

# From Clay Tablets to Web: Journey of Library Catalogue

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## ABSTRACT

The paper discusses the evolution and development of library catalogues from clay tablets to the web-based catalogue. In the early stages, cataloguing was a local and individual library practice. Each library constructed its own catalogue, most suited to its purpose. A series of continuous changes through the ages, in both, conventional and non-conventional catalogues, including recent technology inputs added various features to the present day catalogue. Today the computerised catalogue may function like a portal and this function can be exploited infinitely to connect to a variety of data considered useful for library users. The system designers are trying to adopt new trends in OPACs. Web-based catalogues initiated Web 2.0 trends like RSS feeds, blogs, downloadable e-media, and instant messages. The facelift of the simple catalogue was eminent to keep up with the versatile needs of the widely web-exposed library users.

**Keywords:** Clay tablets, library catalogue, OPAC, Web-OPAC, historic developments, OPAC features

## 1. INTRODUCTION

Management of accumulated knowledge is carried out in libraries that are the treasure houses of books, periodicals, newspapers, government documents, pictorial reproductions, motion pictures, phonographic records, manuscripts, maps, and microforms. To provide speedy and easy access to material in their vast collections, the libraries offer tools and techniques for selecting, locating, and retrieving desired materials.

The two main tools are classification and catalogue. Classification helps in arranging documents on shelves in a systematic order; the catalogue helps in organising, identifying, and locating the required documents.

The library catalogue is a list and an index to its collection of books and other materials. It enables the user to search documents, locate them on shelves, sections, libraries, etc. The catalogue lists the reading materials in a manner that the user can seek and locate documents by author name, titles, subjects, series, and editors which, down the ages, were considered efficient tools for tabulating the vast library resources of the library.

It is a comprehensive index that lists library resources in one library or group of libraries; arranged in a recognised order and containing bibliographical information (the name of author, title, edition, collaborator, call number, details of imprints, and collation, etc.).

## 2. HISTORICAL DEVELOPMENT OF CATALOGUE

In ancient times, the libraries were devoted to the acquisition and preservation of reading materials and used some primitive systems of bibliographical organisation or control to locate available material according to need. This was a crude inventory lists which served only as an index for the library and there were no universal rules. Many attempts were made at standardisation of bibliographic entries among library catalogues but primitive methods of bibliographic control continued to persist. The Archaeological Excavations Assurbanipal (1668-626 BC) revealed that bibliographic information was recorded on tablets that served as a crude location device by recording title, number of tablets, distinct subdivision, and a location. The Alexandria Library had an extensive catalogue compiled by Callimachus in the forms of Pinakes in 250 BC.<sup>1-2</sup>

There was scanty information regarding catalogues and cataloguing during the Roman period even though public and private libraries were common. The Romans continued the methods established by Callimachus, continued without change during the first seven centuries of the Christian era. The fall of Rome in the sixth century brought about the deliberate destruction and dispersion of the private, public and temple libraries. The next ten centuries saw the growth of libraries of the Western World which managed a small collection of manuscripts in

monasteries established during this period. These monasteries played a major role in education as they were the primary places for preservation and production in the middle ages (300-1100 AD). However, there was little need for library catalogues and only inventory records were maintained. Post twelfth century, the typical catalogue remained an inventory list but libraries of universities began with the library catalogue of the Sorbonne, University of Paris in 1289. The 14<sup>th</sup> century catalogues included an author index appended to the inventory list which could be conceived as a true catalogue. In 1327, the catalogue of the Exeter Cathedral library was an author catalogue with only one subject heading<sup>2</sup>. In the fifteenth century, the concept of the finding list slowly emerged with the addition of author indexes. The 16th century was influenced by great bibliographers like Gesner, Treflerus, and Maunsell who were framers of premier catalogues. Maunsell's use of author's surname was indicative of the changing concepts regarding names<sup>3</sup>.

