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ARTICLES

A Generalized Framework for the Design and Development 0f an Area Profile

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Unesco Public Library Manifesto, 1994 proclaims that the public library should be considered as the local centre of information. This paper emphasizes the need of each and every public library to develop local history collection representing a broad spectrum of subjects relevant to the study of a specific locality in which the library is located. As a corollary to this, an area profile containing the factual information concerning different facets of the locality and its community needs to be prepared. A generalized framework of essential components for collection of data on different facets of the area and its community for an area profile is worked out. Suggests the methods and sources of collection of data for it. The preparation of an area profile will facilitate the librarian to acquire necessary knowledge, skills and attitudes that are required to practice the local study librarianship.

Introduction

Libraries have come into being with the dawn of human civilization. They were products of the society reflecting the social, economical, political and cultural environment of their times. They have changed during the centuries as the society changed and have become established institutions. Many countries have realized the importance of library service for national development and national well-being and have provided legal basis for the provision of library service to their citizens. Attempts are made to organise the system of library servicese embracing the whole population.The public library has come to India with the coming of the Western ideas during the eighteenth and nineteenth centuries. Several public libraries have been established. There has been some progress in the planned development of public library services in the country. Several states such as Tamilnadu, Andhra Pradesh, Karnataka, Maharashtra, West Bengal, Kerala, Manipur, Hariana and Goa have enacted library legislation and are struggling to establish the public library system in their respective states.

Our public libraries so far have remained mostly book oriented institutions serving limited sections of the middle class society. People know that the library provides books and periodicals and this is the image of a public library our people have. People in general do not think of going to a library or approching a librarian for dependable information needed to solve the problems relating to their daily livelihood. It is now realised by all

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concerns that an environment in which people look to the public library for the information they need should be created by libraries in order to justify their existence. Public libraries of today are required to get involved in the problems of the community in which they are located and to provide every kind of information that is available in any form to the people so that they may find it easier to solve their problems. Every public library in our country needs to develop an information base or databank based on the needs of the community determined by community surveys. There has also been tremendous growth in interest in all aspects of the history of the local community. Unesco Public Library Manifesto, 1994 proclaims that the public library should be considered as the local centre of information and a clear policy must be formulated defining its objectives, priorities and services in relation to the information needs of the local community. In addition to their being directly educative and recreational, public libraries are nowadays also developing local history collections representing a broad spectrum of subjects relevant to the study of a locality.An area profile containing the factual information concerning different facets of the locality and its community forms an essential component of local history collection in public libraries.

Local History Collection : Meaning and Scope

No precise definition of the term *Local History* is available in the literature. Often, collections of local material are termed *local history*. But this is misleading as the subject covers all aspects of the local community and *not merely a single class, industry or section of it* (4) . A more suitable designation has been suggested as *local Studies*, as this term implies a wider range of interest than previous one (7). To enable all aspects of the community to be studied effectively, it has been suggested to develop a local studies collection of the records of the past and contemporary events in manuscript, print and other non-print forms. Harrod's Glossary defines local studies collection, under the term *Local collection,* as a *collection of books, maps, prints, illustrations and other materials relating to a specific locality usually that in which the library housing the collection is located* (5). A truly representative local studies collection consists of the infinite variety of information sources and activities on diverse subject fields that exist and have existed under the rubric of Local history collection .

The term *Local* in the context of local history collection usually refers to a history of a particular place or area in which the library is located. Much of the literarure reflects the relativity of the use of the term *local*. For example, the local collection building for State Central Library refers to the collection of local studies concerning the whole State. Similarly, it may cover a district or a town or even a village or a group of villages falling within the purview of a Panchyat Samati depending on the nature and scope of the locality in which the library is located and the community it serves. For this , Jordan pointed out, the use of the term *local* implies a contextual situation and it is ....*dynamic and ever-*

changing due to the synergistic influence of improved transportation, communication, education, etc. (6).

The term *History,* on the otherhand, does not refer merely the records of past events. In answering the question *"What is history" ?* Carr mentioned it as *a continous process of interaction between the historian and his facts, an unending dialogue between the present and the past (1).*

Thus, it appears that the local history collection has undergone an amazing metamorphosis from its long term focus upon retrospective works to one including contemporary records representing a wide range of subjects relavent to the study of a locality. It is also to be noted here that the development of local history collection should be considered in the context of the role played by the given locality or its immediate community in the larger socio-economic, political, cultural, educational, linguistic and religious movements covering wider geographical region or the whole country. Documents having any bearing upon one or other aspect of the given locality or its immediate community should form an integral part of the local history collection.

Local History Collection in Public Libraries

Historically, there is evidence of the development of local history collection in American libraries either as part of a special collection department or as a specified collection designation housed and administered under the reference department. After the formation of American Library Association (ALA) in 1876, the profession of librarianship got considerable impetus and leadership in the collection and organisation of local materials for collective use. Local history collection was discussed at several ALA conventions and at the meetings of state and local library association. It is fascinating to note that C.A. Cutter, a multifaceted personality and an inspired teacher in librarianship, gave an essential thought on the local history collection in libraries at the ALA convention in St. Louis in 1889:

> *Every town library must collect exhaustively and preserve tenaciously any book, pamphlet, map, placard, poster, every scrap of written or printed matter relating to that town and less exhaustively to the neighbouring town* (2)

This suggestion of Cutter is still valid and relevant today in the development of local history collection in public libraries. However, it is not the intent of this paper to provide a definitive treatment of the types or kinds of materials coming withing the purview of local history collection. Rather, it is the stated purpose to provide a generalized framework and guideline for the design and development of an area profile forming an essential component of local history collection.

Area Profile

As a corrolary to the development of local history collections, a librarian also requires to prepare a profile of the area wherein the library is located. An area profile is nothing but an information consolidation product which has, in recent times, become quite common and familiar among the library professionals. It presents the factual information concering different facets of a geographical area and its community.The items of information to be incorporated in an area profile are selected from various information sources, analysed, restructured and repackaged for the purpose of disseminating those information to the defined social groups. It is evident that the people from different disciplines and professions like anthropology, sociology, economics, history, geography, political science, law, agriculture, geology,etc. are interested in local studies.There are a wide variety of multidisciplinary studies which focus on the activities of the community within the local geographical- political units. Thus, the area profile to be prepared by the librarian will be of much help not only to the historians but also to the people from other scholarly disciplines and professions who need information on an area for their decision making, problem solving, study and research. In order to provide data relating to a given area, the librarian needs to carry out the study of the area. An area study may be viewed as an educationally planned and professionally guided programme of interaction of a librarian with the experience of a realistic situation through welfare, institutional, and people- based systems in order to help him in the preparation of an area profile. The librarian, who is placed in a community setting for area study, has to make a number of visits to it. During these visits, he is expected to contact the different members representing the community, available official records and other documentary sources ¾ published and unpublished, different government and non-government agencies in order to have a better understanding about the community in terms of its physical, economic, social, cultural, health, animal husbandry, transportation, communication, crafts, small scale industries, service institutions, land distribution patterns and so forth. The aforesaid items of information are to be obtained by way of conducting surveys, holding discussions with key persons, observing events and tracing the history of the community. It is through area study programme, the librarian acquires knowledge, skills and attitudes that are required to practice the local study librarianship.

Framework of an Area Profile

For the purpose of preparing an area profile, it is necessary to formulate a specific need-based general framework of essential components of an area and its community. On the basis of the experience and interaction with the potential users it has been possible to work out a generalised framework for gathering required data for an area profile.The framework is intended to guide the collection of information on different facets of an area and its community systematically. The work of carrying out the preparation of an area profile simultaneously provides an opportunity to the librarian to interact with the differ-

ent expert / people, government and non-government agencies. For example, collection of information on climate determinants calls for an interaction with the geographer and meteorological department in the district and state. When the collected information is systematised according to the prescription of the framework, it will result into an area profile containing the essential information of an area and its community. This profile will be of much help in rendering information services to the users of multiple subject fields. The framework of an area profile furnished below is an illustrative one, not exhaustive.

A Historical Evolution

A1 Meaning, significance and changes (if any) of the name of the area

A2 Genesis of the area , its place in history, the growth of the settlement, legend, myth, etc.

A3 Significant landmarks in the evolution of the area,

A4 Location and profiles of important monuments, palaces, buildings and other structures; their architectural, cultural, historical and other significances.

A5 Important events (Chronologically).

B Geographic Setting

B1 Location : The latitude, longitude and distance to other settlements

C Climate Determinants

C1 Rainfall : The maximum and minimum annual rainfall including the mean annual rainfall during the past three decades; rainfall distribution pattern during the past five years; maximum intensity of rainfall recorded on the wettest day and the wettest month during the past three decades; run-off coefficients and maximum river discharges at selected points; flood levels, flood markings and demarcation of floodable areas.

C2 Temperature: Monthly maximum, minimum and the mean temperature recorded during the past 10 years or more; the highest and the lowest temperature recorded during the past 20 years; effect of temperature on the location; radiation and absorption of solar energy; scope for producing solar energy and other forms of non-exhaustible and non-polluting energy such as hydel, wind and geo-thermal sources.

C3 Humidity : Monthly maximum, average and minimum percentage of humidity for the past 10 years or more; the highest and the lowest humidity ever recorded.

C4 Wind : Meteorological data regarding wind velocities; direction and percentage number of days in the year during which the prevailing wind blows at specified velocity and particular direction.

C5 Geological Structure : The geological structure of the area; soil profiles; suitability of the soils for agriculture and civil construction; location and nature of quarry sites, gravel pits and rock outcrops; seismic phenomenon in the region, intensity and frequency; location of ravines, deep gulles and other geological features.

D Natural Resources

D1 River(s): Area covered; Importance in the area

D2 Sea Resources : Importance of sea as a source of fuel, energy and minerals; area covered; Beach deposits; coastal deposits; sea water resources; oil and gas occurrances.

D3 Forests : Area covered; social forestry programmes; Forest-based industries; Wild life sanctuaries.

D4 Minerals: Types and location of the deposits; Annual output.

E The People

E1 Demographic trends during the past five censuses, i.e. 1951, 1961, 1971, 1981 and 1991.

E2 In and out migration of population: volumes, trends and socio-economic characteristics.

E3 Vital statistics: literacy, births, deaths and marriage.

E4 Ethnic, cultural and social characteristics of the inhabitants.

F Transportation

F1 Road transportation : Functional classification of the network of highways, roads, streets, lanes, etc.; Existing culverts and bridges; Public transportation services by vans, rikshaws, buses, minibuses and taxis; Time tables.

F2 Rail transportation: Railway linkage in the area; Time table.

F3 Water transportation: Existing river and canal systems; number and types of water-borne vehicles such as ships, barges and boats; passenger and cargo volumes; Time table.

G Communication Service

G1 Post and Telegraph Services : Number and location of existing post office(s).

G2 Telephone Service: Telephone excgange- location; number of existing connections by domestic, commercial, industrial and public service subscribers.

G3 Internet facilities / e-mail.

G4 Electricity Services: Source of power : hydel, thermal, solar and other types; Number of connections: domestic, commercial, industrial and public service consumers; Rural electrification.

G5 Newspapers: Name, address, phone number and frequency of publications.

H Education Facilities

H1.Description of all types of educational facilities (nursery , primary, secondary, higher secondary, polytechnics, colleges, University(ies), teacher-training and other professional institutions). The following items of information are to be incorporated for each institution:

- Name of the institution with year of establishment.
- Address
- Phone number / Fax / e-mail
- Location / Distance from the place of residence
- Name of the Head of the institution, his/her residential address and phone number(s)
- Course(s) offered
- Catchment areas
- Students enrolment
- Number of teachers
- Publications.

H2 Literacy programmes

- Name of the NGOs operating literacy programmes and their activities
- Enrolment
- Dropout
- Post-literacy programmes
- Literacy rate: Male and Female.

J Health Facilities

J1 Hospital : Name,address, phone number, number of medical and paramedical staff , doctors, nurses, pharmacists, clinical and laboratory assistants, dentists, public health staff, and other professional and technical staff), number of beds, catchment area, services offered (preventive and curative).

J2 Health Centres / Clinic

J3 Maternity homes

J4 Dispensaries
J5 Ambulance facilities
J6 Pathological Laboratory
J7 Veterinary hospitals :

- Existing facilities for treatment of bovine and ovine stock.
- Name of veterinary doctor(s), address, phone number(s), availability.

J8 Public health education : Role of local self government, use of media in public health education.

J9 Health insurance schemes : Medicare, Mediclaim, etc.

K Housing

K1 Existing housing stock in the area by types, size and availability of utilities and services such as, piped water, sewerage and electricity.

K2 Slums and shanties and the programmes for their improvement.
K3 Housing finance, housing co-operation, housing finance institutions.

L Public Utilities

L1 Water supply : Sources of water (river, ponds, wells), supply of water to various settlements in the area for domestic, commercial, industrial, irrigation and civic purposes, storage and pumping system, community standpipes, water purification.

L2 Sewerage : Existing sewerage system including the network of drains; areas served by bore-hole latrines and septic tanks; treatment and recycling of sewage ; water pollution - the pollutants, nuisance, hazards and remedial measures.

L3 Solid Wastes: Composition, system of collection and disposal .

L4 Pollution Control: Pollution of air, water and land; Pollutants; Nuisance and hazards; Environment awarness campaign.

L5 Fire- fighting service : Location of fire station(s) including phone no.

M Recreation and Entertainment Facilities

M1 Parks and Gardens : Location, available infrastructure, Utilisation of facilities during weekdays, holidays and special occasions.

M2 Sports Facilities : Number, location ,size, capacity, infrastructure and utilisation of existing plyagrounds, fair and festival grounds.

