The provision to set an item temporarily to a new location, and later reverts to original location should be there. Item record should include a field for 'hold shelf location'. When item status is 'On Hold Shelf,' record location it should retain hold shelf location until item is checked out or goes to another hold shelf. Provision should be there so that a branch staff can quickly add barcode numbers for non-cataloged items to existing bibliographic records (e.g. a generic bibliographic record for paperbacks). The system must alert the operator if the loan period of the item is not the patron’s standard period, so that the borrower can be given the correct date of due.

If a missing, or lost items are scanned during inventory, in library use, or at check-in or check-out, the status must automatically revert to on shelf or checked out status without requiring staff intervention. It should not be required to change the status first (from some other option) and then move to check-out option. Our system would allow the creation of a temporary item record to facilitate circulation of materials that have not yet been cataloged. In our system provision would be there so that a patron can check out by himself/herself the materials from any remote terminal. Libraries should have the provision to track the use of items within the library. Software should allow for handling temporary locations like the processing center and/or book carts throughout the library. The system must support retention of the last two or more borrowers’ record for each item in order to manage problems such as damages. Circulation must allow library staff to place holds from staff workstations or borrowers to place holds as part of the user portal from any library or remote location if that facilities are provided. Current hold position should show ' nth hold on x circulating copies' or 'Ready for Pickup'. Additional status like 'In Transit' should be hidden from patron’s window but visible in staff interfaces. Provision should be there to move items temporarily to ‘reserve’ and assign different circulation rules to those items while they are being used for a specific course. Our system will allow library
defined blocks of renewals if the patron is delinquent, the title has a hold registered against it, the renewal limit has been reached, or an item is restricted in some other way. The system of our proposed model must give the option to provide a passkey when staff members attempt to override a block on certain borrower transactions. These transactions must meet any of the specific situations that are set by the library: number of items out, overdue, claims returned or lost, pending requests made, and the amount of fines. It should store and display a history of overdue notices and invoices sent to the patron for all items currently overdue or billed, and include an item’s title, date of notice sent and method sent (telephone, email, or text message). In our system provision will be there so that contents of the notices and reports can be customized. The System should provide the facility for managing bounced email messages by sending to alternate email IDs. It should have the option to send emails to patrons who are: 1) near the top of the holds queue, and 2) have been waiting a long time, to see if they still waiting for the same. The option to send courtesy notices via email in a configurable number of days before due date, depending on loan period of item should be there. It is very important to note that online facilities are available only when internet connectivity and power supplies are available with both the library and the user. Therefore, the library must not depend on this system alone and must keep available offline circulation facility. Obviously, the offline data should be updated as early as possible after the system starts.

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