The 17<sup>th</sup> Century brought the Bodleian catalogue, an early form of the first dictionary catalogue with author and subjects filed in a single alphabetic order appeared, even though the single entry (author or title for anonymous) was the rule of the day. It was the first printed catalogue compiled by Thomas James in 1605 in the classified form. The beginning of the 19<sup>th</sup> century saw the emergence of the dictionary catalogue. But some sorts of subject entries were often visible in author catalogue with 'catch word' entries for anonymous works. In the later half of this century, various cataloguing codes were designed. By the end of the century, the pattern of catalogue construction became well-defined with subject headings, main entry, classification, unit entry, added entries and adequate bibliographical description, which were all well-developed elements. Co-operative cataloguing was in its beginning stage<sup>4</sup>. Thus the twentieth century may be characterised as the period of growth and development of the catalogue. Co-operative and centralised cataloguing gained impetus. Computer-based catalogues appeared during 1960s<sup>5</sup>.

End of the late 19<sup>th</sup> century also witnessed the beginning of the card catalogue. The card catalogue was first introduced (in 1743) in France by Abbi Rosier at the Paris Academy of Science and at Bibliotheque du Roi, now Bibliotheque Nationale<sup>5</sup>. The early part of the 20th century saw the card catalogue displacing book form catalogues totally. Libraries in the US also began adopting this format<sup>4</sup>. Further development in catalogues came with that contained the cataloguing record in compacted micro-images and required a microform reader for viewing. Various media existed for the microform catalogue like microfilm and microfiche. This form was directly produced from a computer database

through the computer output microform (COM) method. The COM device converts the digital information into print displayed on microform. While libraries had been using COM for book form catalogue production and other technical service applications since 1960s, widespread implementation of COM catalogues began only in the mid-1970s<sup>5</sup>.

### 3. DEVELOPMENT OF CATALOGUE CODES

In the early stages, cataloguing was a local and individual library practice, whereby each library constructed its own catalogue best suited to its purpose. Bibliographic records were in forms and styles peculiar to each library but they lacked a system. Gradually, librarians realised the advantages of co-operation among libraries and standardisation of practice. The need for codification of cataloguing practice became apparent. Since the mid-nineteenth century saw a series of cataloguing codes which came into existence. These codes were developed to standardise practices and improve preceding ones. The earlier codes were efforts of individuals while the later ones were results of corporate undertakings. The prominent developments of cataloguing are briefly discussed in the following.

#### 3.1 Pre-AACR Era

The British Museum catalogue was considered to be the first major cataloguing code developed in 1839; as it influenced cataloguing practices of many libraries. It was also known as Panizzi's ninety-one rules. It reflected the functions of catalogues as inventory lists and finding lists. This code had provision only for author entry arranged alphabetically in which only the main entry contained fairly bibliographical details with shorter 'added entries' after being prepared in the form of simple cross references. Professor Charles Jewett, an American, was greatly influenced by Panizzi's code and published a code of 39 rules named Charles Jewett's Rules based on it. His discussion of subject headings represented the earliest attempt at codifying subject headings as a practice. Another landmark was the publication of Cutter's Rules for a Dictionary Catalogue in 1876 containing 205 rules. This was an epoch-making year in the history of cataloguing as the rules were specially designed for a dictionary catalogue rather than any particular library. Cutter established the principles of specific subject entry and the rules governing the choice of subject heading.

The American Library Association and British Library Association jointly prepared the AA Code 1908 to secure greater uniformity in catalogue rules. This was the first attempt to achieve international co-operation in the field. The joint code was, however, perfected. During the Second World War both associations fell apart. The ALA constituted a committee to revise the AA code 1908. It produced the ALA Draft Code in 1941 in which the 174 original rules of the AA

Code were expanded to 375. Then the ALA revised the first part of the 1941 draft and published these ALA Rules in 1949. The second part of this draft was revised by Library of Congress which published its own Rules for Descriptive Cataloguing in 1949 under the title Library of Congress Descriptive Cataloguing 1949.

One of the most significant events in the history of cataloguing was the International Conference on Cataloguing Principles (ICCP) known as the 'Paris Principles' held at Paris in 1961. Delegates from 53 countries and 12 international organisations participated in the conference. Though many countries were greatly influenced by the ICCP it did not provide a satisfactory basis for agreement and several national committees rejected certain clauses of the statement.