M3 Entertainment and Amusement facilities: Present status in term number, location, size, capacity, facilities available, and management of

- Clubs
- Cinema Holls
- Video Holls
- Theatres
- Hotels and Restourants
- Other places of entertainment and amusement

M4 Lodging facilities: Hotels and Guest houses: types of room and tariff.

M5 Places of tourist interest Location, object of interest, maps, guide books, list of guides, etc.

N Institutional Facilities

This section should take note of the name, address, phone number, facilities provided, intensity of use and patronage for each institution.

- Religious Institutions (Churches, Mosques and Temples)
- Libraries
- Museums
- Community Centres
- Art Gallaries
- Archives
- Orphanage homes
- Old age homes.

P Economy

P1 Employment : Types of employment; occupational structure of employed population; Unemployment and Seasonal employment.

P2 Agriculture : Location and extent of agricultural land; Principal crops, their gross products, storage and marketing; Local consumption; availability and use of seeds and fertiliser; Insecticides; Irrigation facilities (major, medium and minor).

P3 Animal Husbandry : Cattle forms and development; Special livestock production; Fodder and feed development; sheep development; Piggery development; Dairy development; Poultry development; Animal health and trainning; Names and addresses of Govt.

and non-govt. agencies - Services provided.

P4 Fisheries : Fish ponds; Fishing harbours; Fish, Seed forms; Gross product; Storage, marketing and processing; Number of trollers and boats Names and addresses of Govt. and Non-govt. agencis - Services provided.

P5 Trade and Commerce

P51 An overview of the various types of commercial activities, both trade and commerce, wholesale as well as retail; classification, location, size, distribution, investment, employment, clientale and other aspects.

P52 Markets : Classification by types such as daily markets and periodic markets/huts ¾ their date and timing, wholesale and retail markets - their location, range of goods sold; social profiles of traders and shoppers.

P53 Banking facilities: Name, location, phone number, services, availability and extent of credit facilities of each bank

P54 Co-operative Institutions: Name(s), address(es), phone number(s) of co-operative stores and societies in the area; types of services rendered.

P55 Investment Organisations : LIC, Peerless, UTI, ICICI, IDBI, etc. ¾ addresses, phone numbers, functions, local agents, etc

P56 Professional and Commercial offices : Name(s), address(es), phone number(s) and functions.

P57 Industries:

- Manufacturing Industries : Name, Address, phone number, Number of employees, types of products of each manufacturing industry.
- Small-scale Industries : Name, Address, phone number, Number of employees, types of products of each small scale industry.
- Cottage Industries : Types of products; number of households / persons involved; Location; Marketing of products.
- Service Industries: Types such as repairing, maintaining, servicing, warehousing,; Cold storage; Number employed, area occupied, ownership and infrastructure.

Q Administration

Q1 Local self-Government:

- Municipality ¾ Location / Address, Phone Number, Names and addresses of Chairman and Councilors; Services.
- Gram Panchayat ¾ Panchayat Samity, Zilla Parisad ¾ Location / Address, Phone number, Names and address of their members and Zilla Sabhadhipati.
- Judiciary Court ¾ District and sub-divisional, their location.
- Legislature ¾ Names, phone numbers and addresses of MLA(S) and MP.

R Politics

R1 Political Parties Names, addresses and phone numbers of the officials of each political party.

R2 Election Analytical results (candidate and both-wise) of last assembly, parliament and panchayat elections.

R3 Important political movement.

S Culture

- Language
- Literary activities
- Music including folk music
- Dance
- Drama
- Folk arts
- Fairs
- Festivals.

T Publications

T1 List of documents (books, magazines and newspapers) published from the locality.

T2 List of documents on the area.

T3 List of documents having bearing on the area or its community.

T4 Press(es) ¾ Name(s), address(es), phone numbers

T5 Newspaper clipping (a separate file can be maintained for it.)

U Directory of Human Resources

This section is intended to take note of the human resources of information. The idea is to identify mainly the local living persons of reputation because of their experiences and specialisation on one or other aspect of the area. Such a person, when consulted, may be in a position to provide specific information about the given geographical area and its immediate community which is not readily available from any other source.For the purpose of developing the records of oral history, this directory will be of much help in identifying the persons to be considered for recording their memoirs. Each entry in the directory should contain name, address, phone number and area of specialisation / activities. The classes of persons to be included in the directory are :

U1 Elected Representatives: MP , MLA , Members of Gram Panchayat, Panchayat Samity, Zilla Parishad; Chairman and Councilors of the municipality.

U2 Medical Practitioners:

U3 Legal Practitioners:

U4 Government Administrators and other officials

U5 Artists: Eminent singers, actors, dancers , painters, sculptors, mummers, magicians, etc.

U6 Sportsmen

U7 Educationists

U8 Litterateur

U9 Businessmen

U10 Religious leaders

U11 Leaders of Political parties and mass organisations

U12 Freedom fighters

U13 Social Workers

U14 Eminent dead persons .

Conclusion

Public libraries in the West have enlarged their activities and are struggling to become the institutions of local informatin. They are ever struggling to identify the information needs of the people and the problems of the community so that they can act in time and provide the information, as well as do their best in solving community problems. Public libraries of our country should get involved in extending the horizons of their activities keeping in mind the needs of the people. Developing adequate library resources including an area profile to support the study of different facets of an area and its immediate community will enlarge our librarians' contact with varities of human experiences and will enable the people of the locality to see themselves and their own culture in perspective. Provision of community information service could satisfy the needs of the literate as well as illiterate patrons. Librarians also need to advertise the kinds of services they offer in the market place with imagination and ingenuty. With such a strategy our public libraries need no longer be the institutions of a small section of the educated elite and middle class people, but could literally become the institutions of the people. If we fail to do so, some other social agency may take over such functions and the public library may be the big loser and may have to face slow death or unglorified existence. Library educators should also emphasise community librarianship and local study librarianship in their curricula and prepare the librarians for the many sided service of the community.

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Pointers to Online Information: Cataloging Internet Resources

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Electronic age has a great impact on library collections and services. The traditional library collection is now supplemented to a great extent by information in various other sources like offline electronic storage devices such as CDs and online information like Internet resources. Users approach to the collection has also drastically changed and they approach both traditional and electronic collection for their information needs. Hence it becomes necessary to provide pointers to information items in online and electronic forms in addition to cataloguing traditional collection. This paper deals with cataloguing Internet resources and discuss the guidelines for description of such resources. Examples are given to illustrate the use the field 856 of MARC21 for description of electronic and Internet Resources. But there are several constraints and problems that arise in such an exercise as cataloguing Internet resources. The problems are discussed with some possible solutions.

Introduction: why catalog Internet resources?

Library catalog is a pointer to information in the library. It provides access points according to the various users approaches to Information. The usual approaches are contained in the acronym 'ACTSS' standing for Author, Collaborator, Title, Subject and Series. The general user may not always be very clear about the document he is looking for. In fact, he would express only a few terms indicative of the subject of his information need than description of documents containing that information. Hence many approach points, some by descriptive methods and some by subject approach methods, are provided in the library catalog to direct users to the right document.

Electronic and Online documents

In the modern environment the traditional library collection is supplemented to a great extent by information in various other sources like offline electronic storage devices such as CDs and online information like Internet resources. There is much skepticism and debate whether these resources would substitute the traditional collection. While there may not be a substitution by either type of resource, it has become established that there is a demand for information in the traditional as well as electronic formats. And as is often the case in modern times, the information sought may only be available in the electronic or online form. Hence it becomes necessary to provide access points to all sorts of material including the electronic and online material.

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In recognition of the need for cataloguing electronic and online resources, OCLC has undertaken projects on web resources cataloguing to enhance access to Internet resources. The premises of the project are stated as(1):

1. There is a great deal of valuable information available through the Internet. These resources need to be organized for accessibility; and

2. Using existing library techniques and procedures, creating records for retrieval through existing online catalogs is the most efficient method of accessing these resources.

Recognizing the rapid changes in computer technology and the dynamic evolution of new forms of computer files in the form of interactive multimedia, optical discs, and remote electronic files on the Internet, the International Federation of Library Associations and Institutions (IFLA) Sections on Cataloguing and on Information Technology initiated, in 1994, a revision to the *International Standard Bibliographic Description for Computer Files* (ISBD(CF)) published in 1990. Following extensive consultation and worldwide review, the final version of the ISBD(ER) was approved by the IFLA sponsors in 1997.

With the emergence of this revised international standard for electronic resources, national cataloguing agencies have undertaken to review and update their rules for descriptive cataloguing. In keeping with this, the American Library Association, Committee on Cataloging: Description and Access (CC:DA) undertook a review of the Anglo-American Cataloguing Rules to consider opportunities for, and implications of, harmonizing ISBD(ER) with AACR2. (2)

The Constraints

The main constraint for cataloging the Internet resources is the volatile nature and rapid change in medium of information on the Net. There are many factors for this:

a. The pages may just be deleted and there may be missing links

b. The information in the pages may be significantly changed in structure and content

c. Drastic changes in the medium of the information sources such as interactive multimedia presentations and information in newsbursts of webcasters

In any case even with all these problems, the value of electronic and online information cannot be denied. Some techniques like adopting PURLS which act as URL redirects to web sites which have moved, are promising solutions if widely implemented .

Metadata

There is yet another constraint that the role of intermediary in document description will be passed on to the author/creator of online documents. This is debatable whether the author/creator would be able to describe the document technically or would bother to do so. Who does it is another matter but the need for adequate description of internet resources cannot be over emphasized in the light of the poor retrieval by the Internet search engines. Many of the projects initiated for cataloging the Internet resources, advocate rules for creating metadata which is nothing but the bibliographic data that describes the document or information and also represents it. The objective is to move towards building effective retrieval on the Internet with semantics driven search engines.

Metadata is invariably described as data about data. It describes the attributes and contents of an original document or work. The DESIRE project (3) describes metadata as "data associated with objects which relieves their potential users of having to have full prior knowledge of their existence and characteristics." In the context of information work, standard bibliographic information, summaries, indexing terms, and abstracts are all surrogates for the original material, hence metadata.(4). But 'Metadata' in the larger understanding stands for data generated to represent documents or information items according to the rules of extraction, encoding and representation advocated by a standard system. One popular standard is the MARC 21.

Functions of Metadata

Metadata is meant to represent information items but in addition has many related functions. They are:

- Act as Documents surrogate
- Aid information retrieval surmounting language barrier.
- Standardisation of structure for data exchange
- Standardisation of terminology
- Aid data portability and re-use

Metadata and Cataloguing rules

Metadata is often the result of applying a standard for document description. In addition, the goal is also to have a commonly accepted format. This reminds us strongly of the rules of cataloging. The cataloging rules deal mainly with rules for

a. Choice of data elements

— Identification of the necessary and sufficient number of elements for describing information items.

b. Data extraction

—How data should be extracted and represented.

c. Order of presentation of the descriptive elements and punctuation to be used.

Metadata also deals with the above along with data encoding rules. That is, identification of a standard tag set for representing the various data elements. Often it is the case that there is much concentration on which tag set should be followed. In addition, there should be adequate focus on the data or content of each of the data elements. At this stage while creating metadata, the cataloguing rules offer very effective solutions. The codes have tread the much beaten path to incorporate enough number of rules to represent various kinds of documents and information items. It is for this reason. that it is always likely that the terms 'metadata' and rules 'cataloging rules' are often used as twin concepts. For example: The MARC21 standard for metadata creation largely follows AACR2 rules for choice of data elements and data extraction, sometimes making variations. MARC 21 is not a new format. From 1994-1997 the USMARC and CAN/MARC user communities worked to eliminate all differences in their two already-similar formats. Compatibility had been a feature of the development processes for both formats for many years. In 1997 and early 1998, updates to the formats were issued that made the format specifications identical. MARC 21, a continuation of both USMARC and CAN/MARC, publishes the formats in one edition under a new name.(5)

MARC 21 for Information Representation

The MARC 21 format is a standard for the representation and communication of bibliographic and related information in machine-readable form.

A MARC record involves three elements: the record **structure**, the **content designation**, and the data **content** of the record.(6)

a. The **structure** of MARC records is an implementation of national and international standards, e.g., *Information Interchange Format* (ANSI Z39.2) and *Format for Information Exchange* (ISO 2709).

b. Content designation, the codes and conventions established to identify explicitly and characterize further the data elements within a record and to support the ma-

nipulation of those data, is defined in the MARC 21 formats.

c. The **content** or data, of most data elements is defined by standards outside the formats, e.g., *Anglo-American Cataloguing Rules, Library of Congress Subject Headings, etc.*

MARC21 has made provision for electronic resources. In the case of online resources the field 856 is assigned. Field 856 was defined in the USMARC Bibliographic and Holdings Formats to contain information that identifies the electronic location of an item, including enough information to retrieve the item. When it was defined in early 1993, the Uniform Resource Locator (URL) was not an accepted standard and the World Wide Web was in the early stages of development. As institutions began to use the new electronic location field, they began to discover various applications of it. The specifications for the field 856 as given by the latest MARC21 manual (7) are discussed below

Field 856 in MARC 21

Field 856 in the MARC 21 Information formats is used for Electronic Location and Access information to an electronic resource and contains information related to the resource. The field may be used in a bibliographic or holdings record for a resource when that resource or a subset of it is available electronically. In addition, it may be used to locate and access an electronic version of a non-electronic resource described in the bibliographic record, part of the resource, or a related electronic resource. In an authority record it contains the electronic location information about the entity authorized by the record (7)

Content of field 856

The data in field 856 may be a Uniform Resource Locator (URL), which is recorded in subfield $u, or it may parse the necessary locator information into separately defined subfields. An access method, or protocol used, is given as a value in the first indicator position (if access method is email, ftp, telnet, dial-up, or HTTP) or in subfield $2 (if access method is anything else). The access method is also the first element of the URL.

