UNIT 2 LIBRARY AUTOMATION PROCESSES

Structure

2.0 OBJECTIVES

After going through this Unit, you will be able to:

- understand typical workflows of library subsystems amenable for automation;
- know how to analyse housekeeping operations systematically;
- identify the requirements, processes and advantages of automating library workflow; and
- realise issues related to administration of library automation processes.

2.1 INTRODUCTION

You already know what and why of library automation from Unit 1. This Unit aims to introduce you with the processes related to library automation in an integrated environment. You can also see here the application of procedural model of library automation in analysing tasks related to different subsystems of a library. One of the major objectives of library automation is to automate the regular workflow of library system i.e. library housekeeping operations. An ILS performs library housekeeping operation through software modules integrated seamlessly. These modules are also called subsystems under ILS. A typical ILS includes acquisition subsystem, document processing subsystem, serials control subsystems and circulation subsystem as core modules. The other managerial activities like export/import, backup/restoration, parameters setting, configuration settings etc. are performed through administrative module.

2.2 LIBRARY WORKFLOW: SYSTEM APPROACH

Automation of library housekeeping system requires the analysis of workflow and activities into their atomic structure. This process is called system analysis. You already know about Procedural Model of library automation proposed by ASLIB (now Association of Information Managers, UK). The sub-section 1.3.3 of Unit 1 covers procedural model of library automation at length. This model acts as a base for system analysis of library housekeeping operations. The procedural model proposes two basic subsystems, four operational subsystems, three levels, eighteen procedures, six activities and fifteen basic tasks as library workflow irrespective of the type and size of libraries (see Text box 1 and Table 1 in sub-section 1.3.3 of Unit 1). The summary table is given below.

Table 2.1: Library workflow

Library System

Four Operational Subsystems (Acquisition, Processing, Use, Maintenance)

Eighteen procedures (Acquisition: Select, Order, Receive, Accession; Processing: Classify, Catalogue, Label, Shelve; Use: Locate, List, Issue, Reserve, Return, ILL, Photocopy; Maintenance: Bind, Replace, Discard)

Six activities (Initiate, Authorise, Activate, Record, Report, Cancel)

Fifteen tasks (pass, receive, discard, place, remove, search, duplicate, attach, separate, move, sort, read, verify, enter and decide)

2.2.1 Subsystems and Workflows

This section covers the workflow of the subsystems of integrated library system.

A) **Acquisition Subsystem**

The acquisition of documents is a prerequisite for libraries. A library should acquire and provide all the relevant documents to its users so that the basic

functions of the library are fulfilled. An acquisition subsystem shall perform four basic procedures – Select, Order, Receive and Accession. The scopes of these procedures are as follows:

Procedures in Acquisition Subsystem

Select

Selection of documents for library users is a very responsible job and should be based on definite principles. It is done with the help of selection tools (such as bibliographies, publishers' catalogues, trade catalogues etc.) and requests/suggestions from library users/authority. Selection of documents to be procured in the library is followed by the formal sanction of the competent authority/library committee.

Order

This procedure starts with pre-order searching, especially to avoid duplicate orders. In the next stage purchase orders are generated and placed either directly to the respective publishers or to the listed vendors/book sellers. Additionally, generation of reminders for overdue items and cancellation of orders also comes under the purview of ordering procedure.

Receive

Documents and invoices or bills usually arrive together. Bills are checked with the order list before processing for payment. Newly arrived books are tallied with the bills and the order list to check the author, title, edition, imprints and price before accessioning.

Accession

A stock register is maintained by libraries in which all the documents purchased or received in exchange or as gift are entered. Each document is provided with a consecutive serial number. The register is called Accession register and the serial number of the document is referred as Accession Number.

All the above-mentioned procedures and related activities of the acquisition subsystem can be mechanised through library management software. In such a system these basic activities are linked with the files of publishers, suppliers, budget & fund accounting, currency etc. to achieve the benefit of integrated library system.

B) **Processing Subsystem**

The processing procedure is the pivot round which all the housekeeping operations revolve in a library. It helps in the transformation of a library collection into serviceable resources. The procedures under this subdivision are classification, cataloguing, labeling and shelving.

Procedures in Processing Subsystem

Classify

The followings are the major classification schemes, which are used in various libraries of the world: Dewey Decimal Classification Scheme (DDC), Universal Decimal Classification Scheme (UDC), Library of Congress

Classification (LC), Colon Classification (CC), and Subject Classification (SC) etc. Classification is a mental process and demands intellectual exercises from classifier. As a result, automatic synthesis of class numbers requires the application of Artificial Intelligence (AI) techniques in development of software. The present edition of DDC is also available in CDROM and known as WebDewey.

Catalogue

Cataloguing is the prime method of providing access to the collection. Cataloguing procedure starts with technical reading of the document to be catalogued by studying title, sub-title, alternate title, author, editor, edition, reprint, imprint, dedication, preface, table of contents, collation, series, bibliographies etc. In case of manual cataloguing, the cataloguer makes separate cards for author, title, subject, cross-references and analytical entries by following any standard catalogue code (such as AACR II, CCC etc.) and file them as per the rules laid down by the library. Computerised cataloguing begins with entering bibliographical data in a pre-designed worksheet. The worksheet or data sheet is very similar to data entry form and is based on any standard content designators scheme (such as MARC 21 Bibliographic Format, CCF/B, UNIMARC etc.). Finally bibliographical data recorded in the worksheets are entered into the computer to produce machine-readable catalogue file and OPAC. Computer-based cataloguing supports importing of bibliographical datasets for the library resources either from centralised cataloguing services or from other libraries and exporting of bibliographical data of its own collection to other library systems. This facility reduces unit cost of cataloguing and ensures standardisation in cataloguing. The recent trend of cataloguing is to utilise Z39.50 protocol to download bibliographical data from other libraries and to provide global access to its own collection through Web-OPAC.

Label

It is the work of pasting various labels on different parts of a document. The following labels are generally pasted in books:

Spine label: This is done to make call number (a combination of class number and book number) properly visible to the users when the book is shelved. The size of the label is in the range of 1.25'' × 1.25".

Ownership slip/mark: These are generally pasted on the inner side of the front cover at left hand top most corner. Ownership marks are put at various parts of a document by rubber stamps. The size of slip is 3" × 2.5".

Date slip: It is pasted on the top most portion of the front or back flyleaf of each book. The size of date slip is 5" × 3".

Book pocket: On the bottom of the inner right side of the front or back cardboard cover a book pocket is pasted.

Book card: One printed/hand-written book card of size 5" × 3" is put in the book pocket of each book.

In a computerised environment, various labels are printed by using library management software. In case of barcode based computerised circulation,

accession numbers of documents are converted into barcodes and printouts of barcodes are pasted on the inner back cover of documents.

Shelve

Shelving is the arrangement of documents on the shelves to fulfill the fourth law of library science – Save time of the reader. Generally books are arranged on the shelves in a classified manner as per the call number. Bound periodicals are generally shelved alphabetically by title and then by volume numbers. Although shelving works are generally manual in nature, RFID-enabled ILS helps in identifying misplaced documents in shelves and thereby supports stock rectification.

C) **Circulation Subsystem**

Circulation service is quite common to libraries of different types. Most libraries lend books and other library materials to be read elsewhere by users. This is convenient for the users, increases the use made of libraries' collection and reduces demand for reading space within library building. This function requires some sort of record keeping arrangement of what has been lent and to whom. There are two good reasons for keeping loan records: i) to reduce the loss of library materials; and ii) to help library staff to answer users' queries about the location of items not on the shelves.

Procedures in Circulation Subsystem

A rich variety of systems of record keeping of loans have arisen out of such needs and these are known as circulation systems. These include some common jobs for successful operations such as enrollment of members, issue and return of library documents, reservation of documents, renewal of documents, maintenance of documents and records, maintenance of statistics, interlibrary loan, issuing of gate pass, calculation and collection of fines for overdue documents etc. In a computer based circulation system, the machine-readable file consists of records for all items on loan from the library is updated periodically with new records. This file is called "transaction file" and it takes required data from other two files – "document file" and "borrower file". Modern library management software support barcode based circulation system. In such a system a barcode reader scans barcoded accession number of a document and the barcode in turn acts as a pointer to the document file. It helps to minimise labour and error in data entry operation. The concept of RFID (Radio Frequency IDentification) based circulation system is emerging rapidly in developed countries. It comprises three components: a tag, a reader and an antenna. The tag contains important bibliographical data. The reader decoded the information stored on the chip after receiving it through the antenna and sent data to the central server to communicate library automation system. RFID technology supports patron self-checkout machines and has the ability to conduct inventory counts without removing a single book from the shelve. As a whole, RFID improves library workflow, staff productivity and customer service with these attributes.

D) **Serials Control Subsystem**

Serials in general and periodicals in particular are essential for research and development (R & D) activities. These are the primary means of

communication for the exchange of scientific information. The periodicals or journals subscribed by libraries can be grouped into these categories: i) Indexing/Abstracting periodicals; ii) Periodicals containing news items; and iii) Periodicals containing full-text research articles and technical papers. Acquisition of serials/periodicals in a library is different from book ordering system. In contrast to books, the libraries regularly subscribe periodicals against advance payment. The modes of subscription of periodicals in a library are as follows – Through local vendors/subscription agents, Through foreign vendors/subscription agents, Direct from the publishers, As gift or Complementary, Through membership and In exchange.

Procedures in Serials Control Subsystem

The workflow of any serials control system, manual or mechanised, can be listed as below:

- Selection of serials
- Selection of subscription mode
- Formulation of terms of procurement
- Selection of vendors
- Order
- Advance payment
- Receiving and registration of serials issues in kardex
- Sending reminders in case of non-receipted issues
- Adjustment of advance payment for missing issues
- Preparation of list of subscribed journals, new arrivals and serials holdings for consultation by users
- Binding and accessioning of back volumes of serials
- Article indexing (optional).