In India, S.R. Ranganathan designed the Classified Catalogue Code (CCC) and its first edition was published in 1934. After five editions the last was in 1964. Each new edition sought to improve the preceding one. The subject approach was recognised as dominant in CCC. It had no restriction of language unlike other codes which were of non-local nature. The fifth edition appeared with additional rules and included a feature of economy as it does not cover the use of imprint and collation in its entries.

### 3.2 AACR Era

A new code, the Anglo-American Cataloguing Rules (AACR), appeared in 1967 based on Paris principles and published in two editions, British and North American. It had some variations between the British and the American texts. The Library of Congress 1949 was used as the basis of description for monographs, serials and non-book material. The logical arrangement and emphasis on conditions of authorship rather than types of works were a landmark improvement. Next step was taken the International Meeting of Cataloguing Experts (IMCE) held in Copenhagen in 1969. Based on this meeting, the International Standard Bibliographic Description (ISBD) was formulated and issued in 1971. In 1975, the General International Standard Bibliographic Description (ISBD (G)) was developed. The primary aim of this code was to prescribe the order of bibliographic elements and punctuation marks on a record to maintain uniformity.

Keeping in view the ISBDs, Anglo-American Cataloguing Code was also modified. A Joint Steering Committee for the Revision of AACR was formed to redraft the AACR provisions for bibliographic description to promote international standards. As a result, the AACR2 was published in 1978. The ISBD (G) was incorporated into it as the general framework for bibliographic description. In the course of application of AACR2 (1978), new developments occurred and the rules were found inadequate to

accommodate new media. Therefore, further revision to AACR2 (1978) it was renamed as AACR2 R, 1988. Although AACR2 R is the result of ongoing revisions, yet it maintains the same principles and guidelines as AACR2. Other changes are related to material for the blind, sound recordings, music, etc., also for the purpose of achieving greater conformity in establishing the headings, a few rules were also changed<sup>4-7</sup>.

The revisions in AACR continued with amendments having made in 1998 and 2001 in chapters 3, 9 and 12 along with changes made to amend the rules for cartographic materials, electronic resources and serials which were approved by the Joint Steering Committee in 2001. The 2002 version of AACR2 had incorporated the aforesaid amendments. Now Joint Steering Committee for revision of AACR became Joint Steering Committee for Development of Resource Description and Access (RDA) which is working on a new code<sup>8</sup>.

## 4. MODERN TRENDS

Libraries had begun using computer applications for their catalogues in the latter part of the 20th century. Developments in information technology (IT) revolutionised the catalogue and consequently, the online public access catalogue (OPAC) emerged. An improvement over OPAC, the Web-OPAC, has been in use for quite some time in the developed countries and has also taking place in some libraries in India.

### 4.1 Online Public Access Catalogue (OPAC)

One of IT's greatest accomplishments is transformation of the card catalogue to the OPAC to facilitate libraries. An OPAC is a library catalogue accessed via a computer terminal for the benefit of library users. It is a computerised catalogue of documents and reading materials available in a library. It provides online access to library's catalogue for users and allows the searching and retrieval of bibliographic records. The OPAC works on several databases, but primarily on the library catalogue database. A catalogue database is the machine-readable form of the card catalogue and is made up of a number of bibliographic records which comprise a collection of data elements (author, title, publisher, subject heading, etc.) organised in a systematic manner which represents bibliographic items<sup>9</sup>.

Harrod's Librarian's Glossary and reference book defines it as 'An OPAC is the catalogue of a library or information centre made available to users online and generally providing a variety of additional facilities such as loan information, online reservation, and library news. With the demise of the card catalogue, the need for stressing the 'online public access' part has disappeared and they are now frequently just 'catalogue'<sup>10</sup>.

The Online Dictionary for Library and Information Science defines, 'OPAC as an acronym for Online Public Access catalog, a database composed of bibliographic records describing the books and other materials owned by a library or library system, accessible via public terminals or workstations usually concentrated near the reference desk to make it easy for users to request the assistance of a trained reference librarian. Most online catalogues are searchable by author, title, subject, and keywords and allow users to print, download or export record to an e-mail account<sup>11</sup>.