Repeatability

There are many reasons to include multiple 856 fields in records. Following are the most common examples:

- Different access methods (e.g. a document available through HTTP and from an FTP server)
- Different parts of the item are electronic, using $3 to indicate the part (e.g., table of contents accessible in one file and an abstract in another)
- Mirror sites (the same resource is made available at two different locations, often

to facilitate access, perhaps internationally)
Different formats/resolutions (e.g. the ASCII version of an electronic journal vs. the Web page for that journal; postscript and pdf formats etc)
Related items, using subfield $3 and second indicator value to specify.

Field 856 contains the following elements:

Indicators

First Indicator (Access Method). The first indicator contains information about access method to the resource and has values defined for Email, FTP, Telnet, Dial-up, and HTTP. Access methods without defined values may contain a first indicator value 7 with the method indicated in $2.

Second indicator (Relationship). A second indicator is provided to show the relationship between the information in field 856 and the resource described in the record. This may be used for generation of a display constant.

First	Access method	Second	Relationship
#	No information provided	#	No information provided
0	Email	0	Resource
1	FTP	1	Version of resource
2	Remote login (Telnet)	2	Related resource
4	HTTP		
7	Method specified in subfield $2		

- First - Access method
  A value that defines the access method to the electronic resource. If the resource is available by more than one access method, the field is repeated. When recording a URL in subfield $u, the value corresponds to the access method (URL scheme), which is also the first element in the string.

- # - No information provided
  Indicates that no information about access method is provided. This value is used when subfield $u contains a URN and there is no URL recorded. When subfield $u contains a URL and the subfield is repeated with a URN, the indicator value for the appropriate access method of the URL is given.

- 0 - Email

Indicates that access is through the Mail Transfer Protocol (MAILTP).

- 1 - FTP
  Indicates that access is through the File Transfer Protocol (FTP).

- 2 - Remote login (Telnet)
  Indicates that access is through remote login using an application such as Telnet.

- 3 - Dial-up
  Indicates that access to the electronic resource is through a conventional telephone line (*dial-up*).

- 4 - HTTP
  Indicates that access to the electronic resource is through the Hypertext Transfer Protocol.

- 7 - Method specified in subfield $2

❑ **Second - Relationship**
A value that identifies the relationship between the electronic resource at the location identified in field 856 and the item described in the record as a whole. Subfield $3 is used to provide further information about the relationship if it is not a one-to-one relationship.

- # - No information provided

- 0 - Resource
  Indicates that the electronic location in field 856 is for the same resource described by the record as a whole. In this case, the item represented by the bibliographic record is an electronic resource. If the data in field 856 relates to a constituent unit of the resource represented by the record, subfield $3 is used to specify the portion(s) to which the field applies.

- 1 - Version of resource
  Indicates that the location in field 856 is for an electronic version of the resource described by the record. In this case, the item represented by the bibliographic record is not electronic but an electronic version is available. If the data in field 856 relates to a constituent unit of the resource represented by the record, subfield $3 is used to specify the portion(s) to which the field applies.

- 2 - Related resource

  Indicates that the location in field 856 is for an electronic resource that is related to the item described by the record. In this case, the item represented by the bibliographic record is not the electronic resource itself. Subfield $3 can be used to further characterize the relationship between the electronic item identified in field 856 and the item represented by the bibliographic record as a whole.

- 8 - No display constant generated

Subfield Codes

$a	Host name (R)	$p	Port (NR)
$b	Access number (NR)	$q	Electronic format type (NR)
$	Compression information (R)	$r	Settings (NR)
$	Path (R)	$s	File size (R)
$	Electronic name (R)	$t	Terminal emulation (R)
$	Uniform Resource Name (R)	$u	Uniform Resource Locator (R)
$	Processor of request (NR)	$v	Hours access method available (R)
$	Instruction (R)	$w	Record control number (R)
$	Bits per second (NR)	$x	Nonpublic note (R)
$	Password (NR)	$z	Public note (R)
$	Logon (NR)	$2	Access method (NR)
$	Contact for access assistance (R)	$3	Materials specified (NR)
$n	Name of location of host (NR)	$6	Linkage (NR)
$o	Operating system (NR)	$8	Field link and sequence number (R)

The most commonly used subfields are as follows:

Subfield $u = [HTTP URL]

Subfield $2 = Access method when first indicator is 7

Subfield $3: data specifying what URL refers to, if applicable

Subfield $z (Public note):

Commonly used Subfields:

- **$u:** Uniform Resource Identifier (R). The URI, which provides standard syntax for locating an object using existing Internet protocols. Field 856 is structured to allow for the creation of a URL from the concatenation of other separate 856 subfields. Subfield $u may be used instead of those separate subfields or in addition to them. Subfield $u may be repeated only if one location of the digital object has multiple identifiers (URIs). The field is repeated if the digital object has multiple locations.
- **$3 (Materials specified):** Subfield $3 is used to specify to what portion or aspect of the resource the electronic location and access information applies. $3 is used to indicate a portion of the resource is electronic. For example: $3table of contents; $3abstract OR to indicate a related electronic resource which is linked to the record. Example: $3scanned image of photograph

- **$z (Public Note).** Subfield $z may be used for any additional notes about the electronic resource at the specified location. Examples include subscription information or access restrictions. Example for a mailto URL: $zaccess only through password no guest logins OR $zspecify the desired file format for attachments

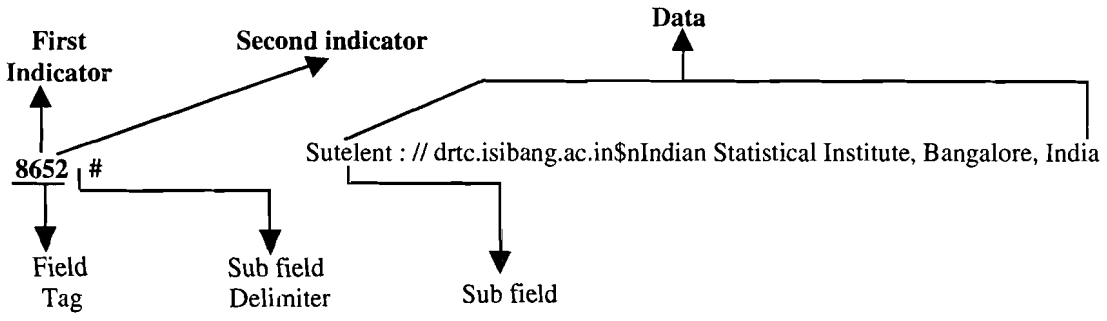
Examples:

Example 1. Information resource by *remote login to DRTC server* is represented using field 856 as shown below.

8562#$utelnet://drtc.isibang.ac.in$nIndian Statistical Institute, India

Here the descriptive elements are given for a remote login resource where the IP address of the DRTC server is "drtc.isibang.ac.in" and the actual address is "Indian Statistical Institute,India".

Figure:1



Analysis of the description given in Figure 1:

Field Tag: 856
Indicators: 2 Access method telnet
Blank(#) Relation not specified

Subfields: u URL
n name of location of the host

Subfields delimiters: $

Example 2: If the resource is a *downloadable archive* on DRTC server it may be represented as below:

8561#$uftp://drtc.isibang.ac.in/software/downloads/ida.zip$cdecompress with winzip$madmin@drtc.isibang.ac.in$nIndian Statistical Institute, Bangalore, India$oWindows$s1.52MB

Example 3: The resource *DRTC website* may be described as shown here:

8564#$uhttp://drtc.isibang.ac.in$madmin@drtc.isibang.ac.in$Indian Statistical Institute, Bangalore, India

Example 4: Mirror Sites are sites where information from one is 'copied' or mirrored in the other for ease of access and downloading. Mirror site is one instance where field 856 is a repeated field. An example is shown below

8561#$uftp://drtc.isibang.ac.in/software/downloads/ida.zip$uftp://isical.ac.in/drtc/pub/ida.zip$madmin@drtc.isibang.ac.in$Indian Statistical Institute, Bangalore, India$oWindows$s1.52MB
8561#$uftp://isibang.ac.in/drtc/pub/ida.zip$madmin@drtc.isibang.ac.in$Indian Statistical Institute, Bangalore, India$oWindows$s1.52MB

Example 5: Link to a subset of the bibliographic item; HTTP URL

8564#$3Table of contents $uhttp://drtc.isibang.ac.in/Seminar/digilib/ toc.html

Problem Areas:

There are several constraints to cataloguing internet resources though there are quite serious initiatives that started and are working towards this objective. Howarth (8) catego-

rises the issues that arise into three:

- change in media
- drastic change in users' approach to information
- change intermediary role in bibliographic description to authors or creators themselves (they should also become metadata creators for their documents)

There are several issues in the decision making regarding which cataloguing rules to apply to internet resources, defining an information unit or item in Internet environment etc. The problems that figure prominently are summarized below:

a. Which rules to follow?

MARC21 has adopted the AACR2 rules of cataloguing in the choice of data elements and their order and presentation. But the compatibility of the stated AACR2 rules used for Internet resources has to be studied in detail to decide upon the extent of their applicability. Description of monographs and books itself had elusive data elements and sometimes the values had to be supplied by the cataloguer. Now with unwieldy information resources such as web documents several challenges arise. More often than not, even the author/creator information is absent whereas in books we were fairly sure to find the author/creator on the title pages.

b. Volatile URLs

The common apprehension which occurs to mind in the parlance of internet resources is their volatile nature. The resources may cease to exist or they may be changed. The problem of volatility of information locators or URLs on the net can be solved to a great extent by implementing 'PURL' or 'Persistent URL'. A PURL can be associated with any given resource/URL. Instead of pointing directly to the location of an Internet resource, a PURL points to an intermediate resolution service. The resolution service associates the PURL with the actual URL and returns that URL to the client, which can then complete the transaction in the normal fashion. In Web parlance, this is a standard HTTP "redirect."

While PURLs allow associating different URLs with them, the PURL itself never changes. PURL are maintained and resolved by an agency. A classic example is the OCLC project on PURLs which provides and maintains the PURL resolver. (9)

c. How to point to a specific part or level in hierarchical and associated resources?

Further, another basic problem that arises when we talk about cataloguing web re-

sources is the definition of the 'information unit' – is it a website, or a web page, in HTML sites. OR in ftp sites which level of the directory in a archive site do we point at? This designation is also a defined URL scheme. Do we consider the most generic address in a location? In that case how do we provide a specific entry point. Should each individual constituent part be treated as a separate unit?

d. Decision on source of information for cataloguing Internet Resources

Secondly what is the chief source of information to be considered for cataloguing purposes. In books and monographs the title page and its verso gives most of the information required while some data must be taken from other parts also. But in Internet resources it is most common data such as author, date of publication are seldom mentioned except if they are online books and articles. There are directives by exercises like Dublin core elements to describe the documents but the question arises how Internet documents come with such metadata? But it is the case that documents are hosted from several hosts in several ways and forms. The responsibility of describing the documents now lies with the creator the documents. At the moment, it rather far fetched to hope that every Internet resource creator will first learn how to describe the documents and also do it!

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Literature Searching: An Intrinsic Part of Scholarship

Swapna Banerjee* Bhubaneswar Chakrabarti**

Literature Search – an integral part of scholarship can also be captioned as a process. Any discipline may hold good with the above as a scientific method. In surveying a field whether tertiary or secondary, from the general to the specific this method will be applicable with ease. In literature search, there are various steps which have been discussed. The locating devices to identify the literature relating to a subject are sought after. An example of literature searching in library and information science has also been incorporated.

Introduction

It is vital for researchers to know what has already been done in their fields. They learn this by turning to records of observations and experiments of their predecessors. This record of earlier work on subject is known as its literature. Locating this information is called making a literature search.

What is literature search?

Literature searching is a procedure by which the searcher tunes in on the scholarly discussion at the level of generality corresponding to the familiarity of the subject and then follows the discussion through clear analysis of more specific matters to reach the level of problem. Often the literature search becomes a paramount importance, for in place of personal experience, the new researcher relies on the experience of others, as reported in the literature. Examination of other research in which the same or similar phenomena have been explored increases one's confidence that the data being reported are reliable.

Searchers of Literature

Literature search may be carried out by different type of users at different times. The user could be a layman who needs information to satisfy this curiosity, a student who needs more details than provided by the textbook, a technical worker who needs the information to perform a certain task, or a research worker embarking on a new area of re-

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search. Every time the nature, extent and depth of information will be different depending on the requirement of each category of user.

Literature search: the steps

Literature search comprises a number of steps; the first and foremost being ascertaining the purpose, scope, depth and precise field on enquiry. Once the parameters of a query is fully understood, a proper search strategy can be easily chalked out.

Appropriate selection of sources is a very important item in literature search. Searching in primary sources, searching in secondary sources or searching in other sources are very essential things. Taking notes of references, and presentation of results are the other effective items in literature search.

Literature search:as an aid in conducting research Reading around in the literature

There simply, is no substitute for 'reading around' in the relevant literature before beginning a qualitative research project.

Reading the literature has many good effects.

These are: -

i) If others have done research on similar or related topics, this can help confirm that an appropriate topic has been chosen or that the topic has been overworked and should be changed. Alternatively, if nothing even remotely similar has been done, this may mean that the field is wide open and awaiting attention, or perhaps too difficult and be avoided.

ii) The literature search can aid in focusing the topic, as other studies show what is known and unknown about a topic – a chosen topic should aim to fill the gap, or at least put a new complexion on existing research.

iii) The search should assist in developing a research design and choosing an appropriate methodology. If others have succeeded in using certain designs and methodologies to investigate a similar problem, then this can confirm what one intends to do. Sometimes choosing an unconventional method can provide significant results. Certainly, reports of failed designs and methodologies should indicate what to avoid.