In an automated system all these tasks are performed by library management software efficiently. It reduces workload of library staff. Automated serials control systems may be predictive or non-predictive. Predictive systems predict the arrival of individual journal issues and can generate reminders in case of non-receipted issues. Prediction means the ability to inform that a named issue of a named journal will arrive in the library within a stated time interval. Modern library management software supports predictive mode of serials control with the facilities of on-line acquisition and access to journals through publishers' portals or library consortia (like UGC Infonet in university libraries in India, N-LIST in colleges under UGC, India and INDEST for IITs, NITs and IIMs). In case of consortia-based access to journals, a library does not perform activities like acquisition, processing and shelving rather optimise user access to the on-line journals. The access interface may be a simple list (by publisher or by journal title) or may be a complex portal with facility for federated searching.

E) **Maintenance Subsystem**

If we don't take proper care to organise and administer the library documents regularly, these documents would become unserviceable resources immediately. The workflow of the maintenance division/section includes four major jobs.

Procedures in Maintenance Subsystem

Shelf Rectification : It is to shelve misplaced documents in proper locations.

Bind : It is to preserve library resources for posterior and present use.

Replace : It is to replace a lost document by the library.

Discard/Withdrawn : It is to weed out out-dated and torn & soiled documents from the library for making enough space for usable stock.

The integrated library automation environment requires information on lost, damaged, missing and withdrawn documents as well as documents sent for binding. These datasets are to be entered to generate and display appropriate messages for the library users and staff against specific tasks in different modules. This is also required to generate reports on lost books, missing books, books sent for binding etc. for the library administration.

2.2.2 Analysis of Tasks

The subsystems and the procedures for their managing subsystems require a set of tasks to be performed. In an automated library system a task is the collective functions of the elements for the accomplishment of the module at the next higher level. Tasks within each activity, just as the activities themselves, may not all be necessary to each procedure.

Table 2.2: Task analysis in workflow

SYSTEM *SUBSYSTEM* *PROCEDURE* *ACTIVITIES*	**LIBRARY SYSTEM** **ACQUISITION SUBSYSTEM** **ORDER**				
	INITIATE	**AUTHORISE**	**ACTIVATE**	**RECORD**	**CANCEL**
What information?	Author, Title, Sub-title, Edition, Place, Publishers, Date, ISBN etc.	Signature of Approval	Library/Branch Library, Date of Order, Order number, Name of Vendor and Bibliographical details etc.	Administra-tive data, Bibliogra-phic data	Order Number, and Date Vendor, Book details
Where from?	Bibliographies, Index, Requisition, Suggestions	Competent Authority	Book Selection Tools, MIS	Order form/ Order letter	Order File/ Computer Database
When?	After Select Procedure	Before Activation	After Authorisation	After Activation	After Activation
Who?	Library Asst./ Technical Asst.	Librarian/ Section-In-Charge	Library Asst./ Technical Asst	Library Asst./ Library clerk	Library Asst.
How?	Receiving copy of Bibliographies, Suggestion slip	Enter Signature	Enter data/ information on Order form/ Computer Database and Generate Order	Filing the Copy of Order form/ Saving in Computer	Deletion from Database/ Removal from File

The analysis of tasks to perform activities within procedures may be done through a set of five primary questions: What information is needed for the activity? Where is the information obtained? When is it required? Who requires it? How is it used? These five questions should be asked to carry out possible activities under each procedure (see Table 2.2). It provides depth to the framework provided by the procedural model. An example of this approach may be shown (in Table 2.2) in the context of five possible activities of book order procedure in acquisition subsystem.

2.2.3 Automation of Workflow

The subsystems and workflows as discussed in previous two sections are completely amenable to computerisation. An Integrated Library System (ILS) manages all the subsystems of a library such as acquisitions, cataloguing, circulation, serials control and administration. These jobs are done by library professionals through librarian/administrator interface of ILS with proper authentication (login and password). The Fig. 2.1 shows modules in Koha (an open source ILS) for managing acquisition, cataloguing (bibliographic data and authority data), circulation (including member/patron management), serials control, system administration (including report generation, export/import, backup/restoration etc.).

Fig. 2.1: Modules for managing subsystems and workflow in Koha

The ILS also provides a discovery interface (commonly known as the Online Public Access Catalog or "OPAC") that enables patrons to search for resources. OPAC includes simple and advanced search interfaces with supports for member login (to check reading history, borrowed books, fines, suggestions etc.). Most of the ILSs now provide Web-OPAC (accessible through web browser) and these are now compatible with social networking tools (such as facebook, twitter etc.) and information mashup to integrate external datasets (like book cover image, book reviews etc.) with local library materials. (see Fig. 2.2).

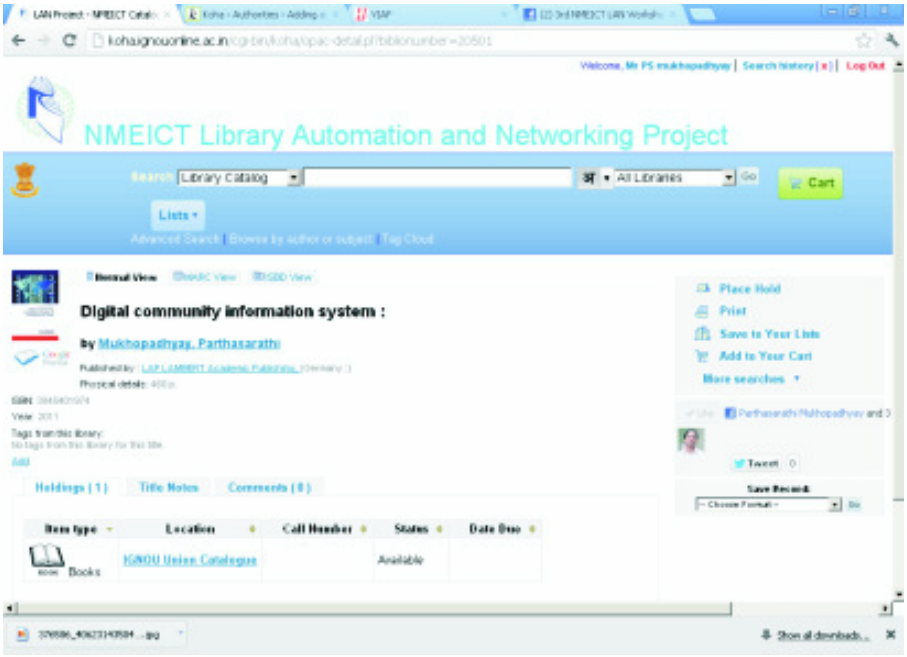

Fig. 2.2: End user interface in Koha with social networking tools

In ILS, system administrator can define privileges (known as privilege control) for each staff of the library. Privilege control ensures responsibility for each staff and also secures integrity of ILS.

Fig. 2.3: Privilege control in Koha

For example only designated circulation staff of the library (with authentication can enter into circulation module for issue, return and collecting overdue charges; similarly one staff (with login and password known only to him/her) can perform acquisition activities. Moreover (see privilege control granularity in Koha in Fig. 2.3) super-user of the ILS can control/enter in every modules. Only chief librarian should know the login/password of super-librarian. The integrated functions of ILS ensure streamlining of library operations, and the data ILS manages gives rich information through information Mashup (the concept discussed in unit 1 of this block).

Self Check Exercises

Note: i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

1) Give an overview of library workflow.

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2) What is serials control? Enumerate activities in serials control.

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3) What is system analysis? Discuss its role in library automation.

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2.3 ACQUISITION SUBSYSTEM IN ILS

Acquisition module of an ILS handle administrative, financial and bibliographical data related to the documents to be procured in libraries. An integrated library management system will transfer necessary bibliographical data (such as author, title, ISBN, edition) of newly procured documents to the cataloguing module of the package as and when those are marked received in the acquisition module. Integrated library system thereby avoids unnecessary duplication of data or data redundancy and achieves economy in terms of time, manpower and money. This

section discusses acquisition procedures under three heads – functional requirements, acquisition workflow and advantages of automated acquisition subsystem.

2.3.1 Functional Requirements for Acquisition in ILS

You already know that the ordering and acquisition process involves some basic routine clerical operations (as discussed in Unit 1 of this block), which are applicable to all categories of library. As a result, the procedures related to acquisition subsystem have benefited from computerisation. Generally, acquisition subsystem concentrates on monographs and other documents (available in many formats) excluding periodical publications. The basic activities of automated acquisition subsystem are: 1) To receive records of items to be acquired; 2) To check whether items requested are already in the library or on order; 3) To print orders or dispatch order electronically to supplier/publishers; 4) To check when orders are overdue; 5) To follow up overdue order; 6) To maintain a file of records of items on order; 7) To note the arrival of ordered items; 8) To process for payment; 9) To maintain book fund statistics and accounts; 10) To generate printed and electronic listing of various reports; 11) To control currency conversions; and 12) To maintain vendor performance reports and statistics. Apart from these basic activities, acquisition module of ILS should also provide support to – 1) Accommodate a variety of materials, including but not limited to – monographs, monograph in series, annual and cumulative indexes, loose leaf materials, supplements, reports, musical scores; 2) Accommodate and identify items in a variety of formats, including but not limited to – print, microform, film, videotape, audio cassette, CDROM, magnetic tape etc.; 3) Record, store and display bibliographic information, acquisition type (order, gift, approval etc.), status (reported, received etc.), library/branch/copy/fund information, invoice information, vendor information, accounting information, requester information etc.; 4) Extend facilities for unlimited number of funds/ budget head, vendors, orders, claims and transactions; 5) Accommodate different types of order – regular order, membership, approval, blanket order, deposit account etc.; 6) Global standards related to document acquisition such as EDIFACT; and 7) Generate reports and statistics related to acquisition activities.

The next sections discuss three groups of activities related to acquisition. These are – pre-acquisition work, acquisition work and generation of outputs.