According to Wells<sup>12</sup>, the library OPAC has atleast three distinct functions:

- (a) It acts as a bibliographic database or an electronic version of the card catalogue that it replaced, acting as an index for users in search, for example of a particular book. As a logical extension of this, OPAC increasingly also provides links to electronic texts, freeing the user from the necessity of physically locating material on the library's shelves.
- (b) It functions as a 'portal' in a way not dissimilar to a library homepage, providing links to non-bibliographical data, either relating to users themselves, i.e., information about overdue books, fines, etc. or other library information like opening hours, etc. In principle, this portal function could be extended indefinitely to connect to a variety of data considered to be of interest to library users; and
- (c) The OPAC functions as a promotional artifact, advertising the presence of the library and the services it can provide and at the same time making a statement of authority about communicative links that are supported and facilitated. OPAC potentially has a fourth function as the management of full-text data and management of bibliographic data coverage and the bibliographic functions of OPAC itself become enabled for full-text searching rather than remaining primarily an index. This technology is not widely implemented in current OPAC installations, but it is on the anvil and likely to develop<sup>12</sup>.

Thus, OPAC is a form of catalogue, a computerised catalogues containing records of items in a library or information centre. It is used for storage and retrieval of information as it provide basic search, advanced search, browsing search, Boolean search, search through access points such as author, title, subject, keyword, call number, etc., options. It also provides information on facilities like loan status, location, availability and reservation of document. Basically, the OPAC acts as an information retrieval system. It is not only an information retrieval system

but also a module of an integrated library system. Therefore, it has more search capabilities and facilities than the traditional catalogue.

#### 4.1.1 *Advantages of OPAC*

Following are some of the advantages of using an OPAC:

- OPAC offers a greater number of access points for a single record;
- It provides access to a wide coverage of information quickly;
- It provides information which may not be available in the printed form;
- It connects to current information since online databases are updated speedily and more frequently;
- It eliminates need for tedious clerical work of typing and arranging catalogue cards;
- It offers faster search facilities and the capability of Boolean searching<sup>13</sup>.

#### 4.1.2 *Historical Development of OPAC*

Computer applications firstly concentrated on library activities other than the catalogue. They were used in libraries mainly for housekeeping operations like circulation control, acquisitions and serial control. Afterwards began the computerisation of library catalogues and as a result, OPAC came into existence. Much had occurred in OPAC development over the last four decades. Bibliographic records have gone from brief (in some systems) to full, catalogues have been expanded to become catalogue and circulation systems. To facilitate use, 'user-friendly' interfaces have been built. Following are some developments in OPAC which have taken place with passage of time:

- Sixties and early seventies

Earlier some libraries in the sixties used computers for the production of catalogues. Eighty column punched cards were used to print the catalogues on paper. The computer systems of that time were not capable of searching the catalogue online. OPACs made their appearance in the mid-1970s, while the history of library automation can be traced back to 1954, the experiments with online information retrieval began only in the early sixties. Seventies was a period of trial and error for the OPACs and large libraries in the US had still not come to completely rely on an online catalogue<sup>7,14</sup>.

The concept of MARC (Machine Readable Catalogue) heralded a new era in libraries. MARC stimulated the development of library automation and information networks. The Library of Congress launched MARC-I as an experiment when there was no established bibliographic record in machine-readable form. There was no consensus as to which



access points were required to take full advantage of an automated cataloging system. Four months before the end of the MARC-I project, MARC-II had been initiated after substantial evaluation of the MARC-I format and developed in 1968 as a result of Anglo-American cooperation. The British Library adopted the MARC record format in 1967 and later on it received increasing acceptance all over the world<sup>15</sup>.

- Mid-seventies

By the mid-seventies, computers started affecting more library processes, particularly circulation control. The COM was to become a popular way of generating the catalogue. Philip Bryant at the Bath University Centre for catalogue research conducted early experiments on catalogue use for physical forms of catalogue (COM fiche, COM film, card and line printer paper).