All of this means that the researcher will be influenced by what others have done, but this contributes to the assumptions that guide any good research.

Thus an important aspect of research planning and proposal writing is *literature search.* An investigator must possess a thorough understanding of the knowledge that has already been produced related to the subject to be investigated. During a literature search, published information relating to the subject of an inquiry is identified, located, and analyzed.

Research workers are helped by this literature search to regard their planned studies as parts of larger investigative efforts about a particular subject or problem area, rather than as isolated inquiries. Literature search often assist research workers to delineate research problems, to identify previously overlooked materials and information, to choose appropriate methodologies for solving problems, and to become more aware of theoretical implications surrounding queries.

The Route from general to specific

The most comprehensive, generalized, and many-sided account of a subject is apt to be that presented by a scholarly encyclopedia.

The history of a discipline conveys " what is known" at another level. From the historical perspective, existing knowledge is viewed as the outcome of the scholarly effort as it has developed over time.

The textbook represents yet another approach to synthesis. It formulates a systematic body of explanations and definitions derived from the past research effort. An essay collection performs the similar function.

All of the above focus on "what is known" in the form of solid, well-recognized and widely accepted ideas. Another group of works convey the scholarly discussion with closer attention to the outer boundaries of existing knowledge and the ongoing research effort.

The handbook characteristically summarizes current activity in a research field, and examines the status of questions of current interest. As a result its approach to a topic tends to be more fragmented than that of an encyclopedia or textbook. But handbook gives more stress on the specifics of data and methodology and to the unsolved problems and contentious issues engaging the interest of researchers.

Similarly, the periodic, stock-taking review considers the ongoing research effort, outlining its directions and accomplishments and the issues of major current interest.

The review article represents a more limited and detailed level of approach to what is known. It examines and weighs the evidence from a body of research in quite specific terms and proposes conclusions that may be drawn. Such reviews often reveal gaps in available knowledge and indicate directions for further research.

Finally, the reports of individual studies view "what is known" with emphasis on newly acquired knowledge proposed for addition to the existing stock. Thus the research reports are the gateways through which new information and ideas enter the system, to

combine and interact with what is already existing and, potentially, to produce changes in what has been set forth all the way back up the line to the generalized formations of textbooks and encyclopedias.

This route from the general comprehensive account of what is known about a subject to the detailed studies of single instances, is the basic pattern of information seeking in scholarly literature. This is not to say that every search must traverse the full gamut of publications from encyclopedias to research journals, with all intermediate steps. Only a portion of the sequence may be involved on any particular occasion, even though the basic pattern and direction are essentially unvarying.

The portion of the literature to be traversed in a given instance represents the distance from where the searcher is, in terms of his prior knowledge, to where he wants to go. The point at which a literature search ends is determined by what the searcher wants to know. That is, the reader proceeds along the continuum from more general to more specific publication forms until he reaches the level of detail and specificity corresponding to the question he has in mind. This sequence from more generalized to more detailed accounts can be matched to a corresponding sequence of publication forms, from encyclopedias to journals. The difficulty in practice is that while the array thus presented describes scholarly literature as whole, each component is not necessarily found in relation to every question.

Locating devices

There are several methods to identify the literature relating to a subject. One familiar procedure is to follow up references cited in the works that the reader has already seen. An advantage of this method is that it focuses directly on the problem under consideration. But a major drawback of this method is that the process normally moves backward through time and cannot be used to investigate the subsequent development of an idea. The technique of citation indexing is designed to deal with this problem.

The second means relies on the searcher's memory and personal familiarity with what has been written on a subject. This approach is employed quite often by scholars and can be used only to a very limited extent by students.

The use of bibliographies is another method of locating information in the literature. The "current awareness list", "retrospective bibliography", "guide to the literature" are all important bibliographic tools of scholarship which comprise a system whose structure and organization parallels that of the scholarly literature.

On-line searching is another effective tool which permits an interaction between the

searcher and the system. The most important advantage of this is that this system gives current, up-to-date information instantly. Indexing and abstracting databases are also nonetheless important in aiding the researcher in literature search process. In addition to searching the literature through abstracting and indexing services, one should scan the footnotes in retrieved papers to find other related publications; such citation analysis often points to older materials missed in a search of current databases.

Literature search in library and information science

An example of literature search in library and information science is cited below. 'Library Literature", an H.W.Wilson Company author and subject index to selected library science materials, is among the most useful sources for locating relevant contemporary literature. When searches are needed for retrospective or historical information, the indexes like "A Bibliography of Librarianship" by Vosburg (Library Association, London, 1934); Harry T. Cannon's "Bibliography of Library Economy" (American Library Association, Chicago, 1927); "Library Literature" 1921-1932 (American Library Association, Chicago, 1934) may prove useful. Theses and dissertations are also valuable sources of research information. The "Library Quarterly", a research journal published at the University of Chicago, features an annual list of accepted library science dissertations, usually in the October issue. The "Journal of Education for Librarianship" also provides a list of approved doctoral dissertation topics. Apart from this, other bibliographies of library science thesis and dissertations prepared in past years are available for conducting literature searches. These include "Library Science Dissertations: 1925-1960"(U.S office of Education, Library Services Branch, 1963); David H.Eyman's "Doctoral Dissertations in Library Science"; Magnotti's "Master's Theses in Library Science", 1960-1969"(Whitson Publishing Co., Troy, N.Y. 1975) are worth-mentioning.

Other specialized reference tools which have also proved to be valuable for literature searches are "Advances in Librarianship" (Academic Press, N.Y,1970); "Annual Review of Information Science and Technology" (1966- Publisher varies), "Encyclopedia of Library and Information Science" (Dekker, New York, 1968-, and now available on-line); The ERIC Educational Documents Abstracts" (CCM Information Corporation, New York, 1974), Australian Library and Information Science Abstracts" (ALISA).

Other helpful journals in this field which needs regular scanning are "College and Research Libraries", "Journal of Academic Librarianship", "Library and Information Science Research", and "RQ", perhaps not surprisingly in view of the predominance of the quantitative paradigm in information science research, such respected journals as "Library resources and technical services", and the "Journal of the American Society for Information Science" contain much value to the qualitative researcher. Some journals not directly related to the field are worth considering, like "Internet Research."

Conclusion

The essential message of the foregoing discussion is that literature searching is an intrinsic part of scholarship and should not be regarded as extraneous, mechanical core. In any actual practice the steps to be followed in literature search would depend a great deal on the character of the question, the extent and depth of the inquiry, and other matters, even though the basic procedure and its underlying rationale would remain much the same. A significant consideration would be the adequacy of the bibliographic resources relating to the subject in question.

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Museum Library and its Utility

Binod Bihari Das*

Furnishes the meaning, types and functions of the museum. Highlights the role played by a museum library to supplement and complement the functions of a modern museum as a centre of education and research. Explains the trinity in museum library – collection, users and staff. Information services to be provided in a museum library are discussed. Suggests to pay special attention to the organization and development of libraries in all the museums in India.

Introduction

Museum is a specialized institution with an objective to promote study and research on the past and present culture on the basis of its collected objects and to act as an educational centre to the public at large.The history of museum through the ages is linked closely to the history of society and to the evolution of knowledge.

The notion of a museum springs from the passion for collecting which is deeply rooted in human nature. Most museums owe their origins to the personal pleasure derived by the people who amass the collection. Since society became organised, museums accordingly are organised for cultural, educational and other uses of their treasures.

There are many kinds of museums. They all collect, preserve, study and exhibit objects. Within the framework of the basic functions they differ widely what they do and why they do it. The varying character of the museum is due primarily to the different kinds of tangible objects in their possession.

But now, two words are to be defined here – 1) **Museology** is the branch of knowledge concerned with the study and of the purposes and organization of museums. Another word 2) **Museography** is the body of techniques related to museology.

Museum : definition

In classical times, the word 'museum' derives through Latin from the Greek 'mouseion'- seat of the muses and is defined as place dedicated to the muses and to study, where one engages oneself in noble disciplines. As there are many kinds of museums and they offer so many different kinds of services, it is hard to define the word 'museum' with

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the single statement. However, the definition adopted by AAM (American Association of Museums) serves our purpose. According to AAM, a museum is ..... *an organized and permanent nonprofit institution essentially educational or aesthetic in purpose, with professional staff, which owns and utilises tangible objects, cares for them and exhibits them on some regular schedule.*

After the World War II, the ICOM (International Council of Museums) was established under the auspices of the UNESCO. International co-operation of museum personnel and sharing of experiences and ideas through meetings and conferences of ICOM become a regular feature. It creates an awareness of the museum personnel regarding their public and social responsibility. The museum authorities have now become conscious of the dictum – *Museum for all.* According to modern conception, the museum is an institution, which assembles, studies, takes care and conserves the objects representing nature and man in order to set them before the public for the sake of information, education and enjoyment.

Museums : Types

- General Museum / Multipurpose Museums
- Children Museum
- University / College Museum
- Art Museum - Art galleries, Portrait galleries, Modern Art Museum, Folk and Craft Museum
- History Museum - Archeology Museum, Site Museum, Personalia Museum, Palace Museum, Memorial Museum, Period House Museum.
- Science Museum - Natural History Museum, Geological Museum, Botanical Museum, Zoological Museum / Garden, Anthropology Museum, National Park, Aquarium, Health Museum, Desert Museum, Planetarium, Industrial and Scientific Museum, Scientific- Centre etc.
- Specialised Museum – Agriculture Museum, Rural Museum, Postal and Philatetic Museum, Music Museum ,Theatre Museum, Sports Museum.
- CYBERSPACE MUSEUM – It is a heterogeneous and cosmopolitan network of museums being put together by using the pavilions of the World Wide web.

Due to globalisation of Museums and electronic revolution, exchanges of ideas and resources, comparative study, access to any resource of any museum and interaction between the museums in the World are possible through Cyberspace Museum. This new type of museum is named "virtual museum" which is product of extraordinary technological achievement. Appearance of virtual museum is an indication for socializing and globalising the museums. In a real sense, it is not a conventional museum possessing material objects. It is in reality a storehouse of computerized pictures and information, related to the registered museums stored in the Internet. This has made it possible for a person to sit anywhere and become acquainted with the immense treasure, accumulated in different museums.

Museum : Functions

There are three basic functions of Museums : 1.Collection, 2.Study, and 3.Communication.

1 **Collection**

Objects come to museums by gifts or by request. Objects are purchased. Objects are collected by field expeditions. Objects are obtained by exchange of items from one museum to another museum.

Collection responsibility does not cease upon acquisition. Collections are 'curated', maintained in order that they may least and organized in order so that they may be used efficiently.

Storage areas provide security from theft, vandalism, insects, rodents, and fire. For many classes of objects, storage provides controlled temperature, humidity and clean air. Constant inspection and application of conservation techniques are essential particularly in case of Artworks and History Collections etc.

2 **Study (Research)**

The second basic function of the Museum is *study*. Study in a museum is spoken in terms of research. The goals of research like other institutions are – 1. the generation of new knowledge, 2. the reorganization of old knowledge, and 3. asking of new questions.

Research is considered as a normal part of the duties of museum people but is not limited to museum staff but often conducted by visiting specialists, or outside research scholars to whom space facilities and access to collection are provided.

3 **Communication**

The third basic function is *communication*. In the museum world, communi-

cation is a synonym for education.
Museum communication takes many forms: displays, lectures, demonstrations, publications, and a myriad of answers to queries by telephone or by letter.
Public galleries, among other things are public access systems in which main communication takes place. Certainly, exhibition is the Museum function – most apparent and most available to the general public.
Most museums are associated in some way with formal education systems in their areas. High School, College and University classes may come to museums on regular schedules for use of exhibits pertinent to their studies under the guidance of their teacher or a staff member of the museum.

Informal education is perhaps the most important educational service of museums. Museums provide visitors with opportunity to see, to become acquainted with and to learn about whatever catches their attention. Public galleries can arouse interest in visitors to spur them to learn more about objects by getting a book from a library or by querying museum people etc.

Publications (popular writings, books, guides, journal articles, magazines, articles in Newspaper etc.) are important communication tools.

Museum Library

The changing concept of the museum as an educational and research center has resulted in the phenomenal growth of museum libraries all over the World .

In order to organize research in museum, it is necessary to employ proper technical staff and research workers, and also to establish well-equipped and well- stocked libraries. Such a library is an essential pre-requisite for the success of a museum as a research and educational institution.

Some National museums of the World also have some of the greatest libraries in the field. The National Art Library and Albert Museum (London) has over 3 lakhs volumes. The well known museums in the United States have large and well-equipped libraries, very few museums in India have really good libraries to meet the requirements of the research scholars.

National Museums (Delhi), Indian Museum (Calcutta), National Council of Science Museum (Calcutta), Salar Jung Museum, BITM (Calcutta), Victoria

Memorial Hall, and Gandhi National Museums and some other museums have good libraries are rendering services to its users.

Objectives of Museum Library

a) To build up an intensive and judiciously selected collection of books, journals and non-book materials relevant to the special collection of the museum and to make it readily available for use through an efficient service.

b) To promote research by providing reference and assisting researchers to get their desired literature.

c) To compile special bibliographies and to render information services.

d) To arrange inter-library loan facilities with various libraries.

e) To answer the specialized information queries of museum staff and the research community at large.

f) To provide necessary forum for self-study by curatorial staff and keep them abreast with the latest research in the special fields.

g) To satisfy the curiosity of the visitors about the knowledge of the specific museum objects.