2.3.2 Workflow of Automated Acquisition

The acquisition workflow may be studied under two heads – pre-acquisition work and acquisition activities. Acquisition module of an ILS requires some essential works that need to be done before proceeding with actual acquisition work. These are termed as pre-acquisition work and may be identified as:

- **Pre-acquisition Works**

The general activities of this group are:

A.1) **Creation of master file for supplier**

The acquisition module must incorporate a vendor/supplier file supporting an unlimited number of vendor records including at least the following information — vendor name, address, code, phone, fax, e-mail ID, contact person, vendor discount etc.

A.2) **Currency conversion**

This facility is required to assist in procuring foreign documents priced in various currencies of the world (e.g. US Dollar, Euro, UK Pound etc.). The conversion of foreign currencies into Indian rupees is necessary for fund accounting and payment on the basis of the current exchange rates.

A.3) **Budget process control**

One of the major functions of library ordering and acquisitions subsystem is to record and to control expenditure from the library's accounts. Funds are committed for spending when orders are placed and are actually spent when the items are received in the library. Fund accounting helps to keep track of library's annual book budget and its allocation. The fund accounting aspect of a typical acquisition module in a library automation package includes four basic steps:

- **Creation of budget heads**

In this step various budget heads are created as per the prevailing practice in the library (e.g. book procurement fund, serial subscription fund, electronic resource procurement fund etc.). Each budget head is described in details and accessed through a code for easy recall as and when required.

- **Main budget allocation**

This is related to allocate the amount to the main budget along with other necessary information such as financial period, budget head, opening balance and total amount allocated or sanctioned amount. This minimum dataset is to be entered before activation of the budget process in the acquisition module.

- **Budget allocation in different heads**

This step is for receiving the amount in different budget heads.

- **Budget division**

Sometimes it is necessary to divide a budget head into several sub-heads (e.g. a book procurement head may further be subdivided into reference books and text books). This step allows a user to divide the budget into sub-heads or even divide the budget sub-heads further.

A.4) **Creation of letter formats**

An automated acquisition sub system should generate and print various letter formats such as approval letter, purchase order, cancellation of order, reminder letter, intimation letter, payment letter etc. In this step templates of respective letters are created and maintained by the user.

A.5) **Creation of member database**

This step is to create and maintain a member system. It is required to link and integrate suggestions given by the users (for procuring various materials) with the member database. Creation of member database is based on some master entries. These are – Category and associated privileges, Name of the affiliated institute, Departments/Branches/ Divisions/Sections under the institute, Name of member, Member code

etc. New members can be added after these steps. Member codes are either generated automatically or may be entered manually as per the practice of the library.

- **Acquisition Works**

Actual acquisition work starts after completion of pre-acquisition works. The flow of acquisition works for document procurement in computerised libraries irrespective of type or size may be divided into four logically related groups – 1) Document related work; 2) Order processing; 3) Accessioning; and 4) Payment.

Group I tasks

Acquisition work starts with collection of information related to documents to be procured. Library staff initiates acquisition with entering bibliographical information and information about requesters from the suggestion slips and books submitted by the suppliers on approval. Bibliographical data given by the requesters in suggestion slips require to be verified by consulting book selection tools. The online databases of virtual bookstores (like Amazon or BookFinder) may also be utilised for checking bibliographical information of recently published documents. Bibliographical details of documents received by libraries in ex-gratis are also entered into the database. A library normally receives a large number of suggestions and documents for ordering. Library staff shortlist these requests depending on need, availability of fund etc. by clicking the appropriate option(s) available in the package. Finally a report is generated for all the short-listed suggestions and documents indicating number of copies required, budget code, budget head and unit price of the items requested. The library committee approves the list officially and on the basis of the final approval list library staff either select or reject the short listed titles. Books on direct approval and gratis items do not have to go through approval process from library committee or any such authoritative body.

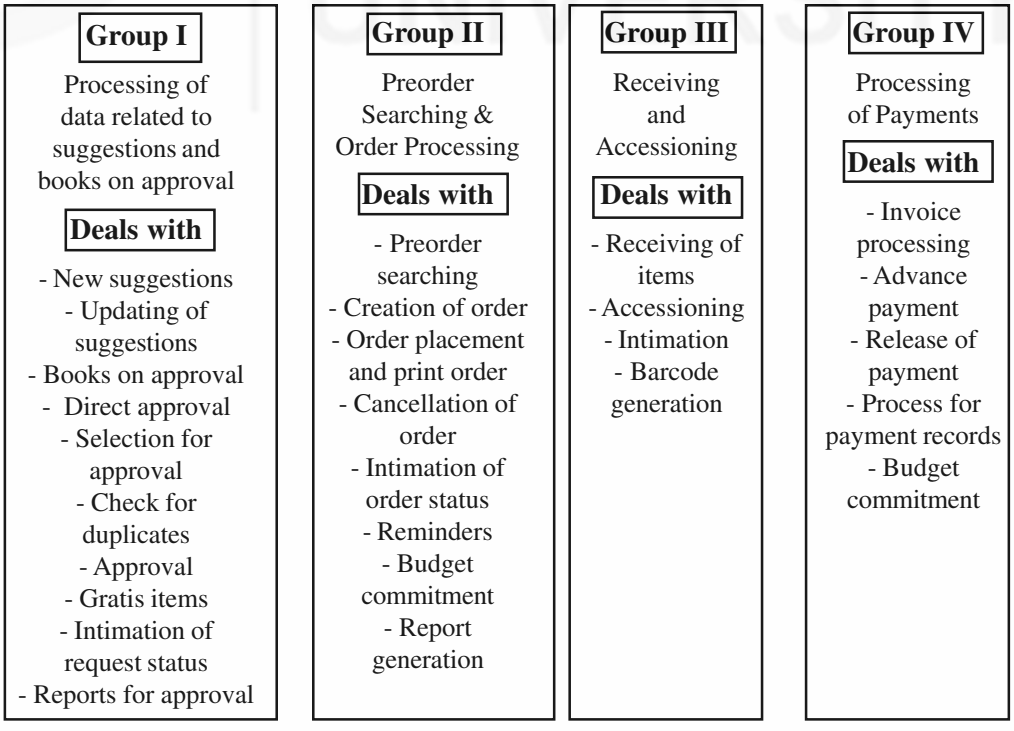

Fig. 2.4: Workflow of acquisition work

Group II tasks

The first step of this group is to select listed vendors (available from master files) for placing orders of approved documents. Order letters are then printed as per the format created in the pre-acquisition stage indicating name of supplier with address, reference number, terms and conditions and expected date of delivery etc. This group also includes the tasks of reordering, reminder generation (for a particular order or to a particular supplier/publisher) and report generation (for ordered items, overdue orders, budget commitment etc.).

Group III tasks

This group includes the works of receiving and accessioning of ordered documents. In case of barcode based circulation system barcode labels for accessioned items are also generated in this sub-module of the package. The requester or department may be informed about the arrival of requested documents in the library through the generation of intimation letter.

Group IV tasks

The work of this group starts with the processing of invoices submitted by the suppliers along with the documents by entering necessary elements into the database. Release of payment is the next step in which letters/reports containing all the necessary administrative and financial details are generated against supplier or order number or invoice number for requesting appropriate authority (generally Finance Section) to release payment to the supplier. After release of payment, the financial details of payment are entered and stored into the database.

2.3.3 Products and Advantages

Computerised acquisition subsystem includes three basic operations – input, processing and output. Data entering and processing tasks in various pre-acquisition and acquisition works are primarily act as input data. The datasets are processed and integrated with other modules of the ILS and finally generated various outputs in the form of list, reports, letters and statistics. Table 3 in the next page lists all the possible reports from acquisition module of ILS. The advantages of computerised acquisition subsystems in an integrated automated environment are manifolds. Such systems can perform following activities:

- Generate financial and statistical reports in the desired format automatically to help planning and management of libraries;
- Ensure quicker and cheaper data processing;
- Contribute in the development of integrated library system by integrating with document processing module (to transfer bibliographic data) and member module (for helping online requisitions/suggestions from members);
- Reduce the workload of processing section by transferring manifestation and item related information related with documents received (modern ILS supports MARC 21 based item processing framework mainly through 9xx series on te basis of FRBR model);
- Minimise routine clerical operations and related paper works;
- Lead towards better management and more productive use of library staff;
- Support real time fund accounting and help to introduce new user services;

- Produce number of reports, letters, statistics and list to support MIS activities of libraries;
- Interact with other library systems/networks to download bibliographical data of items on order on the basis of global standards related to electronic fund transfer; and
- Communicate different outputs of acquisition works electronically to members, suppliers, publishers etc.

Table 2.3: Reports from Computerised acquisition subsystem

• List/Report of item(s) requested • List/Report of item(s) from supplier/ publisher • Item(s) selected for approval • Item(s) approved by the authority/library committee • Item(s) rejected in the approval process • List of gratis item(s) received by library • Report on request status • Printout or softcopy of letters for approval • Printout or softcopy of order letters & query letters • Printout or softcopy of reminder letters • Printout or softcopy order cancellation letters • Printout or softcopy of reordering • Letters for adjustment of advance payment • Letters to bank for foreign exchange rate • Report on order status • List/Reports of item(s) selected for order	• List/Report of overdue item • List/Report of item(s) actually ordered • Reports of budget commitment • List/Reports of item ordered against advance payment • List/Reports of item(s) received against orders • Letters of intimation (on arrival of documents) • Printout of accession register • Printout of barcode labels • List of supplier/publishers • List of currency and exchange rates • Budget with commitments • Report of detailed annual budget of library • Report on amount received in different budget heads • Report/statistics of vender performance • List of recent additions • Generation of book cards (in case of integrated ordering and cataloguing system)

Self Check Exercises

Note: i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

4) What do you mean by Pre-acquisition work?

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5) Point out the major advantages of automated acquisition subsystem.