Cooperative cataloguing systems and resource sharing started to take place in libraries. The OCLC (Ohio College Library Centre) was a prime example of the cooperative system in the USA. BLCMP (Birmingham Libraries Cooperative Mechanisation Project), SWALCP (South Western Academic Libraries Co-operative Automation Project), LASER (London and South Eastern Library Region) and SCOLCAP (Scottish Libraries Cooperative Automation Project) were examples of cooperative systems in the UK. These systems made catalogue records for participating libraries either in COM form or on catalogue cards<sup>16</sup>.

- Late seventies and early eighties

Some companies started to develop hardware and software packages or turnkey system for libraries. The co-operative systems such as BLCMP and SWALCP also began to develop local stand-alone production which could be linked into the central database of records. Some suppliers of systems in North America started to promote their products in the UK and Europe. One of them was Geac. It developed the turnkey circulation system for the Universities of Guelph and Waterloo in Canada in 1977 and was installed first time in 1979 in a UK library and went on to become popular in university libraries in the 1980s.

The ability to search bibliographic records online came to be referred to as OPAC. The first generation OPACs allowed only direct searching using the actual author or title by matching the exact phrase to the library holding. This meant that they had no ability to browse the catalogue, and a mistake in the search term would leave the user bereft of a correct match. These OPACs had access points similar to those of a traditional card or COM catalogue. Some OPACs were primarily book-finding and locating tools and were fully equipped for known item searching. They

were phrase-indexed or pre-co-ordinate OPACs with access points similar to those of a traditional card or COM catalogue, i.e., author, title (as a phrase), class mark or call number (as a phrase) or possibly subject headings (as a phrase)<sup>17</sup>.

- Mid-eighties to late eighties

The OPACs became very popular and were rapidly available during 1980s. The first demonstration of OPAC from University of Adelaide held at Biennial Victorian Association for Library Automation (VALA) in 1981 boosted many universities and institutes of technology. By 1985, some public libraries implemented the integrated library management systems like URICA, VTLA, GEAC, DOBIS/LIBIS with OPAC modules. The European Library Automation Group held a meeting in 1986, concentrated on OPACs. Around the time when the British Library Research and Development Department made a policy of funding OPAC research in 1985.

A large number of suppliers provided integrated systems for library management which included modules for various subsystems such as cataloguing, acquisition, circulation, serial control, interlibrary lending and also OPAC in the mid-eighties. These were second generation OPACs. Some new suppliers like Dynix, came into the field with them based on information retrieval techniques developed by online search services, like Dialog in the 1990s. These OPACs were termed as keyword or post-co-ordinate OPACs. The words from titles, subject headings, authors or other names were access points in these types of OPACs and search statements could be combined by linking Boolean operators, user did not require an exact author or title match to find information. These OPACs had an in-built circulation system, which let users know the copy status of documents and allowed them to place reserves or holds on books<sup>16</sup>. Keyword search, Boolean search and the increased or decreased of search results were among the features of second generation OPACs. Interfaces were usually in two modes-menu driven and command-driven. This made flexible interaction between the user and OPAC more flexible. In terms of user assistance, these provided more options including, help access, error messages and suggestive prompts. Ease of use and user friendliness were two major features of this generation of OPACs.<sup>18</sup>

Many OPACs supported the ability to restrict searches to specified record fields to limit the results by date, language, place of publication, etc. and bibliographic records were also viewed in a number of different display formats. This initiated a trend towards making online catalogues more user-friendly, and providing users with as many available options as possible.

- The Nineties

Library management systems witnessed further evolution and development in the 1990s. Some systems required to install only one manufacture's hardware. A variety of systems existed which required a network to be installed and some of the systems were not compatible with university and other networks. The market was changing rapidly and many suppliers differed products which ran on a wide range of hardware platforms. These systems made use of low cost, high performance hardware as well as standards for communicating systems and relational database management systems besides similar building-blocks<sup>16</sup>.

Further improvements in OPACs were regarded as third generation OPACs post 1996. OPACs of this generation were user-friendly, had improved search capabilities with free text search and enriched database. These OPACs were capable of providing links to external full-text indexes, databases, and e-journals on the internet<sup>17</sup>.