Trinity in Museum Library

Like other libraries, a museum libraries consists of :

1. Document collection, Users / Clientele, and Staff / Personnel.

a) Document Collection

In order to cater the information needs of the museum departments to satisfy the curiosities of the visitors and to meet the varied in-depth information requirements of the research scholars, the museum library should have sound collection of standard works of research value on all subjects covered by the museum as well as on allied subjects. The library collection should be balanced up-to-date and quite comprehensive in the field of its specialization so that all authoritative works on various subjects should be acquired. The collection should consist of basic reference tools, such as-Encyclopedia, Yearbook, Directories, etc. and also of the reference materials required for research.

A museum library holds not only rich-collection of books and journals but also pictorial materials such as photographs, coloured reproductions and slides for educational and research purposes. A representative slide collection is indispensable for illustrated talk. Discourses on art history only become effective and meaningful when they are properly illustrated with the help of coloured slides. Similarly, when the photographic reference file of unique works of art in various collections is not easily accessible, a good collection of coloured reproduction of superb masterpieces of art will be of help and real value in the library.

b) Users of the Museum Library

Users of the museum library usually consist of

(i) Curators & technical staff of the Museum .
(ii) Internal Researchers of the Museum.
(iii) External Researchers or Visiting scientists / visitors.
All these users are interested to gather more information on the varied subjects on the collection of the museum.

c) Librarian and Library Staff of the Museum Library

They act as the interface between the documents or information and the users. They are to be technically equipped to collect, to organize, and to disseminate the information or documents exhaustively at the proper time. They must have fair knowledge about the collection and objects of the museum. They must be fully aware of the information seeking behavior of the museum people so that they can anticipate the information needs of the users. On the other side they must be professionally equipped to operate the information dissemination techniques manually as well as with the application of information technologies.

Information Services of Museum Library

The mere size of the library collection should not be the main factor in evaluating its importance. The quality of services and the types of clientele served by the library rather than the quantity of books should merit major consideration.

a) As a special library of the particular administration it serves the officers of that administration, the staff of the museum not only by providing a reference collection but also by responding actively to their specialized information needs.

b) The maintenance and servicing of photographic articles, slide collections, picture collections and pamphlet files are only a few of the documentation activities that go on in the museum library.

c) The books, journals and other types of documents are to be provided at the time of need: if needed through inter library loan or any other systems.

d) The special bibliographies on the various subjects on which the researches are going on in the museum, are to be compiled on demand and also on anticipation.

e) List of new additions in the library should reach to each user.

f) The museum library might gather information from the publications that come into library daily and on the basis of reander's profiles disseminate it selectively to staff members. This may be SDI (Selective Dissemination of Instantly) to the researchers.

g) A "current content" information services may be provided to the museum people to some extent aggressively involving some indexing and abstracting of periodical articles or through mere xerox of the content pages of the journals received currently on monthly basis.

h)A state-of-the-art report / a trend report on the subjects of research may be provided – this type of aggressive services may create more demands of the use of the museum library.

i) Now the challenge of museum education is not to increase the number of visitors but to deepen the experience the average visitor receives. Any such campaign is bound to involve library on many levels. Reading is indispensable in any serious effort to deepen understanding.

j) Small topical collection of books might be placed in the middle of a sequence of galleries. They would induce the visitor to deepen his understanding of what he has just seen and lead him to the library for further study.

k) Reprographic Services, micro–film reader services and translation services may be provided.

l) With the application of the information technologies the museum library could be computerised. This would enable networking among the museum libraries in the regional as well as national levels, and they may avail the facilities of international networking in this field.

Utility of a Museum Library

a) As the museum library supplements and complements the functions of a modern museum as a living centre of education and research, the great museums have become the holders of some of the greatest libraries in the world.

b) Museums all over the world build up libraries with special collections of

books and non-book materials so that they may be able to play their role as research and educational institutions successfully.

c) Unless a museum promotes and conducts research in the materials that it possesses and brings out the qualities inherent in them and publishes proper publications namely, guidebooks, handlists, catalogues, monographs, memories, journals etc., it cannot project its collection, their importance and significance as valuable resource materials for advancing knowledge.

d) For the museum curators and other professional staff, a museum library is a sure means of keeping abreast of studies undertaken in their fields throughout the world and the latest advances in the subjects of their specialization. To them, the museum library provides a forum for self-study.

e) It may be said that the museum library should make the museum a dynamic institution by lending academic support to it its programmes.

Conclusion

A museum library is indispensable for the success of the museum as a research institution as well as for the success of its educational mission. No museum is thinkable which does not own a collection of books and journals and other materials for use of the staff and other users. Museum library should be well equipped with rich collection of books, journals and other materials on the subjects covered by the museum as well as on allied subjects, and also with the technically sound staff with good academic background of the subjects of the museum and service bent mind. For this, adequate budget should be allocated. Museum library should avail the facilities of the networking with the application of IT and render various specialized information services aggressively to its users. It is hoped that all the museums in India should pay special attention to the organization and development of their libraries so that they would be able to play theproper role as the dynamic centres of research.

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Gateway Library

Ratna Bandyopadhyay*

Explains the concept of Gateway Library (GL). Characteristics of GL derived by its definitional analysis are furnished. Compares GL with other modern types of Library (Polymedia, Digital, Electronic and Virtual Library) highlighting the additional benefits that the GL can provide.

Introduction

Technology has become a fact of life. It has changed the concept of time. As computers retrieve information very fast, users expect speed in all aspects of their lives. Nowadays it is possible to use global credit cards in any currency. One can send any important document to anywhere in the world through the Internet. Libraries are also adopting technology for providing improved services and reducing costs. Users want to get what they want at any time. Uses are now using online catalogues that allow them to enjoy flexibility in using keywords and combining terms. They are now enjoying the speed of searching databases on CD–ROM. The users of the library are now waiting to be introduced to the world of information. Users are now expecting full text of the document through the Internet. Now we are supposed to inform our users what and how information can be accessed through online search. All these would add to the utility of the library. The traditional role of the library has been changed with the application of information technology. At one time the library was considered as a repository of various documents on different subjects. In the next stage the library was considered as a centre providing services based on information content of the documents. At present the library is supposed to obtain information from anywhere in the world to meet the demands of the users. The library is also facing the problems of information explosion, increasing complexity in the nature of information and proliferation in the media in which information is being stored. To cope with these problems and satisfy current users' expectations the concept of gateway library has developed.

What is the Gateway Library ?

> *Gateway is a metaphor for access to knowledge and evokes the image of crossing a threshold and entering a dramatically expanding world of information and learning. The library, as gateway, is the means by which students and faculty will locate and use this information. The gateway we envision is the constellation of services, the organization required for providing these services, and the spaces dedicated to student learning. (1)*

The gateway provides a single, convenient, uncomplicated entry point to a carefully selected library of bibliographic, full-text, and numeric information.(2)

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The following attributes are found by analyzing the definitions of the gateway library:

(i) The gateway library emphasizes on access to vast sources of information especially electronic information with the help of electronic means. It can also be said to be a method of organizing services even in a decentralized environment.

(ii) To provide access to these resources and thus to make research and study more effective the gateway library coordinates different services. It helps to locate the right information from increasing mass of information.

(iii) This type of library is also supporting students' learning by providing flexible physical space for individual and group study and by catering other facilities that are needed by the academic world to make their research work effective and qualitatively better.

(iv) As an organization the users in this gateway library will get general assistance and instructions along with specialized services.

By studying the above characteristics of the gateway library and by comparing other modern types of library we can see the additional benefits that the gateway library can provide.

Polymedia, Digital, Electronic, Virtual and Gateway Library

The polymedia library can be defined as "..... institutions that store information and knowledge using a wide variety of media types." (3) These libraries contain conventional books along with information contained in different formats like audiovisual materials, microforms, compact disks, etc.

" The management and organizational processes within polymedia libraries will be...basically manual. The information retrieval processes used in these libraries will also be of a manual nature ..."(4)

The gateway library also stores information in various media but gives emphasis on electronic information and electronic means of access to this information as well as access to information outside the library.

In an electronic library the organization and retrieval of information are done electronically or with the help of automation. Here with the help of computers and networking systems one can get the advantages of online indexes, full-text searching, computerized information retrieval, automated record organization and computer-based decision-mak-

ing, etc. Although the conventional books are present in electronic libraries an important aspect of the electronic library is the move towards electronic storage, retrieval and dissemination of information.

The gateway library is similar to the electronic library in most of the above aspects. In addition the gateway library addresses the problems of research and study by providing flexible physical space for both individual and group study,

" Within electronic libraries it will still be possible to gain access to librarians in order to seek help and assistance relating to library matters. However, attempts will often be made to computerize some of the more routine queries that librarians have to handle."(5)

In this respect librarians of gateway libraries have a much more active role in guiding students. They give general assistance in locating resources. They also help in specific academic programmes like creative learning. Programmes may be arranged to view a play by Shakespeare, still photographs of the play and the text simultaneously.

In a digital library information is stored in digitized form only. *"A digital library is a collection of computer-processible information or a repository for such information."(6)*

In this digital library, information is stored in electronic memory or magnetic tape or optical disk. This type of library does not possess conventional books or information not contained in electronic media. Obviously, information stored in this digitized form cannot be accessed without computers. Digital information can be shared and accessed simultaneously without involving much cost. Two of the main types of documents are: items published in machine-readable form and documents converted into digitized forms from conventional forms.

Users can personally come to this digital library or they can use it from a remote location.

A gateway library contains digitized information as well as non-digital information in a variety of media. It offers most of the advantages of the digital library regarding its digitized collection. However, it must be remembered that till today digitized information is only a small fraction of the total information available. For example in the Library of Congress only about 5 lakh documents are digitized till today out of its total collection of about 11 crore 50 lakh documents. Digitization of documents has to catch up with about 500 years of modern printed materials, 150 years of photographs and 100 years of movies and sound recordings. So, gateway libraries will enjoy for a long time the advantage of not being restricted to a small fraction of documents available as digital libraries are today.

Virtual library is totally dependent on modern information technology. " Virtual library ....is perceived as transparent, will have transparent physical facilities and transparent librarians."(7)

Without physically visiting a library the user can enjoy the browsing facility of a library and even read a book from anywhere on a computer screen. In a virtual library all information is stored in digital form. In this respect a virtual library is a kind of digital library. But this virtual library is a library without walls.

A gateway library lays great stress on the flexible physical spaces it provides its users and uses the physical space in a variety of ways to support the students' research. This aspect is missing in a virtual library. A virtual library is restricted to only documents available in digitized form just like a digital library. The advantages of a gateway library on this point has already been explained above.

Benefits of Gateway Library

Nowadays the world of information has become very complicated and information is contained in various formats. Information overload and not information deprivation is being recognized as the problem. The continuous development in the field of information technology and the problem of information explosion need expertise. Information stored in various formats ask for the attention of the professionals. The gateway library takes care for developing specialization among its staff.

Gateway library is considered as a part of the international research community. A scholar's success will be measured in terms of his ability to identify, and use effectively the needed information. The Gateway library helps the scholar in locating, evaluating and organizing information. The librarian of the gateway library is also helping the users to filter out the excess information and find out the essential information. This type of help is needed to steer in this unruly world of information and to conduct research work effectively. Thus the gateway library may be called a *teaching library*. Gateway library can also be called a place of learning where the librarian helps the users at all levels in identifying and assessing the right information. In this type of library information is to be provided to the user in the format that will best serve their need. For example, census data are required to be served in a form that will help in the computerized statistical analysis. The gateway library can take the initiative to develop cooperative collection building and resource sharing activities also. This gateway library is supposed to deliver interlibrary loan services even to users' desktop computers.

While handling the information the gateway librarian should acquire expertise in diagnosing information problems and thus they may be called the 'practitioners of clinical informatics'. The librarians of the gateway library are considered the agents for consumers in the commercialized information market. They are also organizers of information communities.

The development in telecommunications and in electronic information is changing scholars' learning and research process. Librarians should acquire a better understanding of the various learning processes in order to help the users more efficiently. Now we are paying money for purchasing electronic access to various databases that will not exist as objects in the library's collection,.

This library also invites discussions among groups and individuals. It supplements the traditional library by providing flexible atmosphere for interactions and multimedia technologies.

The Mann Library at Cornell University is a gateway library. It has received the first

ALA /Meckler Library of the Future Award. It is called the Mann Gateway. Since 1991, it is being used at workstations within Mann Library, and elsewhere on campus, at home, or anywhere in the world with network access. Mann Library's print collection has also grown. The use of electronic information has not made the print based information obsolete. Both the in-library use and circulation has increased. The availability of more databases in various formats has contributed to higher volume of reference questions. Questions come from the regular users as well as from the remote users. Reference librarians have trained themselves to answer these questions effectively. The librarians/ library workers have adopted the new skills required to offer new services. They are also organizing instruction programmes to teach skills to use new media of information. Harvard University library is another example of a gateway library.

Conclusion

Information is changing our society. It is expected that the future society will be virtual. All communications will be in electronic form. The social contacts, personal meetings will all be challenged and replaced by teleconferencing, teleworking and telelearning, etc. Development in telecommunication is now giving birth to global village. Expert systems for libraries are now being developed. But that will not replace librarians. These systems will enable librarians to engage themselves in more professional work. Libraries should be prepared by developing strategic plans to cope with significant external forces.

For a long time libraries are maintaining archival records of information. Hope libraries will continue to perform this role . Some users may feel comfortable to use a conventional library containing printed materials as a major part of its collection. Others will prefer to use a virtual library. The gateway library provides a balance between these two.

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A Bibliometric Study of the Journal "OPSEARCH" (1995-1999)

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Bibliometric study including the citation pattern of the subjects has been made in this paper by analysing 114 articles from the journal "Opsearch" covering a period of five years from 1995 to 1999. This study attempted to identify the growth pattern of literature both subjectwise and yearwise, authorship pattern, different bibliographic forms of literature, rank list of core journals on the subjects, leading authors and pattern of citations etc in the references.