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2.4 DOCUMENT PROCESSING SUBSYSTEM IN ILS

In automated document processing environment, resource description or cataloguing is possibly the most important task of library automation work. It requires standardisation and should be supported by carefully crafted decision table(s). The cataloguing module of ILS gives us freedom to choose MARC standards (UNIMARC and MARC 21) or Non-MARC standards (like Common Communication Format or your own standard). However, MARC 21 bibliographic format is now considered as the global de facto standard. MARC 21 family of standards (a family of five coordinated standards such as bibliographic standard, authority standard, community information standard holding format and classification format) are now selected as content designator in most of the ILSs. There are two reasons for it. First, MARC 21 standards are updated continuously, available through Web, and emerging as open standards. Secondly, these are now becoming almost the de facto global standards in the domain of library automation as these are adopted by the national libraries in different parts of the world. Cataloguing module of an ILS should also be supported by an array of internationally agreed upon standards and facilities like – FRBR, FRAD, pickup lists, authorised value lists, standard lists, export-import through ISO-2709 or MARC-XML etc. This section discusses automated document processing subsystem under three major heads – 1) Functional requirements, 2) Workflow, and 3) Advantages and products.

2.4.1 Functional Requirements for Document Processing in ILS

The functional requirements of cataloguing module of an ILS (as suggested by Mukhopadhyay, 2006) include areas like authority data, bibliographical data, distributed cataloguing, OPAC, reports, backup and restoration, export and import, and multilingual data process and retrieval.

Authority Control

The ILS must support following facilities for mangaing authority data:

- Support for MARC authority format for personal, corporate and topical name headings in a name authority file; title, uniform title and series entries in a title authority file and subject headings in a subject authority file;
- Provision for generation of SEE, SEE ALSO references and NT-BT-RT relationships network from authority records and link these references to matching access points in OPAC;
- Must allow any bibliographic field to be authority controlled (particularly 1xx, 6xx and 7xx groups in MARC 21 bibliographic format) and should include facilities to search, retrieve, and display print and global editing of authority records by authorised operators;
- Must include provision for multiple thesauri with the ability to produce a list of all citations with authority file violations; and
- Provision to link local catalogue data with global linked open authority data like VIAF (a service merging authority data from 25 national libraries available from viaf.org).

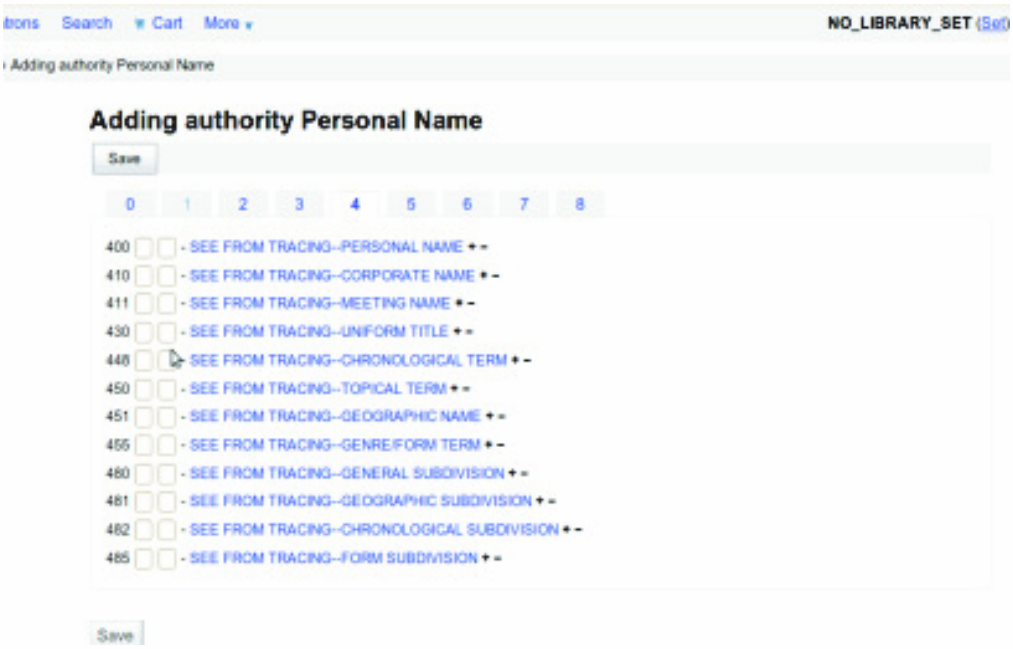

Fig. 2.5: MARC 21 authority data entry framework (name authority) in Koha ILS

Bibliographic Control and Interoperability

The bibliographic record management capabilities of an ILS should extend support for –

- MARC 21 bibliographic and authority framework for processing bibliographic data including multilingual data processing support (Unicode character set processing ability);
- MARC record loader that can accept records input from various sources and from various media like tape diskette or over network;
- Global editing utility that find and replace data within specified fields;
- Data format validation during input of bibliographic data;
- MARC 21 format for holding and display of holding on the basis of ANSI Z39.44 serials holdings display format;
- Import of bibliographic data through Z39.50 complaint distributed cataloguing interface; and
- Interoperability and crosswalk through incorporation of XML, RDF and metadata schemas (e.g. Dublin Core Metadata);

Some tags and subfields of bibliographic framework(s) require support for achieving standardisation in data entry activities. For example, the Leader fields (24 character fixed length field) in MARC 21 is necessary for different document types and the process of entering data for different character positions is quite complex. For example, the following tags and subfields of MARC 21 bibliographic format require support of pickup lists, code lists, standard lists etc. during data entry activities:

Field	Description	Type of Support
Leader	24 characters fixed-length field	Pickup list for character positions
005	Date and time of latest transaction	Automated entry of date and time from system
006	Books – (00-17) – Fixed-length field	Pickup list for character positions
007	Text - (00-01)	Pickup list for character positions
008	Fixed-length data elements	Pickup list for character positions
040	Cataloguing Source	Pickup of library code (as per MARC)
041	Language Code	Code list support (as per MARC)

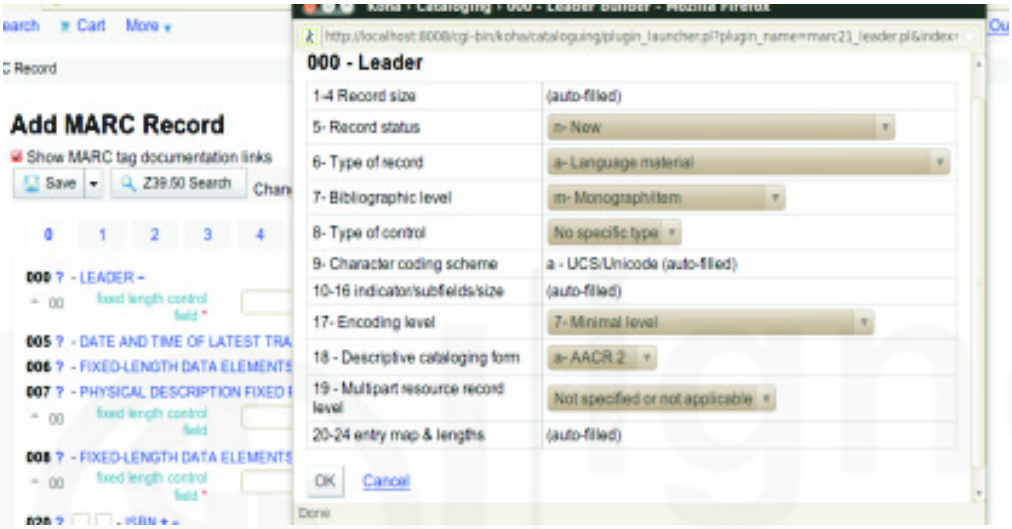

Fig. 2.6: Support to manage Leader field (24 character positions) in Koha ILS

Online Public Access Catalogue (OPAC)

- OPAC must be fully integrated with other modules and accessible through web-based client;
- OPAC should provide browse indexes for author, title, and series and browse index combining all four indexes;
- Should support searching different forms of authorities;
- It should allow combined, specific and field level searching for all formats along with phrase searching, nested searching and truncated searching;
- It must enable searching by using Boolean operators (OR, XOR, NOT, AND), positional operators (SAME, WITH, NEAR, ADJ) and relational operators ('greater than', 'less than', 'equal to', etc.) within and across all fields including provision for Fussy searching;
- It should provide facility to see processing status (fully catalogued, in process, lost, withdrawn etc.) and circulation status (in transit, reserve, recalled, on-hold etc.);
- OPAC should support full, brief, standard and customised display of records including relevancy ranking of search results;

- OPAC should also support bulletin board, information desk and gateway services (to access external databases) along with patron self-service options (e.g. holds, renewals etc.); and
- OPAC must track users' preference and interests, organised into a list of favourities and support interactive, participative and collaborative platform through web 2.0 tools like RSS, social networking tools, user tagging, document rating etc.

Distributed cataloguing

- Must be Z39.50 complaint cataloguing system [ANSI/NISO Z39.50 (1995) or ISO 239.50 (1998)];
- Should enable to capture bibliographic and authority records from any Z39.50 server through Z39.50 client; and
- Should allow local manipulation (change of call number etc) of captured data.

Fig. 2.7: Z39.50 client to support distributed cataloguing in Koha ILS

Reports and backup requirements

- Must produce a count of all records added, edited by a specific operator or over a specified time period;
- Must generate lists, statistics and counts of items added or tabulated by call number, item categories, item location, holding library etc.;
- Must produce a list of all citations with authority file violations; and
- Must support backup of all cataloguing records in suitable media (magnetic, optical etc.) and easy recovery of records at the time of need.