These OPACs enhanced records including additional and uncontrolled access points (such as chapter title in books) while some of these systems included partial match techniques instead of Boolean operators. They had the provision of context-dependent automatic help and used terms from relevant records retrieval to enhance the search strategy. The retrieved sets displayed most relevant records first.

The most recent development that OPACs have achieved in providing easy access to bibliographic information was by using GUIs like Windows. These systems may be considered as fourth generation OPACs that have moved up from traditional menu-type interfaces. These OPACs are associated with client server and graphical user interfaces. They use WIMP (Windows, icons, mouse, and pointer) interfaces to speed up and simplify searching.

Searching capabilities in the Windows version of OPACs are far more than those found in earlier OPACs. Pointer capabilities allow the user to select exactly the term he/she is looking for. By using scroll bars and pull-down menus, browsing in different indexes is very simple. Boolean operators can also be used to narrow down or broaden search results. Such strings can be constructed using the mouse alone. A number of OPACs provide the facility to refine the search results by year, language, and type of publication. Most recent additional advanced feature of this OPAC is the hypertext function. Through this function, any word that the user selects or highlights can be used to search all fields and sub-fields in all records of the database. This dynamic feature helps the searcher navigate the database to find more relevant documents<sup>19</sup>.

#### 4.1.3 OPAC Features

Today, although a large number of Integrated Library Management Systems (ILMS) are available at the international and nation levels, all ILMSs do not provide the same features and functionalities in their OPACs. There are variations in features of OPACs of different ILMSs. However, some general features are:

- Interactive Interface

The OPACs have interfaces through which the bibliographic information is searched, retrieved and displayed. Present interfaces are interactive. Interactive interfaces allow communication between the user and the system in an interactive manner. Users can interact with the system, and alter search methods and information displays in order to optimise search results as per their information needs. Graphical user interfaces (GUIs) have made OPACs more interactive and easier.

- Types/methods of searches

Some library softwares offer different types of searches namely simple or basic and advanced/expert or complex searches. The term 'simple/basic search' means a search by any word or phrase from any one bibliographic field of OPAC and 'advanced/expert/complex search' means searching by more than one field of the bibliographic elements of OPAC record. In these types of search, some OPACs provide different search methods such as Boolean logic, truncation, exact searching, word proximity and phrase searching. In the use of Boolean operators such as AND, OR and NOT, user can combine two or more terms from title index, author index and subject index in a search statement. The user can broaden up or narrow down their search with the help of Boolean operator.

Majority of OPACs permit the user to broaden the search through truncation method. This is a strategy to search information by entering the root part of a word with multiple variants or spellings using a symbol (usually\*) but the symbol varies in some softwares. The search word can be truncated from both right and left hand side. For example, librar\* would retrieve library, libraries, librarian, librarians, etc. This search method is generally used when character-by-character exact match does not help.

- Access points

In terms of search capabilities, OPAC is a significant departure from the traditional library catalogues. One of its most interesting features over the manual catalogues is to enable the user to search the required information in a variety of ways that are not available in the traditional catalogue. The OPACs are able to search the

catalogue through a greater number of access points with little information to hand:

(a) Searching by author, title, call number, ISBN, series, etc.

These are basically string or phrase search options and consequently the end-user has to provide words from any of these access points in the search box of OPACs. The facility of combined search terms using Boolean or other operators may be provided.

(b) Searching by subject

Subject search is a very important search option. This is general phrase search. The user has to provide either the complete subject heading or the left part of the phrase or a search expression. The user may use the search terms or keywords from the same subject headings list or thesaurus that was used while the input was prepared for the databases.

(c) Searching by keywords

Keyword access is a very powerful tool and provides more flexibility to user to search the items for which he/she does not have exact information. This is very different in the manual catalogue. Keyword search makes the index from all bibliographic fields such as author, title, series, subject, etc. and it is an appropriate alternative for the users who cannot match the exact bibliographic information to the catalogue. In many OPACs, there are options for limiting keyword searching to fields such as author, title and subject. The user can enter one or more keywords and these can be combined using Boolean operators. Other functions such as truncation or limiting search options may also be used through it.