Introduction

Bibliometrics is nothing but the study of the use of documents and patterns of publication in which mathematical and statistical methods have been applied. It is a quantitative study of the various aspects of literature of a given subject. The techniques of bibliometrics have extensive applications equally in sociological studies of science, information management, librarianship, history of science including science policy, study of science and scientists and also in different branches of social scientists.(1)

Science rests on its published record. Every invention or discovery is an improvement over the earlier one or a reinterpretation of an earlier theory. The importance of citations lies in the distribution of credits and recognition to those whose earlier work has contributed to the development of ideas in different fields.(2)

Citations are the references given at the end of scholarly papers, to the articles of documents previously published. The nature and extent of relation between the article of an author (citing paper) and the references in his paper (cited paper) will vary greatly. Again, the relative merit of a paper can be analysed by observing the number of citations made use of by the paper.(2)

However, the practice of giving citation seems to have started with the advent of scientific journals and the cited paper goes to Derek J de Solla Price and Eugene Garfield. According to Price, each paper carries on an average of 15 citations back to the previous literature.(2)

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Analysis of cited and citing papers can provide many useful information for location and identification of existing and emerging knowledge on a subject. By analysing citations many important empirical laws have been derived. The backbone of citation analysis perhaps rests on the hypothesis that the more an article is cited, the more significant becomes the paper.(7)

However, an attempt has been made in this paper to see a quantitative analysis of the different aspects such as growth pattern of literature, authorship pattern, rank list of journals, bibliographic form of literature, pattern of contribution in citation etc by analysing the papers published in the journal "Opsearch", covering a period of five years from 1995 to 1999.

Collection of Data

The data for this study has been taken from the quarterly journal of 'Opsearch', which is the official publication of the 'Operational Research Society of India', Kolkata. For the present study data were collected from the articles and corresponding references covering five volumes (vol 32-36) from the year 1995 to 1999. Total number of articles covered in this study is 114 and divided into seven broad classes namely, Linear Programming Problem, Quadratic Programming Problem, Inventory Control & Management, Queueing Theory & System, Replacement Problem & System Reliability, Transportation and Assignment Problem, Dynamic Programming Problem.

Objectives

The specific objectives of the present study is to determine :

i. Bibliographic form of literature in references (Yearwise and Subjectwise)
ii. Overall growth of literature (Yearwise and Subjectwise)
iii. Change of authorship pattern
iv. Rank list of authors and journals
v. Length of contributions and number of references cited

Methodology

Articles collected from the journal OPSEARCH from 1995 to 1999 were analysed and divided into seven broad topics namely, (i) Linear Programming Problem, (ii) Quadratic Programming Problem, (iii) Inventory Control & Management, (iv) Queueing Theory & System, (v) Replacement Problem & System Reliability, (vi) Transportation and Assignment Problem, (vii) Dynamic Programming Problem. For the analysis of the growth of literature, data were grouped yearwise from 1995 to 1999. All the entries were ana-

lysed yearwise and subjectwise. The number of authors responsible for a article i.e., single, two, three, four, five & more and anonymous work for each article were analysed both subjectwise and yearwise. Subjectwise and yearwise bibliographic form of literature in the references are also calculated. Rank list of authors and journals were also studied. The length of the contributions in terms of the number of pages were also measured and the articles were also grouped on the basis of the number of references cited by them.

Analyses and Interpretation of Data

1 Pattern of Growth of Literature

This study covered data on the basis of the articles in journal OPSEARCH for five years from 1995 to 1999 as given in Table-1. The result of this study shows that a maximum of 28.07% of articles were published in the year 1999 and a least of 14.91% in the year 1996. Except in the year 1996 the trend of publications in terms of the number of articles published is in an ascending order.

TABLE – 1

Growth pattern of literature

Sl. No.	Year	No. of publications	Percentage (%)
1	1995	19	16.66
2	1996	17	14.91
3	1997	23	20.18
4	1998	23	20.18
5	1999	32	28.07
	Total	**114**	**100.00**

2 Subjectwise Distribution of Literature

Table-2 depicts a subjectwise distribution of the articles into seven subjects. An analysis of data in Table-2 reveals that the highest percentage of publication 23.68% is on the subject Dynamic Programming Problem, 16.67% to Quadratic Programming Problem and Inventory Control & Management, 13.15% to Linear Programming Problem, 12.28% to Replacement Problem & System Reliability, 10.53% to Queueing Theory & System and remaining 7.02% to Transportation and Assignment Problem.

TABLE-2

Subject wise Distribution of Literature

Sl. No.	Subjects	No. of Papers	Percentage(%)
1	Linear Programming Problem	15	13.15
2	Quadratic Programming Problem	19	16.67
3	Inventory Control & Management	19	16.67
4	Queueing Theory & System1	12	10.53
5	Replacement Problem & System Reliability	14	12.28
6	Transportation and Assignment problem	8	7.02
7	Dynamic Programming Problem	27	23.68
	TOTAL	**1141**	**00.00**

Therefore, it may be concluded that the journal "OPSEARCH" covers maximum number of articles on the subject Dynamic Programming Problem.

3 Subjectwise and Yearwise Distribution of Literature

In Table-3 the data were further arranged into yearwise and subjectwise distribution of articles as has been given in Table-1 & Table-2 respectively. This table shows in details the distribution of articles – (a) yearwise in different subjects and (b) subjectwise in different years.

TABLE-3

Subjectwise and yearwise distribution of literature

Sl.No.	Subjects	Years					
		1995	**1996**	**1997**	**1998**	**1999**	**Total**
1	Linear Programming Problem	2	2	6	2	3	15
2	Quadratic Programming Problem	4	3	5	-	7	19
3	Inventory Control & Management	4	4	3	2	6	19
4	Queueing Theory & System	1	1	2	4	4	12

5	Replacement Problem & System Reliability	2	2	2	4	4	14
6	Transportation & Assignment Problem	1	2	-	3	2	8
7	Dynamic Programming Problem	5	3	5	8	6	27
	TOTAL	**19**	**17**	**23**	**23**	**32**	**114**

4 Authorship Pattern

An analysis of the authorship pattern, as has been given in Table-4 indicates that two authors have contributed to 59.65% of the total articles; single author to 20.18%, three authors to 18.42%, four authors to 1.75% and there was no articles in the journal for the said period which were published by five & more authors or anonymous work. This study also reveals that the maximum articles published in the journal throughout five years are by two authors and a least percentage of articles published by four authors. It is also found that 79.82% of the articles are collaborative in nature.

TABLE-4

Authorship pattern

Sl. No.	No. of Authors	Total No. of Publications	Percentage(%)
1	Single	23	20.18
2	Two	68	59.65
3	Three	21	18.42
4	Four	2	1.75
5	Five & More	-	-
6	Anonymous	-	-
	TOTAL	**114**	**100.00**

5 Yearwise Trend in Authorship Pattern

It is evident from Table-5 that from 1995 to 1997 the percentage of single authorship decreased from 42.11% to 8.70%, but in the year 1998 it increased to 26.09%. In the year 1999 it is again decreased to 12.50%. The percentage of three authorship pattern is almost in an increasing way. But the pattern of two authorship is just reverse to the pattern of single authorship, where it increase up to the year 1997 but decrease in the year 1998 and again it increase in the year 1999.

TABLE-5

Yearwise trend in authorship pattern

Sl.No.	Year	Number of Authors						
		Single	Two	Three	Four	Five & more	Anonymous	Total
1	1995	8 (42.11%)	9(47.37%)	2(10.53%)	-	-	-	19
2	1996	3(17.65%)	11(64.71%)	3(17.65%)	-	-	-	17
3	1997	2(8.70%)	16(69.57%)	3(13.04%)	2(8.70%)	-	-	23
4	1998	6(26.09%)	11(47.83%)	6(26.09%)	-		-	23
5	1999	4(12.50%)	21(65.63%)	7(21.88%)	-	-	-	32

6 Subjectwise Trend in Authorship Pattern

An analysis of the data in the Table-6 indicates that individually the trend of two authorship pattern is either equal to or more than that of other authorship patterns and it is highest in case of Transportation and Assignment Problem.

TABLE-6

Subject wise trend in authorship pattern

Sl. No.	Subjects	Number of Authors						
		Single	Two	Three	Four	Five &more	Anon ymous	Total
1	Sub-1	4(26.67%)	8(53.33%)	2(13.33%)	1(6.677)	-	-	15
2	Sub-2	3(15.79%)1	2(63.16%)	4(21.05%)	-	-	-	19
3	Sub-3	1(5.26%)	12(63.16%)	6(31.58%)	-	-	-	19
4	Sub-4	5(41.67%)	5(41.67%)	2(16.66%)	-	-	-	12
5	Sub-5	2(14.29%)	10(71.43%)	1(7.14%)	1(7.14)	-	-	14
6	Sub-6	2(25.00%)	6(75.00%)	-	-	-	-	8
7	Sub-7	7(25.93%)	14(51.85%)	6(22.22%)	-	-	-	27

Sub-1: Linear Programming Problem, Sub-2: Quadratic Programming Problem, Sub-3: Inventory Control & Management, Sub-4: Queueing Theory & System, Sub-5: Replacement Problem & System Reliability, Sub-6: Transportation & Assignment Problem, Sub-7: Dynamic Programming Problem.

7 Subjectwise Bibliographic Form of Literature in References

Table-7 presents subjectwise arrangement of data in different bibliographic forms used in the references in the articles in the journal. Out of the total number of references analysed, 70.92% are journal articles, 23.93% are part of books/transactions, 1.66% are dissertation/thesis, 1.58% are conference proceedings/symposium, 1.19% are reports and remaining 0.71% are technical publication. So, from this table it may be concluded that over 94% of the references are either belong to journal articles or part of books.

TABLE-7

Subjectwise bibliographic form of literature in references

Sl No.	Subjects	Documents Type: Journal	Dissertation Thesis	Conference Proceedings/ Symposium	Reports	Parts of books/ Transaction	Technical Publication
1	Sub-1	86	6	3	3	75	2
2	Sub-2	170	5	3	1	60	-
3	Sub-3	174	-	-	1	34	-
4	Sub-4	87	-	2	1	31	1
5	Sub-5	99	1	1	2	32	2
6	Sub-6	80	8	5	2	17	-
7	Sub-7	199	1	6	5	53	4
	Total	895	21	20	15	302	9
		(70.92%)	(1.67%)	(1.58%)	(1.19%)	(23.93%)	(0.71%)

Sub-1: Linear Programming Problem, Sub-2: Quadratic Programming Problem, Sub-3: Inventory Control & Management, Sub-4: Queueing Theory & System, Sub-5: Replacement Problem & System Reliability, Sub-6: Transportation & Assignment Problem, Sub-7: Dynamic Programming Problem.

8 Yearwise Bibliographic Form of Literature in References

Table-8 represents yearwise distribution of data in different bibliographic forms used in the references. It is evident from Table-8 that about 70% of the references or even

more than that are journal articles. Again there is a tremendous increase in the number of references in the articles are found in the year1999. There is an increasing trend also observed in the number of part of books/transactions in the references.

TABLE-8

Year wise bibliographic form of literature in references

Sl.No.	Documents type	Year				
		1995	1996	1997	1998	1999
1	Journal	183	144	144	168	256
		(74.39%)	(73.10%)	(64.86%)	(68.02%)	(73.14%)
2	Dissertation/Thesis	6	3	-	7	5
3	Conference proceedings/ Symposium	2	3	4	4	7
4	Reports	4	-	3	3	5
5	Part of books/Transactions	47	44	69	65	77
6	Technical Publication	4	3	2	-	-
	Total	**246**	**197**	**222**	**247**	**350**
		(19.49%)	**(15.61%)**	**(17.59%)**	**(19.57%)**	**(27.73%)**

9 Rank List of Authors

Rank list of the authors who have contributed three papers or more in the journal throughout these five years are given in Table-9.

TABLE-9

Rank list of authors

Sl. No.	Name of Authors	No of Papers
1	P. Kanniappan	6
2	M. Maity	4
3	P. Pandian	4
4	A. Behera	3
5	Abha	3
6	Abraham Mehrez	3
7	Chao-Ton Su	3
8	Davinder Bhatia	3
9	G. K. Panda	3
10	G. V. Sharma	3
11	M. C. Puri	3
12	M. N. Gopalan	3
13	S. K. Mishra	3
14	X. M. Yang	3

There are only one author who have contributed 6 papers, two authors who have contributed 4 papers and 11 authors who have contributed three papers during five years under study.

10 Subjectwise Rank List of Journals

The data in Table-10 are organized on the basis of the productivity of journals in the references. Journals on each subject are arranged on the basis of their decreasing productivity. From this table it is possible to find out the core journals on each subject. It has also been found that the journals Opsearch and Operation Research are favourite for most of the subjects. However, here the names of only six journals are taken into consideration.