2.4.2 Workflow of Automated Document Processing

The workflow of document processing subsystem involves two major jobs – bibliographic data management and authority data management. Bibliographic data are managed in two basic modes – 1) cataloguing data entry for newly

acquired library materials processed in acquisition module; and 2) cataloguing data entry for existing library materials not processed through acquisition module (also known as Retrospective Conversion or ReCon). The works of cataloguing module of an ILS are –

- Authority data management
  1) Authority data entry
     - Name authority
     - Subject authority
     - Title authority
  2) Authority data linking
- Bibliographic data management
  - For newly acquired document
  - For existing old stock

Bibliographic Data Entry for Cataloguing

This facility of the catalogue module of automation packages is utilised for updating and standardisation of bibliographical data elements of newly procured documents and entering bibliographical data of existing old stock of the library. Easy and structured data entry form design on the basis of standard content designator scheme is important for local creation of records. An integrated automation package use the same record for cataloguing function as is used in the acquisition module. In the catalogue module the record is standardised through entering additional data elements and rendering of access points with the help of authority file. The transformation of bibliographical data elements of existing stock of any library into machine-readable form is called Retrospective Conversion or simply RECON. The work of RECON starts with recording of bibliographical data elements on a worksheet. The worksheet is designed as per the internal data format of the automation package. These internal bibliographic data formats are based on internationally adopted standard content designator schemes such as MARC 21, UNIMARC or CCF. Finally bibliographical data of each document as recorded on the worksheet is entered into the catalogue database. The data entry work may be done by the library staff or the job may be dome through outsourcing. In some cases library may procure validated MARC 21 bibliographic data from the following sources –

1) **Existing library catalogue in machine readable from**

   Bibliographic data in standard formats (MARC, UNIMARC, USMARC, CCF, MARC 21) are available in many libraries for merging into the catalogue database of newly installed LMS through import (ISO-2709 based exchange of bibliographic data).

2) **Union catalogue**

   Library networks at the global level (like OCLC, RLN) and national level (like INFLIBNET and DELNET in India) provides union catalogue of member libraries in machine readable form. Union files of the stock of several libraries, or another shared database may be imported, converted into local standard format and finally merged into the catalogue database.

3) **Commercially available files of MARC records**

In this process records from external databases may be added from tape, or by downloading directly from the files through network. A further option is to acquire records on CDROM or DVDROM and to download records from optical media. For example Harvard University, US recently uploaded all bibliographic records in MARC 21 format (2 million book records) for other libraries.

4) **Z39.50 server**

Computerised cataloguing provides a unique advantage of loading and merging of bibliographic and authority records from external databases. There are thousands of Z39.50 servers from where selective downloading of validated bibliographic data may be done at the local level (see Fig. 7). This feature of an automated system leads to a reduction in cataloguing effort and a consequent saving in the unit cost of cataloguing. This mode of shared cataloguing is popularly termed as copy cataloguing and implemented in ILSs through Z39.50 standard developed by ANSI/NISO.

Authority Data Entry for Cataloguing

A library catalogue supports two basic functions – finding function and collocation function. Bibliographic datasets support finding function and authority datasets support collocation function. Therefore, authority file is essential to control from of index terms or headings, such as author headings, or subject index terms for better retrieval efficiency. Authority data management has two basic routes – internal dataset creation and external dataset application. Records in this file may be created locally by using a standard authority data framework standard like MARC 21 authority data format (see Fig. 2.5) or drawn from externally available files such as the name and subject authority files of the Library of Congress or other agencies. Library automation packages provide facility to create and maintain authority file in the catalogue module. This file is acting as a master database, where entry is to be made once. This gets reflected in various modules of the package. The master file containing authority entries can be consulted

Fig. 2.8: Authority data types in Koha ILS

during cataloguing, possibly by display in a separate window and new headings are immediately added to the authority file with an opportunity to review or authorised locally or remotely. For example, Fig. 2.8 shows the authority data entry options in Koha ILS. Selection of authority data type will display corresponding authority data entry framework (as Fig. 2.5 shows name authority data entry format) for processing work.

Alternatively libraries may take advantages of cooperative authority datasets like LoC authority data, NACO, SACO and VIAF –

Name Authority Cooperative Program (NACO)

It is one of the components of the Program for Cooperative Cataloging (PCC) that was initiated in 1995 by the Cooperative Cataloging Council (CCC) in the USA (PCC, 1998). The NACO program enables participants to add name authority records to the national name authority file, which is hosted at the Library of Congress and downloading of authority data from the server.

Subject Authority Cooperative (SACO)

The SACO program allows cataloguers to propose new and updated authority records for inclusion in Library of Congress Subject Headings (LCSH) and the LC/SACO Authority File. SACO is also working under Program for Cooperative Cataloging (PCC).

LoC Authority Data Service

Library of Congress Authority datasets allows to browse and view authority headings for subject, name, title and name/title combinations for bibliographic and other materials available in LoC. It also facilitates downloading authority records in USMARC/MARC 21 format for use in a local library system. This service is offered by LoC free of charge.

Virtual International Authority File (VIAF)

VIAF is a new, international service designed to provide convenient access to the world's major name authority files from 25 national libraries under the leadership of OCLC (limited in the initial stages of the service to names for persons). Its creators envision the VIAF as a Linked Open Data (LOD) for linking in local services like ILSs. An ILS can link VIAF automatically from authority data entry interface through application program interface.

2.4.3 Products and Advantages

OPAC is possibly the most visible product of document processing subsystem of an ILS. But it is not the only one. This subsystem produces different other forms of library catalogue like Card catalogue (main entry and added entries), Printed book catalogue, Microform and Computer output on microform. ILS supports the generation of various reports, lists and labels that are required for the management of catalogue section such as Reports with a count of all records added, modified or edited by a specific operator or over a specific period of time; Reports that produce statistical account of items added and tabulated by call number, item categories, item location etc.; Lists of items catalogued by class number, subject heading, collection type, language etc.; Spine labels, shelf catalogue, book cards etc.. This module of ILS also generates information products

that form the basis of a number of user services such as bibliographic service, current awareness service etc. These are typically – List of books received in the library (during a particular period, on a particular subject, by a particular author or by a particular author on a particular subject in a particular period) and Bibliographies of documents received by the library in standard format or as per the format specified by users. Modern OPACs are changing from monologue to dialogue based service by the applications of Web 2.0 tools, federated search mechanism and discovery services (see section 1.7 of Unit 1 in this block).

The application of advance level ICT in the management of library processes leads to a significant change in the nature and role of catalogue records. The impact of these changes has contributed towards standardisation of entry format, resource sharing and efficient access to documents and their contents. For example Web-OPAC overcomes two fundamental barriers of access to information – time and space (anyone can search from anywhere at any time). In an integrated set up circulation module and acquisition control programs utilise cataloguing records. Similarly catalogue module uses bibliographical data elements of records created in acquisition procedure and also utilises transaction records from circulation control to notify users about the availability of a selected document. The other advantages of automated document processing (as identified by Mukhopadhyay, 2006) are –

- Computerised cataloguing ensures greater standardisation in catalogue records;
- It reduces routine clerical operations required for maintenance of catalogue;
- It supports interchange of catalogue records and thereby ensures reduction in unit cost of cataloguing;
- It supports seamless access to not only library resources but also web resources, OPACs of other libraries, online databases and a variety of information services including subject gateways through federated search mechanism and thereby ensues a single-window access interface for users;
- It provides opportunities to take output in a number of forms and formats;
- It enables users to retrieve relevant records through the application of variety of search techniques and search operators and to display the retrieved records in desired formats; and
- It helps library staff to generate variety of information services.

Self Check Exercises

Note: i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

6) What is distributed cataloguing? How can it help libraries?

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7) Discuss the MARC 21 family of standards.

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2.5 SERIALS CONTROL SUBSYSTEM IN ILS

International Serials Data System (ISDS) defined *serial* as a publication issued in successive parts and intended to be continued indefinitely. Serials include periodicals, newspapers, annuals, proceedings, transactions etc. and are differentiated from monographs by their ongoing or continuing nature. Serials management subsystem of an ILS has to deal with the features unique in serials control such as – Periodicals are procured through various subscription modes and by gift or exchange; Successive issues are received at regular or irregular intervals and it is necessary to ensure that successive issues arrive when they have been published; Subscriptions to periodicals must be renewed recurrently; Catalogue data that describe serials must be extensive and should be supported by formats exclusively designed for serials; Serials change their titles, are published under variant titles and may change their frequency of publication, therefore, references must be inserted to link associated periodical titles; Precise control over the binding of successive issues is very important (alternatively called as backvolume management); Indexes, special issues and supplements must be controlled for effective retrieval; and Article-indexing is an added advantage for serials control module.

2.5.1 Functional Requirements for Serials Control in ILS

In view of the foregoing, you can now understand that the serials control subsystem of ILS which attempts to provide mechanical means for checking in serials issues, issuing claims, handling binding and other such functions has to be designed very carefully because of the complex nature of serials management. The serials control module of ILS should meet following functional requirements (Mukhopadhyay, 2006):

- New subscription
- Renewal of subscription
- Cancellation of subscription
- Budget control
  - Department/unit-wise budget
- Invoice processing
  - Invoice for individual issues, or for annual (or other period) subscription
- Recording the receipt of journal issues
  - Formula for generating expected issues (predictive mode of serials control)
- Managing (sending claims for) missing issues
  - Sending reminders

- Support for domain-specific bibliographic format like MARC 21
- Needs to be able to cope with "special editions", supplements, and indexes
- Should also be able to cope intelligently with name changes (of publication, publisher) and merges or splits (i.e., one journal becomes two, or two join together)
- Binding control
- Accessioning bound volumes
  Barcoding of accession numbers
- Complete holding information for individual title
- Report generation
- Listing the periodical for browsing
  Hyper linking the e-journals from publisher's sites or consortia sites
- Editing and updating of records
- Searching in OPAC
  By title
  By publisher
  By distributor
  Sorting by date or volume/issue number
- Printing of holdings of periodicals and supporting Routing of periodicals
- Options for display holdings and receiving of serials in Web-OPAC
- Table of contents and other personalised information services
- Article indexing (The serials control module should support indexing of journal articles by author, title, and subject keywords)
- Union list and union catalogue (In union catalog the complete holdings information is given along with all its missing issues, discontinuation in subscription, changes in title etc.).