- Browse searching

In this type of searching, list of index terms are presented in alphabetical order and searcher can navigate the database by going forward or backward through the desired index until he/she finds the index term(s) which may lead him/her to relevant records. Through graphical user interface, this approach helps user to browse different indexes such as author index, title index, subject heading, etc. This facility removes the problem of search specification. Browsing search is an effective approach to searching that requires little effort and knowledge on the part of the user.

- Search output and bibliographic display

Each OPAC has its own capability for manipulation of the search results. This is usually a list of bibliographic records retrieved in OPACs with some holding information. The output may be listed alphabetically or by publication date. There may

be provision to print and save the retrieved records, or for the transmission of results by e-mail. OPAC permits displaying bibliographic information in a variety of ways. OPACs show short display or full display or a combination of both. Most OPACs first display a short record, which can be expanded to show more details of the documents. Some OPACs display card catalogue form or a local format and fewer have MARC format display. Some even use the common communication format (CCF).

- Search limits

Provision of search limit gives an essential means for making the search meaningful. In terms of refining search results, OPAC has a great advantage over the traditional catalogue. This option enables the end-user to limit/refine search results by year of publication, types of document, language, and location, etc. When many records are retrieved, the user may limit them through the above mentioned options. Thus, the user can limit all the search results to the works in a particular language, in a particular type of material or all the works published prior to, during or after a given year. Another feature of OPACs is to provide the facility to user to sort the search results by the author, the title, subject and the date of publication.

- Search strategy

Search strategy is the planning process to apply an effective search to find relevant information on a topic in a database. It is a generalized set of techniques of how to enter the search into the database or index. Some possible strategies include controlled vocabulary searches, specific entry searches, browsing, broad to narrow searches, adjacent item browsing, subject tracing searches, keyword searches, and cross reference searches. The OPACs display the methods how to make a search. Some OPACs display the search strategy during searching. The OPACs have different search strategy tools such as display of search strategy, provision of examples under each type of search, display of search history, and sorting of records according to relevance.

- User assistance/online help

It is a valuable feature of OPACs and is a major advantage over the manual catalogue as the system can provide assistance to the user to search documents. It is a great tool to make the user familiar about OPAC and its facilities. OPACs have the ability to provide user assistance in a variety of ways and at different levels. Most OPACs have textual information on the user screens/interfaces. Some OPACs have a provision of in-built help message and procedural learning/training to user in order to enhance optimum use of OPACs.



- Status, holdings and location information

A major feature of OPAC is to provide holding information and to show status and location of the needed item. OPACs are able to show the status of the volume and copy of the document and whether the document is available on the shelf or on loan or missing. These features help the user saving the time in knowing the status and location of the required documents.

- Services/facilities

The OPACs provide an interface with the circulation system and a provision for the options such as ILL, renewal, reservation, etc. Some OPACs offer provision of online mailboxes for comments or suggestions. Now, a small number of OPACs also have the facility to accommodate multilingual documents of a library.

- Access and availability

Unlike a manual system, the user of OPAC has access to bibliographic database, circulation, acquisition, holding and location information at the same terminal. Unlike card catalogue, OPAC is accessible through terminals located at different places within and outside the library via local area networks (LANs) and also via wide area networks (WANs). Thus, different users at the same time can search the same record simultaneously. In terms of access to library catalogues, distance has now become irrelevant as technology has enabled decentralised bibliographic information access through the internet.

- External links

With advances in computer and internet technology, it is possible now to have access to electronic texts and files stored anywhere in the world over the network. Some OPACs provide the ability to link to electronic sources such as electronic journals and books by using hypertext links of these resources. Different OPACs may be searched by using the standard known as Z39.50. It is a protocol for information search and retrieval in a client-server environment.

- General points

Most of OPACs show the name of library software and the owning library. Some OPACs display the brief overview of the library. Logging-in and logging-off are usually optional features. Some OPACs explain the contents and coverage in them and provide logging-in and logging-off instructions. The time out feature is also optional but is a useful feature to avoid slow retrieval of information on network<sup>20-23</sup>.

