



Module 4

Procedural Model of Library Automation



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MODULE 4: PROCEDURAL MODEL OF LIBRARY AUTOMATION

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4.1 Learning Outcome

After going through this module you will be able to:

- understand definition, scope and objectives of system per se;
- identify characteristics of libraries as information systems;
- apprehend applications of general system theory in designing library systems;
- understand merits of procedural model as system analysis and design tool; and
- apply procedural model in understanding working of ILSs.

4.2 Introduction

A system is defined as a set of interacting components that operate within a boundary for the purpose of achieving an objective. The boundary of a system filters interactions (input/output) between a system and its environment.

The term information system is used in different disciplines with different meanings. In the context of library and information services, an information system is a system, which handles information sources in different forms and formats with the definite purpose to provide users with information at the time of their need. As per the main working document of UNISIST II an information system is –

“a set of interrelated information processing systems associated with communication facilities, which are cooperating through more or less formal agreements, and institutional agreements, in order to jointly implement information handling operations, with a view to pooling their resources and to offer better services to the users. They generally follow identical and compatible rules and procedures”.

4.3 Library System

In summary, an information system (in the context of library and information science) has following major attributes:

- An information system is organized collection of information sources;
- Information systems follow standard information processing activities;
- Information systems are related with specific discipline or group of related subjects;
- Users are the most important component of any information system; and
- Information systems follow global standards for the sake of compatibility.

4.4 Elements and Components of Library System

A library system, like other systems, has five basic elements. These are System objectives, Environment, Resources of the systems, System components, and System management. Every information system has a general set of objectives, goals and targets. Each component of an information system has a set of specific objectives and goals that help to achieve objectives of the system. A library system has seven basic parts. These are –

Components

These are subsystems within an information system that are acting in combination to achieve system objectives. Components may be homogeneous or heterogeneous.

Boundary

A boundary is an area separating one information system from another. It filters transmission of input and output between the information system and its environment.

Environment

An information system exists to meet specific informational needs of the environment. An information system may have environmental elements like users, personnel, government, financiers, vendors, geographical area, and other information systems.

Input

Data and information sources (in different forms and formats) are input for information systems.

Output

Information products that are produced by information systems after processing of the input elements are considered as output.

Interface

Interface is the region between the boundaries of different systems and also interaction area of subsystems within an information system.

Feedback

Feedback is a mechanism through which output (performance) of an information system is measured against a predefined set of standards.

4.5 Library System Analysis

System analysis is a tool for system design, development and modifications. It is the systematic investigation of functions of a system to study interrelationship amongst the components. General System Theory (GST) advocates ten major factors in system designing and six principles for well-defined systems. These factors and principles may well be applied for designing library systems. Application of design issues (as proposed by general system theory) in development of information systems may be represented as follows –

Design issues as proposed by GST	Application in designing information systems
System must act as a whole.	An information system must be defined in totality.
Components of a system must interact.	Provision of seamless interaction among interrelated components must be ensured in designing an information system.
System must have a definite set of objectives or goals.	Goals of an information system as a whole should be framed judiciously including goals of each individual component must be defined properly.
Systems should have input and output.	Provision and specification of input and output must be included in information systems.
System must be able to process input to produce output.	Information systems must adopt internationally agreed upon standards for information processing in view of the compatibility.
System yields entropy.	Success of an information system depends on information processing activities.
System is to be controlled properly.	An information system must have regulatory functions including feedback mechanisms.
System needs to have hierarchical architecture.	Information systems must have structured operational subsystems with definite set of objectives and roles.
System exhibits differentiation.	Information systems must have dedicated parts for different task zones.
System reveals equifinality.	Design architecture must be selected judiciously (best alternative) for achieving targets.

Table 4.1: GST and Library system design

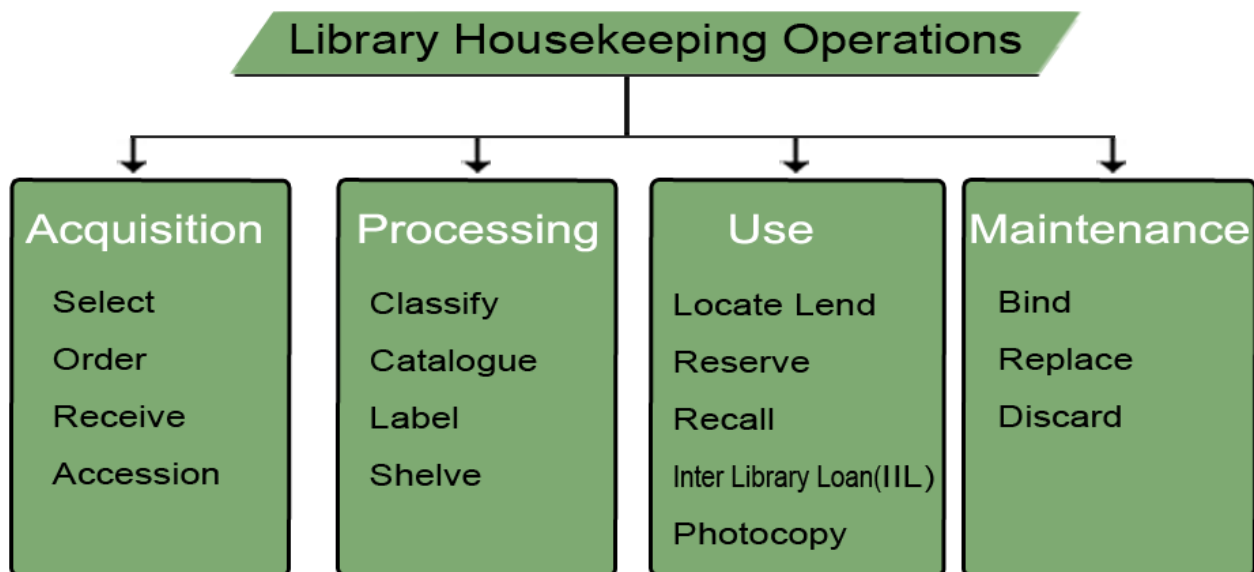
4.6 Procedural Model of Library Automation