2.5.2 Workflow of Automated Serials Control

The basic workflow of serials control subsystem in ILS may be grouped into four subdivisions – 1) Creation and maintenance of the master database; 2) Subscription and acquisition; 3) Cataloguing and article indexing; and 4) Circulation and binding. These four basic groups of activities include series of tasks. Obviously, the procedures, activities and tasks related to serials control requires frequent and repetitive record addition or amendment. Computerisation is an attractive proposition for serials control because of this reason.

Group I: Creation and Maintenance of Master Database

In serials control module of an ILS, master databases play important role. Any number of addition, modification and deletion is possible in the master database and these changes are automatically reflected in all the sub-modules under that module. It reduces data entry work and ensures standardisation. A typical serials control module includes:

Title master

In this file bibliographical details of new serials are entered (on the basis of standard comprehensive data format like MARC 21 bibliographic format) after the selection and approval process.

Country master

This file contains name of countries and their corresponding codes for entering country of publication data in sub-modules of serials control. Country code is generally based on ISO-3166 where each country is represented by two unique characters e.g. the code of India is **in** as per ISO-3166.

Language master

Now in most of the cases MARC 21 geographic area code (GAC) is used for the purpose. But this file may also contain entries for languages and their three digit codes as per the ISDS manual and CCF manual.

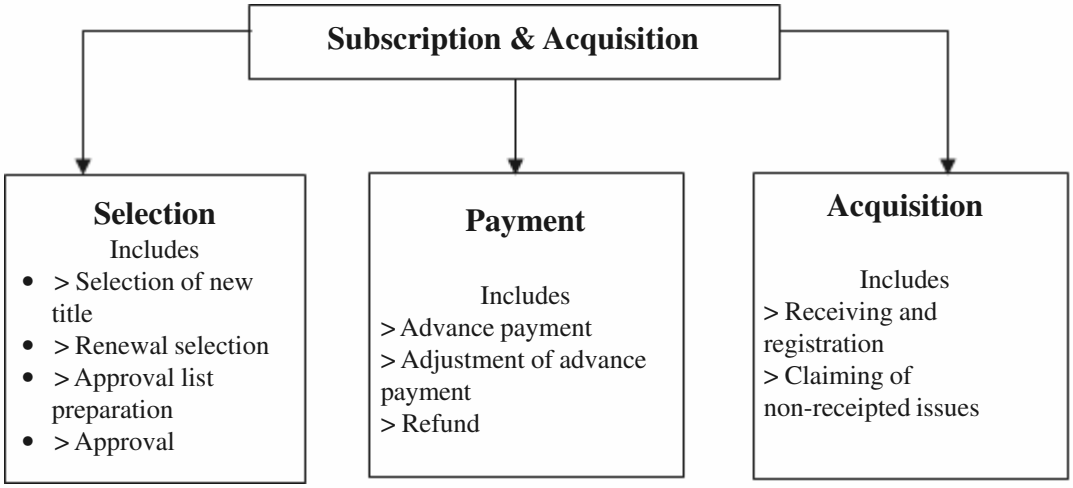
Supplier/Publisher/Binder master

This master file contains details of all local and foreign subscription agents, publisher of serials and binders along with their corresponding codes. These codes are generally created locally.

The above mentioned master files are essential and the other important master tables are – 1) Subject master (holds lists of subject descriptors); 2) Frequency master (holds codes for serials frequencies); 3) Budget master (holds financial data necessary for serials acquisition); 4) Currency master (contains currency description, codes and exchange rate for foreign currencies); 5) Delivering mode master (contains different modes of delivery of serials by publishers and vendors); 6) Physical media master (holds forms, formats and media for serials in coded form); 7) Binding type master (contains different modes of binding (e.g. standard, lather binding, cloth and rexin binding etc.) and their corresponding codes); 8) Letter master (includes formats for every type of letters required for the generation of outputs such as order letter, cancellation of order letter, reminder letters etc.).

Group II: Subscription and Acquisition

The tasks of this group may be organised into three groups and may be represented diagrammatically as below:



All together, there are 12 basic works in this group of works related to serials control given in the sequence – 1) Selection of serials for new subscription; 2) Renewal or discontinuation of existing journals/serials; 3) Selection of delivery mode; 4) Selection of subscription mode; 5) Formulation of terms of procurement; 6) Selection of vendors; 7) Approval from authority; 8) Ordering and renewal; 9) Payment; 10) Receiving and registration; 11) Reminder generation; and 12) Adjustment of advance payment for non-receipted issues.

Group III: Cataloguing and Article Indexing

The major jobs of this group are –

Cataloguing

Cataloguing formats for serials are fundamentally similar to those of monographs. But the content and format of serials bibliographic records varies considerably between systems. Some catalogues are based on ISBD(s) and others on ISDS formats. Some cataloguing systems use local formats and some use standard format like MARC 21, CCF/B, UNIMARC etc. You may consult the Table 4 in next page for a set of minimum essential tags and subfields related to serials from MARC 21 bibliographic format.

Article indexing

Article indexing option is generally requires by libraries in research institutes. Indexing of articles (also called papers) from journal issues is an optional facility of serials control subsystem. Generally, publishers of primary periodicals produce annual and other sorts of indexes regularly. Apart from such products, libraries also subscribe to number of indexing and abstracting journals related to the areas of their interest. As a result, article indexing is only necessary when available indexing and abstracting services do not cover the core journals on discipline of interest.

Leader 24 characters fixed-length field

00X group	**Control Fields**
005	Date and time of latest transaction (NR)
006	Serials – (00-17) – Fixed-length field (R)
008	Fixed-length data elements – General information (NR)

0X0 group		**Number and Code Fields**
022	ISSN (R)	[##; $a (NR)]
040	Cataloguing Source (NR)	[##; $a (NR)]
041	Language Code (NR)	[0/1_; $a (NR)]
042	Authentication Code (NR)	[##; $a (R)]
043	Geographic Code (NR)	[##; $a (R)]
082	DDC (R)	[0#; $a (R), $b (NR), $2 (NR)]

2XX group		**Title Related Fields**
210	Abbreviated Title (R)	[0#; $a (NR)]
222	Key Title (R)	[#0; $a (NR)]
245	Title Statement (NR)	[00; $a (NR), $c (NR)]
246	Varying Form of Title	[14; $a (NR)]
260	Publication, Distribution etc.	[##; $a (R), $b (R)]

3XX group	**Physical Description etc. Fields**	
300	Physical Description (R)	[##; $a (R), $b (NR), $c (R)]
310	Current Publication Frequency	[##; $a (NR)]
362	Dates of Publication etc.	[1#; $a (NR)]
5XX group	**Note Fields**	
500	General Note (R)	[##; $a (NR)]
6XX group	**Subject Access Fields**	
650	Subject Added Entry-Topical Term (R)	[#0; $a (NR), $v (R), $s (R)]
653	Index Term – Uncontrolled (R)	[##; $a (R)]
7XX group	**Added Entry Fields**	
710	Added Entry – Corporate Name (R)	[1#; $a (NR), $b (R)]
770	Supplement/Special Issue Entry (R)	[0#; $a (NR), $t (NR), $x (NR), $w (R)]
780	Preceding Entry (R)	[0-0/7; $a (NR), $t (NR), $x (NR), $w (R)]
780	Succeeding Entry (R)	[0-0/8; $a (NR), $t (NR), $x (NR), $w (R)]
841-88X group	**Holdings, Location, etc. Fields**	
850	Holding Institution (R)	[##; $a (R)]
852	Location/Call Number (R)	[##; $a (NR), $b (R), $c (R)]
856	Electronic Location and Access (R)	[##; $u (NR), $s (R)]

Table 4: Data elements (minimum) for serials on the basis of MARC 21 bibliographic format (R=Repeatable field and NR= Non-repeatable fields)

Group IV: Circulation and Binding

This group includes following jobs –

Circulation

Circulation of serials is often referred as Routing of journals. Circulation pattern of serials differs largely from that of books. But if serials are available for ordinary loan, then the same circulation control system will suffice as for monographs. However, serials are generally reserved for reference use only. In special libraries, the short time loan options for journals are common because of the specific need of users. If the number of transactions per day is large enough then such transaction system may be computerised. Such computerised facility must have a list of serials taken, a list of users and their addresses, and transaction interface with options for the generation of required output.

Binding

Back volume management is an important job in serials control. It is a valuable feature of computer based serials control subsystems to inform the library staff of volumes that have been completed and are now ready for binding. It is a very helpful feature to assist in work scheduling and to spread the binding load to give an even distribution of work in the binding throughout the year. After binding of back volume of a journal, accessioning is done for the bounded volume and then holding information for the concerned journal is changed / modified in the bibliographic database of journals.

2.5.3 Products and Advantages

The output of products of an automated serials control subsystem may be grouped into three basic categories – OPAC (gives search option for journals, journal articles and journal holdings), Reports and lists (provides status reports and MIS reports for decision making) and information products (such as table-of-contents and other altering services including SDI). OPAC of an ILS allows searching serials by Title (Current title, Complete holdings, Key title, Linked title, Variant title), Subject (Broad subject heading, Subject divisions, descriptors and class number), Publisher, Title history (Title split, Title merge, Title change, Title holdings), ISSN and Free text. Several reports, letters and statistics can be generated by the automated serials control system such as List of suggestions, List of approved titles, List of titles ordered, List of issues received, List of non-receipted issues, List of missing issues etc. In serials control module of an ILS information products are originated either from article indexing activities or serials catalogue database and produced on demand such as List of recent arrival for issues of a group of journals (as selected by users), List of journal available on a particular discipline, Discipline-wise holding list of serials, Table of contents service of a group of journals (as per user selection), Compilation of on demand subject bibliographies, CAS and SDI services in online and offline mode etc.