## 4.2 Web-OPAC

Web-OPAC or web-based catalogue is an advanced technological form of OPAC. It is a library catalogue

on the web or internet and is the next generation of OPAC. It utilises the world wide web protocol to deliver a library's catalogue. It is programmed to facilitate the library user to access OPAC remotely. The concept of Web-OPAC is very well established and practiced successfully in developed countries, like USA and UK. In India, however, some libraries have begun providing web-based OPAC.

According to Harmsen, "Web-OPACs are an advanced generation of traditional OPACs serving as a gateway to the resources not only held by a particular library but also to the holdings of other linked to full-text resources."<sup>24</sup> Harrod's Librarians Glossary and Reference Book defines, Web-OPAC as, 'a library OPAC made available to users via a Web browser.'<sup>10</sup>

According to ODLIS, 'an Online Public Access Catalogue (OPAC) uses a graphical user interface (GUI) accessible via the world wide web, as opposed to a text-based interface accessible via telnet'.<sup>11</sup> Thus, Web-OPACs are those OPACs which make the searching of resources of a library possible through the world wide web. The major advantage of web-OPACs is that their usage is global, a person can access them anytime and from anywhere in the world. They perform all the functions of OPACs.

### 4.2.1 Features of Web-OPAC

The important features of Web-OPAC are:

- The GUI is available which is typically thought of as a combination of windows with pull-down or drop down menus, icons and a pointing device such as mouse or trackball to manipulate information;
- The usual features of traditional OPACs such as, storing bibliographical and sometimes full-text databases; providing direct access to a library's bibliographical database by means of terminal or PC, providing instructional help, display of search results in readily understandable form, sometimes remote access from the library's location, information about community events, providing links to circulation files, reference help, etc., providing search through a variety of access points such as author, title, keyword, subject, periodical title, series, call number, ISSN, or ISBN, etc.;
- The ability to use hypertext links to facilitate navigation through bibliographic records;
- A move towards emulation of the appearance and search features similar to those found in search engines;
- Linking to full-text when available;
- Ability to help bring a convenience in searching of all electronic information available through



one interface e.g., catalogue, CD-ROMs, internet sources, etc.<sup>25</sup>

## 5. CONCLUSIONS

To summarise, there have been continuous changes through the ages in both conventional and non-conventional catalogues. Conceptually, the objectives and functions of the catalogues are independent of its physical forms and arrangement. Technology, however, influenced the way in which the functions are carried out. Computer and communication technology have added additional features in the catalogue. New developments in computer technology from time to time are being incorporated in computerized catalogue or OPAC/Web-OPAC. Earlier, users have to visit the library to ascertain the availability of a particular document; today a user can do it outside the library. Library catalogues were merely locating tool to find information, current catalogues are capable of providing information at the spot without going to library shelves because of integration of electronic resources with it.

Today, OPAC systems not only serve the purpose of catalogues but also provide unified or integrated systems covering almost all other library activities such as acquisition system, serial control system, circulation system, financial system, personnel management system and so on. Thus, such library information systems are meant to be bibliographic information systems for the users and information systems for library management. OPAC can function like a portal and this function can be exploited to extend indefinitely to connect to a variety of data considered to be of interest to library users. System designers are also adding new trends in OPACs.

Web-based catalogues have started to apply Web 2.0 trends like RSS feeds, blogs, downloadable e-media and instant messages. The RSS feeds and instant messages may be used as alerting services for users about new books and other material added to the library collection. It is hoped that developments in the library catalogue will continue in line with the fast advancements in computer and communication technology. The modern catalogue should provide an easy access approach and all possible means to the user for searching the vast library resources. The OPACs have been adopted widely in Indian libraries. Therefore, catalogues should be studied periodically to examine their effectiveness and user friendliness from the user's point of view. The OPACs has come a long way from the tedious card catalogue, yet there are many more frontiers to be gained to quench the very thirsty scholars' quest for knowledge. The versatile and dynamics evolution of the OPAC is a reflection of this quest which shall continue to pose challenges and expect them to be answered.

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