Library automation aims to support workflows of a library in an integrated setup. It means different subsystems of a library (like acquisition, cataloguing, circulation, serials control, OPAC etc.) need to be supported by an ILS. Therefore, to understand library automation we need to understand first the library workflows. In fact an ILS (or LMS) automates the workflows of a library system. Most of the LMSs are based on a model called **procedural model of library automation** (first proposed by P.A. Thomas in an analytical study of library automation conducted by the then

ASLIB). The model proposes that a library system has mainly two subsystems – administrative subsystem and operational subsystem.

We cannot automate the process of administration but if we can automate operational subsystem, it may help administrative subsystem in taking right decision at the right time. In fact automation of operational subsystem may provide a wholesome MIS (Management Information System) to library managers. Operational subsystem comprises mainly four subsystems for performing housekeeping jobs through eighteen procedures. These procedures under each and every operational subsystem require one or more of six possible activities. There are fifteen basic tasks for performing procedures and activities. In short procedural model of library automation 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 and it advocates automation of the procedures, activities and tasks through different modules of an ILS.

The functions and activities of one division are entirely different from other divisions but they are closely related and the combined efforts lead towards the better library services. It is quite clear now that libraries are complex systems that include subsystems and components. The main two subsystems are operational subsystem and administrative subsystem. Library housekeeping operations are part of the operational subsystem.



As per the analytical study of ASLIB (Association of Information Managers, UK), the operational subsystem may be divided into four further subdivisions namely Acquisition, Processing, Use and Maintenance. Within each of these divisions there are a number of procedures and within each procedure there is one or more of six possible activities. The tabular presentation of the place and scope of housekeeping operations related to different subsystems in a library system (as per the procedural model) is given below:

System	Subsystems	Operational	Procedures	Activities
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		Subsystems		(Common to all Procedures)
Library System	Operational Subsystem	Acquisition	Select Order Receive Accession	Initiate (To commence a procedure)
		Processing	Classify Catalogue Label Shelve	Authorize (To approve a procedure)
		Use	Locate List Lend/Issue Reserve Recall/Return ILL (Inter Library Loan) Photocopy	Activate (To implement a procedure through appropriate action)
		Maintenance	Bind Replace Discard	Record (To record what action has been taken)
	Administrative Subsystem			Report (To notify staff or user about the action taken)
				Cancel (To stop a procedure or undoing an action)

Table 4.2: Procedural model of library automation (Source: Mukhopadhyay, 2005)

In considering libraries from one general organizational point of view, the analysis of housekeeping system is useful for automation of a library. It is a prerequisite to design and use library

management software and to communicate with software vendors and programmers. A close analysis of the operations involved in library housekeeping provides us three hierarchical levels – **procedures, activities and tasks.**

4.7 Procedures and Activities

The eighteen procedures listed in the previous paragraph are common to libraries of different types. The design and use of an automated library housekeeping system requires the analysis of all these procedures into their atomic structure. The procedures under each and every operational subsystem have been analyzed by P.A. Thomas in terms of six possible activities – *initiate, authorize, activate, record, report and cancel.* All of these activities may not be involved in every procedure. There are one or more six possible activities against each procedure. The six common activities are defined as: -

Initiate – That which makes it apparent that a procedure should be commenced.

Authorize – In some cases, the decision to carry out a certain procedure must be approved before any further action is taken.

Activate – When a procedure is known to be necessary and in some cases approved, it is usually implemented by taking appropriate actions.

Record – The function that states or records what action has been taken.

Report – To notify library staff or user that an action has been taken.

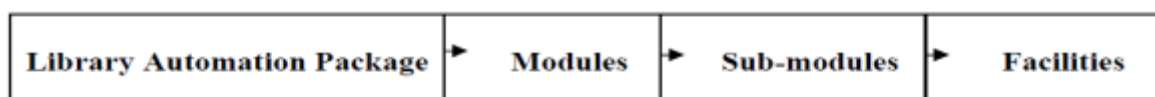
Cancel – To stop a procedure, in particular the aspect of revoking or undoing an action.

4.8 Tasks

The third level in the hierarchy is concerned with ‘tasks’ within an activity under each procedure. Task means a related group of operations carried out to perform a particular kind of job. 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. In this context, ASLIB defined a set of fifteen tasks for the basic procedures. These are – *pass, receive, discard, place, remove, search, duplicate, attach, separate, move, sort.* Such tasks are supported by other four element tasks namely *read, verify, enter and decide.*

4.9 Conclusion

Most of the LMSs are presently based on procedural model of library automation and follow a modular approach to perform the tasks related to housekeeping operations. Generally, the whole package is divided in **modules** for each operational subsystem. Modules are divided into **sub modules** and each sub module supports various **facilities** to carry out tasks related to the procedures.



In summary, we can say that procedural model of library automation as proposed by ASLIB (Association of Information Managers, UK) is acting as a general model for automating library housekeeping operations.

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