Serials management is a complex process. This subsystem involves frequent and repetitive record addition or amendment. Computerisation is an attractive proposition for serials control because of this reason and it leads to following advantages –

- Generates various reports in required formats for MIS activities as decision support tool for serials control (requires for addition, deletion and continuation of journals);
- Ensures timely reminders generation for missing issues and better binding control for completed volumes;
- Offers easy and simple solutions for fund accounting, payment management and budget control, a critical requirement for serials control;
- Facilitates creation and maintenance of article indexing database and thereby generates number of user services on demand;
- It helps library staff in quick production of serials holdings and list of recent arrivals in many forms;
- Facilitates online access to the serials database from anywhere at any time in any format;
- Predicts the arrival of journal issues and generates schedules for receiving journal issues;

Self Check Exercises

Note: i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

8) Discuss Kardex management in serials control module of an ILS.

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9) What is a predictive mode of serials control? Discuss its advantages in library automation?

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2.6 CIRCULATION SUBSYSTEM IN ILS

Circulation module of ILSs are effective tool for managing issue, return, renew, reservation and fine calculation easily and quickly. A circulation subsystem in ILS records loan transactions to specify – What material is in the library stock or readily accessible on ILL; Which material is in loan, and from whom or where it can be retrieved and When materials on loan will next be available in library for other users. In ILS, the transaction or loan database is the core of circulation subsystem. This database comprises a series of records, one for each transaction. Each record includes a brief dataset that specifies details of the document (through document number such as accession number), details of the user (through membership code) and transaction details (e.g. date of issue & date of return are extracted from the system date, and due date is calculated automatically). In an integrated setup, the bibliographical details (e.g. author, title edition, place and year of publication) of documents on loan are extracted from the catalogue database and the membership database is utilised for collecting user information. Accession numbers of documents are used as the key data elements in first case, whereas membership codes act as pointer to the member database in the second instance. Data-capturing is generally based on barcodes (to encode/decode both accession number for books and member ID from member card) but the use of RFID technologies in circulation are increasing significantly even in libraries of developing countries.

2.6.1 Functional Requirements for Circulation in ILS

Computerised circulation subsystems generally perform a group of functions utilising three basic categories of information – Information about the borrower; Information about the resources being borrowed; and Information about the loan transaction. An automated circulation system should provide facilities for managing the above mentioned three categories of information including following support services – 1) To locate circulating items (on loan, reserved by user, at binding, being reprocessed); 2) To identify items on loan (to a particular borrower, to a specific class of borrowers; 3) To record 'personal reserves' for items on loan but desired by another borrower and to issue alerting notice to the library staff on return of the reserved item by a borrower; 4) To print recall notices (for returning overdue items, for renewing of items); 5) To arrange renewal of loan; 6) To notify to the library staff of overdue items and printing of overdue notices; 7) To calculate fines or overdue charges for generating (printout of fine notices, receipts of fines records, printout of fine receipts); 8) To generate statistical reports (document related, user related, top ten items by popularity, top ten user by circulation activity etc); 9) To extend provision for handling special categories

of borrowers and special types of materials; 10) To generate and print gate pass and due date slips; 11) To act as decision support system for better circulation management; 12) To support various data capturing devices e.g. barcode readers, smart card and RFID equipments; and 13) To extend facilities for ILL and maintenance activities.

2.6.2 Workflow of Automated Circulation

The workflow of automated circulation subsystem starts with defining library circulation rules. Modern ILSs supports branch management system in circulation. It means if a library has branches, each branch may have their own circulation rules and one circulation module will serve all the branches on the basis of circulation rules of that branch. Circulation rules match patron category with item types by defining number of checkouts, loan days, fine amount, grace period, number of renewals, number of reservations etc.

Fig. 2.9: Circulation rules setting option in Koha ILS

The other broad groups of activities for the workflow of automated circulation are:

Membership Management

This sub-module is basically meant to crate and update membership records in a library. The works of this sub-module are – 1) Master database creation and maintenance facility; 2) Member category and privileges management; 3) Institute

profile and profiles of Departments/Divisions under the institute; 4) Calendar to record weekdays and closed days for library; 5) Member enrollment facility including modification/deletion/renewal of membership; 6) Output generation facility.

Transaction Management

Transaction sub-module includes all the day-to-day activities of circulation section of a library vis. issue, return, renewal, reservation, reminders for overdue books, searching document availability and listing of items issued to a member.

Reminder Generation

This facility is meant for generating reminders for overdue documents – To a group of members, To individual members, For a particular due date, To all members. The format and text of reminder letter may be modified by using this facility or by using the master database.

Fiscal Management

It provides option to manage outstanding dues against a member. It also includes generation of payment receipt. Fine amount may be waiver by authorised staff. This facility should also allow printing of fine statement if a member wants to have a statement of fines.

Inter Library Loan (ILL)

Inter library loan method simply means that documents of a library can be issued to the members of other libraries. ILL activities of an ILS are - ILL membership management; ILL transactions management; and ILL supervision.

Maintenance

Maintenance is generally attached with circulation module for recording information about lost documents, documents sent for binding, damaged documents, missing documents and documents withdrawn from library.

2.6.3 Products and Advantages

The typical products or outputs from automated circulation subsystem in an ILS are –

- List of library members (list of members can be printed either by name or by member code and can be sorted on any required sequence or order);
- Items issued over a period (list of documents issued on a particular date or date range);
- Items returned over a period (list of documents returned on a particular date or date range);
- Items reserved over a period (list of documents reserved on a particular date or date range);
- Member ID card (Member ID card with name of the member, membership code, department, institute, category, branch and year may be printed by utilising appropriate facility); Fig. 2.10 shows the member card generation utility in Koha ILS. You can observe the ability of the ILS to convert member ID into corresponding barcode.

Fig. 2.10: Bar-coded member card generation in Koha ILS

- Reminder letters and notifications (preformatted reminder letters for overdue document(s) is a regular task of circulation section);
- Item's transaction history (transaction history of any particular document);
- Membership expiry list (list of memberships expiring on a particular date or date range);
- Member history (list of documents issued and returned by a member during his/her membership period);
- Fiscal report (details of the fines collected by the library on a particular date or date range);
- Library usage (usage by deferent category of library members or by usage of different types of library materials);
- Most frequently issued items (list of most frequently issued documents);
- Most frequent member (list of most frequent users by circulation activities).

The other important products are –

- List of items issued to a member;
- 'No dues' certificate;
- ILL reports (arrival intimation, reminder, list of items on ILL, overdue charges and payment receipts);
- Transaction details undertaken by a staff working at circulation;
- List of lost, missing or damaged documents;
- List of lost documents for which amount recovered;
- List of documents sent to binding;
- Order letter for binding;
- List of withdrawn items.

The main advantage of automated circulation subsystem is the ability of library staff in extensive control of stock. Transaction records can be entered and saved

into the main database through a terminal. The central transaction database is updated immediately and subsequent consultation of the database will communicate the current situation. Some of the important issues may be enumerated as – Fines can be calculated on demand; Reservation and other modification to document records can be made instantly; Automatic identification of over borrowing and problem borrowers; Error-free data capturing through barcode, RFID and smart card technology; Provision of self-checking or self-issue option through web interface; Back up provision and exchange of circulation records on the basis of NCIP (NISO Circulation Interchange Protocol) standard.

Self Check Exercises

Note: i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

10) "Automated circulation is fairly successful right from the eighties"– elucidate.

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11) Explain the use of RFID in automated circulation.

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2.7 SYSTEM ADMINISTRATION

System administration of ILS is not regular and repetitive in nature but the working of each modules of ILS activated after configuration of each module as per the requirements of library through system administration interface. System administration involves two sets of works – 1) Setting of initial configuration for each module; and 2) Adjustment of configuration settings from time-to-time to match requirements of library. Post-installation configuration of an ILS is required to make the default installation of ILS library specific. Only super user of ILS can set the administrative parameters. The typical system administration jobs are listed herewith –

General parameters

- Date format: Selection of "metric," "us," or "iso" date format for entire ILS ("us" = mm/dd/yyyy; "metric" = dd/mm/yyyy; "iso" = yyyy/mm/dd);
- Tax parameter: Setting of tax (generally in percentage) for acquisition of documents;

- Parameters for Authorities: Involves decisions regarding Authority Display Hierarchy and Authority separator;
- Default character encoding: Selection of character encoding standard for whole ILS, usually Unicode for multilingual data;
- Theme selection: Selection of themes for appearance for both librarian and user interfaces;
- Branch management: Option for setting managing parameters for library branches.

Cataloguing parameters

- Allows settings of the following parameters for cataloguing activities – default dispaly format for retrieved documents, default data format (MARC, UNIMARC etc.), Auto/manual barcode generation, Filing rules etc.

Circulation parameters

- Allows parameters setting related to maximum outstanding fine amount, maximum reservations allowed, patron image display, notification for borrower expiry, generation of gate pass etc.

OPAC parameters

- Supports setting for the following parameters related to OPAC – enhanced content linking (like Amason etc), suggestions by users from OPAC, virtual shelf management.

Library Branches: Options for setting library code, name, address, IP address, domain name etc.

Library Funds: Setting of budget heads for different library materials as per the decision of the authority;

Currencies: Define the currencies library deal with exchange rates.

Item Types: Setting "categories" into which library items are divided.

Borrower Categories: Setting definition for the types of users of library and how they will be given privileges.

Issuing Rules: Controls aspects related to the circulation of library materials.

Authorised values for bibliographic format: Options for setting list of authorised values for different tags and sub-fields of selected bibliographic format.

Bibliographic framework: Scope for customising of data entry framework by selecting require tags and sub-fields.

Printers: Setting of printers (or several printers) that is attached to ILS server.

Stop words: Provision to list all of the words library staff wish to ignore by ILS when performing catalogue searches or building the keyword index.