TABLE-10

Subjectwise rank list of journals

Sl.No.	Subject and Name of the Journals	Frequency of publication
1	***Linear Programming Problem***	
(i)	Operation Research	8
(ii)	Management Science	6
(iii)	Journal of the Operational Research Society	4
(iv)	The Engineering Economist	4
(v)	American Mathematical Society	4
(vi)	Engineering Optimization	3
2	***Quadratic Programming Problem***	
(i)	Journal of Optimization Theory and Application	18
(ii)	Journal of Mathematical Analysis and Application	15
(iii)	Opsearch	13
(iv)	Mathematical Programming	12
(v)	Journal of Australian Mathematical Society	11
(vi)	Journal of Information and Optimization Sciences	11

Sl.No.	Subject and Name of the Journals	Frequency of publication
3	***Inventory Control and Management***	
(i)	Journal of the Operational Research Society	27
(ii)	Operation Research	13
(iii)	International Journal of Production Research	11
(iv)	Noval Research Longistics Quarterly	11
(v)	Opsearch	10
(vi)	Management Science	9
4	***Queueing Theory & System***	
(i)	Queueing System	14
(ii)	Journal of Applied Probability	9
(iii)	Operation Research	6
(iv)	Advance in Applied Probability	6
(v)	Journal of the Operational Research Society	4
(vi)	Computers and Operation Research	4
5	***Replacement Problem & System Reliability***	
(i)	Microelectronic and Reliability	18
(ii)	Management Science	11
(iii)	International Journal of Production Research	9
(iv)	Journal of Applied Probability	8
(v)	Noval Research Longistics Quarterly	6
(vi)	Operation Research	6
6	***Transportation and Assignment Problem***	
(i)	Operation Research	21
(ii)	Opsearch	11
(iii)	Management Science	9
(iv)	Mathematical Programming	6
(v)	European Journal of Operational Research	4
(vi)	Journal of the Operational Research Society	4
7	***Dynamic Programming Problem***	
(i)	Journal of Optimization Theory and Application	30
(ii)	Opsearch	28
(iii)	Journal of Mathematical Analysis and Application	14
(iv)	Journal of Australian Mathematical Society	9
(v)	Academy of Management Journal	7
(vi)	European Journal of Operational Research	7

11 Rank List of Journals

Table-11 shows the rank list of journals on the basis of their productivity and not limited to any one subject. This table also helps us to select any journal for institutions/ associations etc.

TABLE-11

Rank list of journals

Sl.No.	Name of Journals	Frequency
1	Opsearch	70
2	Operation Research	66
3	Journal of Optimization Theory and Application	51
4	Management Science	47
5	Journal of the Operational Research Society	43
6	Journal of Mathematical Analysis and Application	32
7	Noval Research Longistics Quarterly	29
8	European Journal of Operational Research	29
9	Mathematical Programming	24
10	Journal of Applied Probability	22
11	International Journal of Production Research	21
12	Journal of Australian Mathematical Society	20
13	Microelectronic and Reliability	18
14	Queueing System	16
15	Journal of Information and Optimization Sciences	14
16	Bulletin of Australian Mathematical Society	13
17	Computers and Operation Research	11
18	Optimization	10
19	Academy of Management Journal	10
20	Advance in Applied Probability	10

12 Subjectwise Number of Citations in References

Table-12 shows the subjectwise analysis of citations in references. Here, all citations those which are given in references are taken into considerations. Data are grouped

under different classes having an interval of five. From the table it may be concluded that maximum number of citations in references are with in the range of 6 to 15.

TABLE-12

Subjectwise number of citations in references

No.of Citations	Sub-1	Sub-2	Sub-3	Sub-4	Sub-5	Sub-6	Sub-7	Total
1 to 5	2	-	3	3	3	-	4	15(13.15%)
6 to 10	4	11	7	4	6	1	11	44(38.60%)
11 to 15	5	4	6	3	4	3	8	33(28.95%)
16 to 20	3	2	2	1	1	3	3	15(13.16%)
21 to 25	1	1	1	-	-	1	1	5(4.39%)25
>25 -	-	1	-	1	-	-	-	2(1.75%)
Total	**15**	**19**	**19**	**12**	**14**	**8**	**27**	**114(100%)**

Sub-1: Linear Programming Problem, Sub-2: Quadratic Programming Problem, Sub-3: Inventory Control & Management, Sub-4: Queueing Theory & System, Sub-5: Replacement Problem & System Reliability, Sub-6: Transportation & Assignment Problem, Sub-7: Dynamic Programming Problem

13 Subjectwise Length of Contributions

Table-13 shows data from a different angle. It shows the length of article in number of pages. The table depicts that the maximum number of articles has the length between 11 to 20 pages.

TABLE-13
Subject wise length of contributions

Length in pages	Sub-1	Sub-2	Sub-3	Sub-4	Sub-5	Sub-6	Sub-7	Total
<5	-	2	-	-	-	-	-	2 (1.75%)
5 to 6	-	3	-	-	1	-	3	7 (6.14%)
7 to 8	4	2	-	1	5	-	3	15 (13.15%)
9 to 10	4	5	2	1	2	2	3	19 (16.67%)
11 to 20	5	7	17	8	6	5	16	64 (56.15%)
>20	2	-	-	2	-	1	2	7 (6.14%)
Total	15 (13.15%)	19 (16.67%)	19 (16.67%)	12 (10.53%)	14 (12.28%)	8 (7.02%)	27 (23.68%)	114 (100.00%)

Sub-1: Linear Programming Problem, Sub-2: Quadratic Programming Problem, Sub-3: Inventory Control & Management, Sub-4: Queueing Theory & System, Sub-5: Replacement Problem & System Reliability, Sub-6: Transportation & Assignment Problem, Sub-7: Dynamic Programming Problem

From this study it is not claimed that the study is comprehensive but efforts have been made to cover all articles in the journal 1995 to 1999. The effect of negative citation also plays a very important role in citation studies. Because, authors of scientific papers very often cite paper of others with a view to contradict or criticize claims, or findings of their predecessors because of incorrect results or inference drawn by them in their publication. In some cases author gave a long list of citation, which creates problem to the investigator. In the same way excessive self-citation beyond permissible limit may also cause some adverse effect on the reliability of citation analysis. Again ranking of journals based on references and without regard to maintain chronology may not ensure true index of demand and usefulness of scientific periodicals to research workers.

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2 ANNAMALAI UNIVERSITY (Director of distance education). Master of Library and Information Science. Paper –VIII, Lesson: 5, p1-2.

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Geographic Information System: An Overview

Guru Prasad Chattopadhyay*

Geographic Information System(GIS) is basically a computer system capable of capturing, storing, checking, integrating, manipulating, analyzing and displaying spatially reference data with appropriate applications of software. Four basic elements forming the essential structure of GIS are Computer Hardware, Computer Software, Data and Liveware. In recent years information technology has made a rapid progress with the introduction and subsequent application of GIS. With the aid of Remote Sensing GIS can extract spatial information of a wide range of sector and thereby process different environmental management scenarios. The major growth of this system phase began in the late 1980's through the combined effect of development in software and increasing access to a wide range of geographical data in digital form. All types of spatial information system , from that of image-based to cadastral, come under the fields of typical GIS applications. The two fundamental methods of representing topological data are Raster method and Vector method. In order to encourage the nations capable of integrating natural resources data and socio-economic data for development-oriented planning, monitoring and research UNESCO prepared a comprehensive list of guidelines.

Introduction

The present world is changing very fast. Information about the global environment is especially important, and its extraction has been crucial to man's development. The definition of environmental information is determined by its socio-cultural and technological context. *Remote Sensing (RS) and Geographic Information System (GIS)* are two important tools in the environmental studies at the higher level and in the micro – and macro-level planning processes of the country. Remote Sensing and GIS together provided geo-informative support in terms of relevant, reliable and timely information needed for environmental planning and protection as well as environmental development. Through interfacing remote sensing with GIS different environmental management scenarios can be processed.

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Definition of GIS

The term GIS stands for *Geographic Information System.* By a simple definition GIS can be stated as "*A computer system capable of holding and using data describing places on the earth surface*" (ESRI, 1990). Practically there is no universally accepted definition of GIS; however, a systematic definition would be "*...a system for capturing, storing, checking, integrating, manipulating, analyzing and displaying data which are spatially referenced computer databases and appropriate applications software. A GIS contains a number of components namely, i) a data input subsystem, ii) a data storage and retrieval subsystem, iii) a data manipulation and analysis subsystem and iv) a data reporting subsystem*" (Stefanovic et. al., 1989).

Development of GIS in Information Technology

The origin of GIS dates back to the 1960's. However, the major growth of this system phase began in the late 1980's through the combined effect of development in software and increasing access to a wide range of geographical data in digital form. Rapid development of GIS from this time can be attributed to the continuing advances in computer technology and increasing availability of digital data sets.

Over the last two decades the GIS technology has enormous popularity all over the world as well as in our country particularly in the sectors where spatial data are used for planning and development. Spatial data sets on land areas, such as topography, soils, land use, forestry, administrative boundaries, population etc., are generally available at different scales coordinating systems, accuracies and aerial coverage. GIS software systems are making changes in spatial data collection procedures and analytical processes. They assist decision makers by suggesting various alternatives in development and conservation planning and modeling the potential outcomes of a series of scenarios.

Component Information Systems of the GIS

GIS is basically a tool for information science, but it has its special identity for visual aspect dealing with spatial data and associated maps. For this aspect it has a close connection with the technology of computer graphics (computer aided deign or CAD); at the same time with regard to its ability for storage of spatial data. GIS forms a close relationship with Remote Sensing. The information systems that come under GIS are:

- Cadastral information system
- Image-based information system
- Land data system
- Land information system(LIS)
- Geo-referenced information system

- Natural resource management information system
- Market analysis information system
- Planning information system
- Population information system
- Property information system
- Soil information system
- Spatial information system
- Spatial decision support system
- Urban information system
- Global positioning system (GPS)

Application Areas of the GIS

Following are the field of typical GIS application in the present world:

- Automated cartography
- Sub-division design (cut/fill, street and parcel layout)
- Cadastral mapping
- Highway mapping
- Utility facility mapping and management
- Geodesic mapping
- Event mapping (crime, fire, accident etc.)
- Census and related statistical mapping
- Land use planning and management
- Environmental impact studies
- Natural resource mapping and management
- Land information system
- Marketing and relating vehicle routing and scheduling
- Urban and regional planning
- Route selection of highways, pipelines and similar data
- Surveying and engineering
- Mineral exploration

Elements of GIS

Four basic elements form the essential structure of GIS namely: i) Computer Hardware, ii) Computer Software, iii) Data and iv) Liveware (Maguire,1991).

i) ***Hardware*** forms the computer platform. The peripherals required for data input are digitizing table, scanner, graphics accelerator etc., and for data output are plotters and printers and data storage and processing.

ii) **GIS *Software*** may be of various types. They include the file/map processing (e.g.,

IDRISI, MAP), hybrid (e.g., ARC/INFO) and extended designs (e.g., SYSTEM9).

iii) ***Data*** is the third important element. Out of the total cost of implementing GIS data accounts for 70 percent. With the development of remote sensing and progress of national mapping programmes as well as collective international ventures aiming for creating global databases there have been marked problems with volumes of data. Basically database looks at data collection, database orientation, database updating and geographic links.

iv) ***Liveware*** i.e., the people designing, implementing and using GIS is perhaps the most significant element subsequent to the general systems as mentioned above. It is a certain fact that without having properly trained personnel with a genuine commitment to the project in operation little can be achieved under the GIS (Maguire, D. J., 1991).

Database for GIS

The sources of data for GIS operations are of two types: ***a) conventional sources*** *(topo-maps, other text maps, charts and ground information)* and ***Non-conventional sources*** *(aerial photographs and satellite imageries)*. Such large volume of data can be extremely tedious and often hazardous to handle using traditional systems; but using Geographical Information System on the computer can conveniently do it. Data are raw material from which every land information system is generated. They are collected and assembled into records and files. A database is the assembled body of data that can be shared by different users. Geographical data describes the object from the existing world in terms of their i) co-ordinate system, ii) attributes (colour, cost, etc.) and iii) spatial interrelationship with each other. Any data storage system would be maintained in such a way that they should be accessed or cross-referenced promptly.

Topological concepts of geographical data in terms of mapping

For all geographical data there are three basic topological concepts: *a) the point, b) the line, and c) the area.* Every geographical element can in principle be represented by a point, line and area (space) plus a label stating what it actually is. For example, a factory can be shown by a point entity consisting of a single coordinate pair 'XY' and the label *Factory*; a section of highway can be represented by line entity consisting of a starting XY coordinate, an end XY coordinate and the label Highway; a forest can be represented by an area entity covering a set of XY coardinates plus the lable Forest. The labels can be the actual names or they can be special symbols All these techniques as stated are used in conventional mapping.

There are two fundamental methods of representing topological data, which can be summarized as follows:

1) *Raster representation method:* In this method, there are cells located by coordinated, each cell is independently addressed with the value of an attribute.

2) *Vector representation method:* This comprise three main geographical entities – points, lines and areas (see above); points are similar to cells, except they do not cover areas; lines and areas are set of interconnected coordinates that can be linked to give attributes .

Goals for GIS

Goals for the GIS can be stated as : a) to bring about better management of geographical data, b) to lessen data and procedural redundancy, c) to improve access to geographical data for decision making, and d) to make geography a means of analyzing and reporting information.

GIS applications in India

Various emerging environmental issues are now pressing the environmental scientists and planners in India to develop GIS using remote sensing technology. For forest mapping and wasteland mapping the GIS has been of remarkable use over the last decade. However, the lack of reliable and sufficient database appears to be a major drawback for rapid progress of GIS in India till present day.

Some GIS works in India can be mentioned here. Zoning Atlas for location polluting industries for various districts In India has been initiated by CPCB. WWF Biodiversity Conservation Planning and Tiger distribution in India has been done by IGCMC. Watershed case study and Himalayan Environmental Database has also been prepared by GBPIHED

Guidelines by UNESCO for establishing GIS

In order to encourage the nation capable of integrating natural resources data and socio-economic data for development-oriented planning, monitoring and research UNESCO prepared the following comprehensive list of guidelines in 1984:

Guideline 1: A balanced development of the information system as of its components (conceptual base, data collection, storage and processing, as well as analytical capabilities) should be aimed at.

Guideline 2: In order to identify the (potential) users of information, it is suggested that inventories be made of: existing flows and utilisation of data/information, the rel-

evant decision processes and potential information, users at different levels of responsibility.