Z39.50 Servers: Adding Z39.50 servers library want ILS to search.

Export/Import: Settings for performing export/import activities by following standards like ISO-2709 and MARC-XML.

Backup/Restoration: Regular backing up databases and restoration at the time of emergency.

Self Check Exercises

Note: i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

12) What do you mean by system administration? List some major jobs covered by this module.

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2.8 SUMMARY

This Unit starts with a theoretical discussion on system analysis and shows the application of procedural model to analyse tasks related to housekeeping operations under different sections of a library. It discusses library automation processes in integrated setup under four major subsystems namely acquisition subsystem, document processing subsystem, serials control subsystem and circulation subsystem. Each subsystem includes three major heads of discussion uniformly. The heads of discussion are functional requirements for the subsystem, workflow of the subsystem and advantages of automating the subsystem including typical products of the automated subsystem. Functional requirements section argues what an ILS should support and workflow section discusses how an ILS may be utilised for automating the subsystem. This unit ends with a discussion on system administration jobs related to library automation.

2.9 ANSWERS TO SELF CHECK EXERCISES

1) Library workflow or housekeeping operations are basic functions of any type or size of library. The works include acquiring, processing and preserving of library documents. The circulation of documents and maintenance of library stack is other important works of library housekeeping. These works are done through various divisions/sections of a library namely acquisition, processing, circulation, serials control and maintenance. These are basically routine and recurring works. Mechanisation of such works may be done through the application of ICT tools e.g. computer hardware and software (called ILS).

2) Serials control is concerned with the management of operations of journal section of a library. These are subscription, renewal, order, payment, cheek-in or receiving, reminder, binding and accessioning of bound volumes. Such activities lead to various information products and user services.

3) System analysis is technique for the analysis of components of a organisation and its works into atomic structure. Library is a complex system and consists of various subsystems and components. ASLIB, on the basis of system analysis techniques, identified a set of eighteen procedures related with

different subsystems. The same study also identified six common activities for all the eighteen procedures. These are – initiate, authorise, activate, record, report and cancel. All of these activities may not be applicable for each procedure. These procedures and activities are common to each type or size of library. An ILS should cover procedures, activities and tasks related to each subsystem of a library. Therefore, system analysis is a powerful tool for implementing an ILS.

4) Acquisition module of any ILS requires some essential works that need to be done before proceeding with actual acquisition work. These are termed as pre-acquisition works. This set of activities include – creation of master file for vendors/publishers/suppliers, creation and maintenance of currency conversion table, budget allocations under different heads, setting pre-defined letters for ordering etc, member creation and privilege setting.

5) Acquisition module of an ILS reduces a great deal of routine clerical chores in acquisition, supports online data entry and Electronic Data Interchange (EDI), generates reminders for overdue orders and sends them automatically over communication channel, provides real-time fund accounting, transfers bibliographical data of newly acquired items entered in the acquisition module to catalogue module for necessary modifications and up-gradation. Such a system helps to introduce new user services and cheaper data processing. It generates reports, statistics and lists required for the better library management and planning of efficient library services. Another advantage of automated acquisition system is to provide ready answers against queries related to the status of requests or orders.

6) Distributed cataloguing is a form of shared cataloguing and cooperative cataloguing. It allows online capturing of bibliographic data from remote library servers over the Internet. It reduces unit cost of cataloguing and saves lot of time for individual libraries. However, the major problem is of variation in data formats, software and hardware. ANSI/NISO Z39.50 standard was developed to support distributed cataloguing and to overcome the problems of database searching with different search languages. Z39.50 is a session oriented program-to-program open communication protocol based on client-server computing model. ILS incorporated with Z39.50 copy-cataloguing client (called origin in the standard) submits a search request to any Z39.50 server (called target), which then process the request and returns the result in desired standard. ILS will then place the captured record in the catalogue editor for changing and modifying bibliographic data in local library.

7) MARC 21 is a family of five coordinated formats developed 1999 through conciliation of major national MARC formats like USMARC, UKMARC, CANMARC etc. The five standards are namely - MARC 21 format for authority data, bibliographic data, classification data, community information and holdings data. MARC 21 is mainly a development over USMARC, and has become the de facto bibliographic standard in the area of computerised cataloguing since the beginning of 21st century.

8) Kardex management basically deals with loose issue management of journals in a library. It is also known as Cheek-in operation. It involves works related

to the receiving and registering of individual parts or issues of serials in library. It is necessary to make a careful note of the arrival of every issue of all periodicals along with special issues, indexes or other accompanying materials. Reminder generation for non-receipted issues depends largely upon this function.

9) Predictive mode of serials control means the ability of the ILS to predict the arrival of individual issue of a journal and to generate reminders automatically in case of non-receipted issues or parts within a stated time interval. An automated serials control subsystem may be predictive or non-predictive. A predictive serials control system saves labour, energy, time and money and ensures timely delivery/release of reminders for due issues of journals.

10) Circulation work of a library involves a group of operations that are specific, repetitive and systematic. As a result automated circulation systems have been fairly successful from the early days of library automation. Such systems require minimum set of essential data for carrying out circulation activities and data may be captured in a variety of ways. In an academic library, where users are generally large in number, this automated subsystem saves time of the users in great way.

11) Automated circulation subsystems are now-a-days RFID-enabled for many reasons. Libraries apply RFID (Radio Frequency IDentification) technology to manage un-manned self-service counters for issue and return of documents. An RFID system comprises three components: a tag, a reader and an antenna. The tag is paper-thin chip, which stores necessary bibliographic data. The tag is to be placed on the inside cover of the corresponding document. RFID reader and antenna are often integrated into patron self-checkout machines or inventory readers. The reader powers the antenna to generate RF field to decode information stored on the chip. Reader sent information to the central server, which in turn communicates with the ILS. RFID, apart from self-issue facility, also supports stock verification, theft detection (through EAS gate), and identification of misplaced books and inventory counts.

12) The administrator or super user should control the overall administration of ILS through a highly secured module for managing access control - for individual user, for each module and for each function; system security to prevent unauthorised access to databases; standard implementation and setting of system parameters and keep a log of each transaction, which alters the database. The other important jobs of system administration are privileges control, branch management, backup and restoration and System configuration.

2.10 KEYWORDS

Backup : Storage of records in magnetic or optical media for recovery of data at the time of need.

Barcode : A barcode is simply a computer readable tag that is used to identify individual items and patrons that are related to a specific library database.

Boolean Operators : The words AND, OR, and NOT used to combine concepts or search terms when searching a database for information.

Budget Allocation : It is the distribution of total library budget into various budget heads and subheads.

Charging : It is the act of 'issuing' a document and to record the loan transaction.

Check-in : The act of receiving and recording arrival of individual parts of serials.

Common Communication Format (CCF) : The CCF was developed by the General Information Programme (PGI) of UNESCO in order to facilitate exchange of bibliographic data between organisations, and first published in 1984. It is a highly compatible format that provides a structure in which records may be entered to the system; a format best suited to long-term storage; a format to facilitate retrieval and a format for display.

Data field : In a record, a meaningful collection of one or more related characters treated as a unit. In bibliographic records, these are variable length portion containing a particular category of data.

Directory : A table of entries, each of which gives the tag, length, and location within the record, segment identifier and occurrence identifier of one data field.

Discharging : The act of cancelling the records of documents on loan after their return.

Indicator digit : The first two characters of each data field, supplying further information about the contents of the field.

Intranet : The network that uses Internet technologies (TCP/IP and others) for local connectivity and is available only to the members of the network.

ISDS : An acronym for International Serials Data System. An international network of operational centers (established in 1973 within the framework of UNISIST programme), which are jointly responsible for the creation and maintenance of computer-based databank, and facilitates retrieval of scientific and technical information in serials.

ISO-2709 : An international standard for bibliographic information interchange on magnetic tape, developed in 1981. Most of the content designator schemes constitute a specific implementation of this standard.

ISSN : Acronym for International Standard Serial Number – an internationally accepted code for the identification of serials publications. It consists of seven Arabic digits with an eighth that serves to verify the number in computer processing.

Mandatory field : A data field, which should appear in the record when the relevant information appears on the item.

MARC 21 : MARC 21 is a family of five coordinated formats namely MARC 21 format for authority data, bibliographic data, classification data, community information and holdings data. MARC 21 is a development over USMARC, and has become the de facto bibliographic standard in the area of computerised cataloguing.

Merging of Title : It refers to combine two or more journals into a single journal under one title.

Record : A collection of information, in one or more fields, about an entity.

Repeatable field : A data field, which may appear more than once in the same segment.

Repeatable sub-field : A subfield, which may appear more than once in a single occurrence of the data field to which it belongs.

Reservation : A request for a specific book or other circulating items to be reserved for a member as soon as it becomes available on completion of processing, or on its return from the binder or another member.

Routing : The systematic circulation of periodicals or other printed material among the staff or members of a library in accordance with their interests in order to keep them informed of new developments.

SDI : Abbreviation for Selective Dissemination of Information Systems. It is an automated system of information retrieval utilising a computer for disseminating relevant information to users. An interest profile depicting and defining each area of interest is compiled for each user; it consists of terms, which are likely to appear in relevant documents.

Splitting of Title : The breaking of a single journal into two or more different journal titles.

Standing Order : An order to supply each succeeding issue of a serial publication or subsequent volumes of a work published in a number of volumes issued intermittently.

Sub-field : A separately identified part of a data field containing a data element.

Sub-field identifier : Two characters immediately preceding and identifying a subfield. First character is called subfield flag and the second character is termed as subfield code.

System Analysis : A powerful technique for the analysis of an organisation and its work.

Tag : A three characters code appearing in the directory, associated with a data field and used to identify it.

Union Catalogue : A catalogue of the various departments of a library, or a number of libraries, indicating their locations. Union catalogue of serials includes the complete holding of serials available in member libraries.

Withdrawal : The process of cancelling records in respect of documents that have been withdrawn from the stock of a library.

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