These ir ventories can be confined to the specific sectors and/or user communities of the information system in question. The emphasis in approach will depend on the orientation of the information system, i.e., general purpose, supply-oriented or function oriented.

The execution of a pilot survey in collaboration with user community may facilitate a subsequent full inventory of the needs of users and meaningful user participation in the envisaged system.

Guideline 3: Before considering the design of information system, the types of utilizations (e.g., research, inventories, monitoring/evaluation, underpinning of informal information) and the required degree of accuracy, precision and resolution in data must be identified.

Guideline 4: Information systems serving a heterogeneous group of clients/users who face different situations should be flexible and adaptable to permit easy inclusion and retrieval of detailed information when needed. This generally requires some standardization of concepts and formats for data collection.

Guideline 5: Information systems for monitoring or evaluation of specific projects and programmes should be embedded in the design of these projects and programmes, whereas more general information system for monitoring or evaluation should be embedded in the management and decision-making structures of the information users.

Guideline 6: Monitoring requires the establishment of set of key-indicators and an information system that can adequately cope with them.

Guideline 7: When designing an information system, the availability of 'informal information' should not be overlooked; indeed, such information should be utilized to the maximum extent possible.

Guideline 8: The design and creation of an information system should be placed in the context of other information systems, existing as well as anticipated. To this end a survey of existing data and of information-handling capabilities and practices should be made before embarking on the design of a new system.

Guideline 9: Decentralised information systems in general have a great potential for facilitating local and sectoral decision-making. Inexpensive data processing technology is becoming available to implement such systems. Decentralisation, however, requires careful formulation and regulation of the linkages between the central unit and the peripheral nodes as well as strengthening of local capabilities.

Guideline 10: At an early stage in the design of an information system, training programmes have to be developed to gurantee the availability of skills. The resources needed for these training programmes must be ensured.

Guideline 11: The envisaged information system should take into account both locally available technology (including hardware and software as well as manpower)and international trends in technological development.

Guideline 12: In parallel with the selection of computer system, a careful strategy for change and adaptation should be developed. Data collection procedures should depend as little as possible on the system's hardware in order to facilitate necessary future changes.

Guideline 13: It is generally preferable that information systems develop within the existing administrative and institutional contexts. It is usually advisable to examine the evolution of manual methods into computer-assisted methods. These improvements show a benefit as soon as possible in order to sustain the confidence and interest of the users.

Guideline 14: The optimal size of the basic spatial units of an individual data set depends on the required spatial precision of the phenomena considered. Relatively large basic spatial units are often acceptable, thus simplifying the sampling procedures needed to collect the appropriate data.

Guideline 15: The optimal level of spatial detail for a geographic information system as a whole represents a compromise with respect to the requirements for each of the individual data sets.
As a means of improving processing and storage efficiency, individual data sets with exceptional degrees of detail can be regarded as separate but coordinated data sets.

Guideline 16: An appropriate method of geographic referencing can only be selected after determining the requirements in terms of treatment of spatial data, the required level of spatial detail and the need to integrate specific sets of spatial information.

Guideline 17: Whenever practical, fully compatible geo-coding schemes should be adapted at the stage of data collection. Otherwise, methods have to be found to transform or adjust the geo-coding schemes applied to individual data sets to permit matching with other data sets as necessary. This question should be considered with care since in specific situations mixed geo-coding schemes can be more cost-effective than having a single scheme.

Guideline 18: An integrated geographic information system may be composed of separate but co-ordinated data sets such having a different method of geographic referencing. Of these date sets, one or more are selected as the basic data set(s), while the others are considered as related data sets. The basic data sets have a stronger influence on the methodology for integrating the various data sets.

Guideline 19: Certain kinds of data sets on natural resources which have a high degree of variation over space and a low decay rate, are appropriate basic data set within integrated information system.

Guideline 20: When integrating spatial data sets which differ in terms of scale and/or detail, care should be taken to inform the users of the inherent limitations of the data.

Guideline 21: The integrated geographic information system should be designed in a modular way. It may prove useful to foresee a common 'data transformation service which may be either manual or automated.

Guideline 22: An inter-agency or interdepartmental steering committee is an effective instrument to plan, monitor and evaluate the development and use of an integrated geographic information system. In such a steering committee both users and producers of spatial data should be represented. The committee should be housed within an appropriate government policy or planning agency.

Guideline 23: To ensure smooth and a continuous operation of the information system, administrative support structures have to be created in the technical, financial, logistical and managerial areas. These support structures have to be carefully planned.

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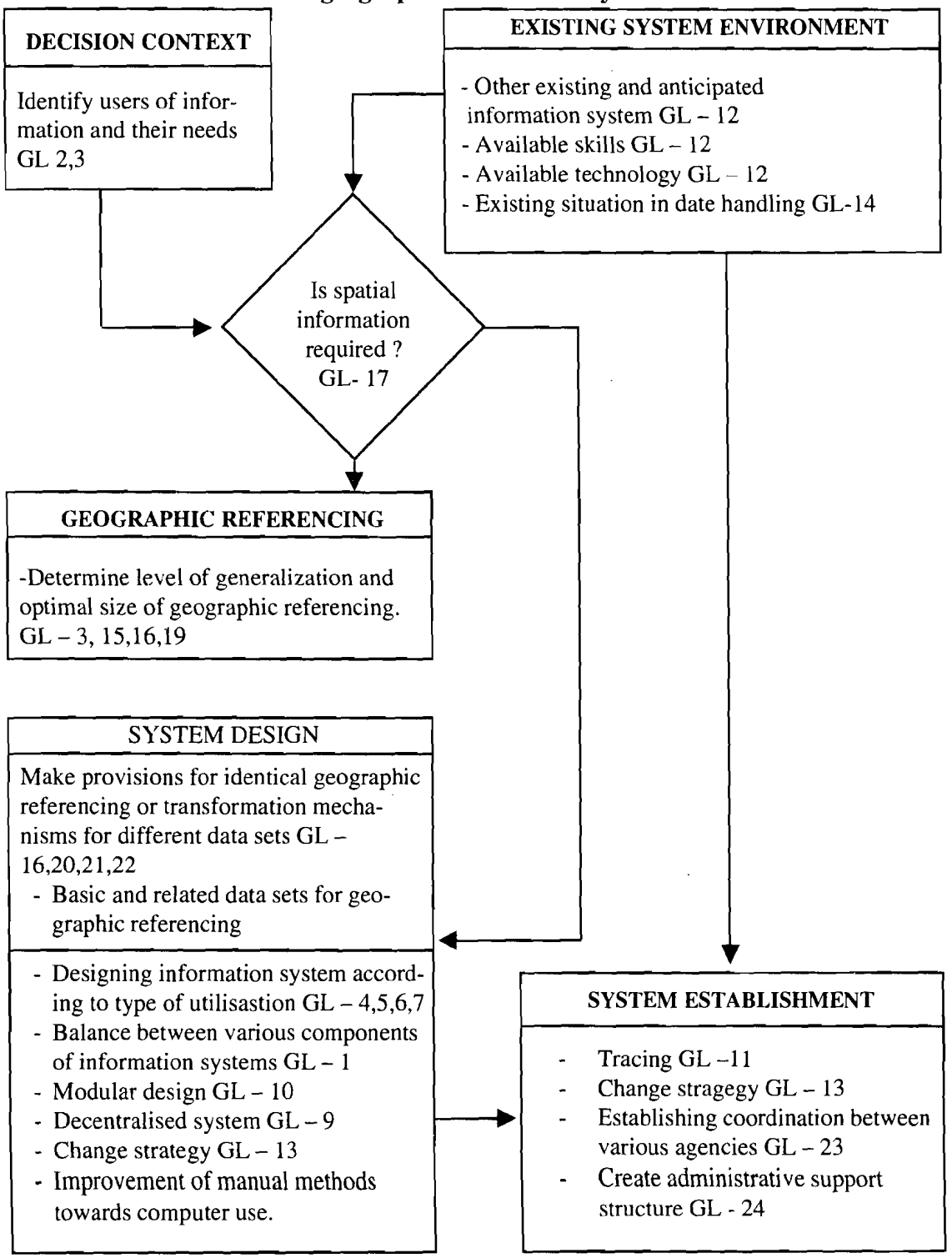
Annexure

Flowchart showing the guidelines (GL) for establishing geographic information systems



Economics Of Information: Some Issues

P N Mukherjee *
Durga Sankar Rath **

Some burning issues regarding economics of information products and services have been discussed here. Fundamental principles of economics, which are applicable in any industry, are applied to decide the magnitude of it. Solution in the cost-effective way have been described keeping in view the real need of the society.

Introduction

Last August we came across an advertisement [1] of an organisation in a leading daily of Kolkata. It says, in India, there are precisely only two ways to regularly come by new books and journals - i) buy them, and ii) join in that particular organisation. The organisation even went further in justifying their claim. According to them, those libraries that subsist on unrealistic membership fees and skimpy aid can't help the cause of the information seekers or knowledge developers.

If we look into the particular scenario of the British Library services in India in the contemporary period, probably another shock is waiting for us. The saga of the British Libraries in Lucknow, Patna, even in Kolkata are quite disheartening. Though people may argue by citing the popular phrase- 'Shape in or Sip out'. They may even describe the encouraging picture of Bangalore or Pune chapter of the British Library Services. Still the totality reveals to us is a bit gloomy.

Let's see the classic example of the reputed Encyclopaedia Britannica and its less known recent origin rival Encarta, the encyclopedia in Compact Disc, produced by Microsoft Corporation. It took a short period for the realization of the management of the Encyclopaedia Britannica - whether their future is really at a stake or not. But by that time market has taken its toll.

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Underlying Principles

All these cases may appear as the isolated ones. Their cause may be crunch of fund, lack of vision, lacunae in providing services; even the easy catchword 'technology' makes the difference in all the aforesaid cases. May be the situations were unavoidable. It requires further introspection to understand the nature of the problems.

The leading principle of the nominalism of William of Occam, commonly known as 'Occam's rozor' that for the purposes of explanation things not known to exist should not, unless it is absolutely necessary, be postulated as existing. Here the philosophic rule that entities should not be multiplied unnecessarily. Here also we believe the basic principles of the economics of information which do not differ much from any other industry.

While discussing the economic state of the present plethora of information it would be wise to think of it in the line of common industry. So we have to understand the phenomena in an industry. The understanding about industry reduces the complex relationships of all firms of an economy to manageable dimensions. Here also we fine three distinct subsystems - Input, Processing and Output in the whole system of information.

As some of the renowned authorities have already described information in the line of industry, we are also obliged. 'Any systematic economic activity often involving manufacture and trade of goods, is industry' as we understand from the dictionary [2] meaning of industry. We also know that like all other production system, in information system we have sound basics and solid foundation of the Applied Information Science - which works from the point of information generation to the point of utilization of the information.

Ultimate Application

Something, which got some usage must have some economic value. It can be measured in terms of money. Though it is difficult to measure information services in quantitative term, still it is not impossible. At least to a large extent we can measure all sort of services in providing information.

Besides that, one thing to be kept in mind - information directly affect the financial position of the consumer. Some sort of information, even the data have the material value - which can make or mar the situation. So the data should be dished out in such a fashion that user can easily interpret it and deduce clear conclusion. Otherwise, it could 'affect them in a more material way - a fall in the value of their house'[3].

In stead of looking into the individual applications, let us have a look -how in the common field of studies Information Science is applied. It would be helpful to gauge economic importance.

	FIELDS	APPLICATION
Information Science	1. Education	Learning & Research
	2. Psychology	Curiosity Thrust for knowledge
	3. Sociology	Information Diffusion Communication Process
	4. Technology	Research Development of Technology packages
	5. Economic	Value Addition to products / Services Marketing Consumer Studies
	6. Law	Case Files, Presentation of thoughts
	7. Mass Communication	Information Collection Processing, Dissemination and Presentation

This is not a comprehensive list, rather only a cross section of the fields and their applications. Much more fields and their various application do exist, that we can easily observe in our day-to-day experience. What are the precise roles of Library and Information Professionals in these applications? We call library and information profession as a 'Calling'. What exactly we are performing? Whether we are adding any value to the point or not. Are we bridging the gap between the source and the application or not? If so, then we can justify our existence. This is what called in semiotics the role of an actant: 'what it does, in essence, what function it performs within a discipline'[4]. In the discussion of pricing we talk on the costing of these services.

Pricing Issues

The frequent discussions on economics of information, invariably rests on the pricing issues. It is told frequently that - nothing comes at free cost, so the user has to pay for it. Now comes the question of legitimate pricing. How the price can be determined? Should it follow the pricing theory of the open market (If it is really uncontrolled!) in the situation

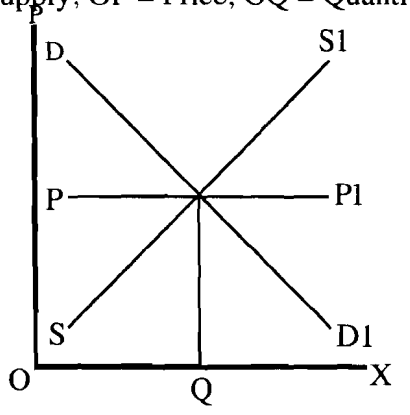
of the Perfect Competition.

The basic assumptions of the perfect competition are large number of information provider and users, homogeneity in service, free entry and exit of the information providers, profit maximisation, no government control, mobility of the factors of services, and lastly the important one–perfect knowledge.

It is clearly evident from the assumptions that in most of the countries the practical situation is different. So when we talk about profit maximisation or cost-benefit analysis of the libraries or information centres, points do not stand firmly. Leaving apart other conditions, if each and everyone is properly informed about the environment - where best is available at the cheapest then only Perfect Competition is possible.

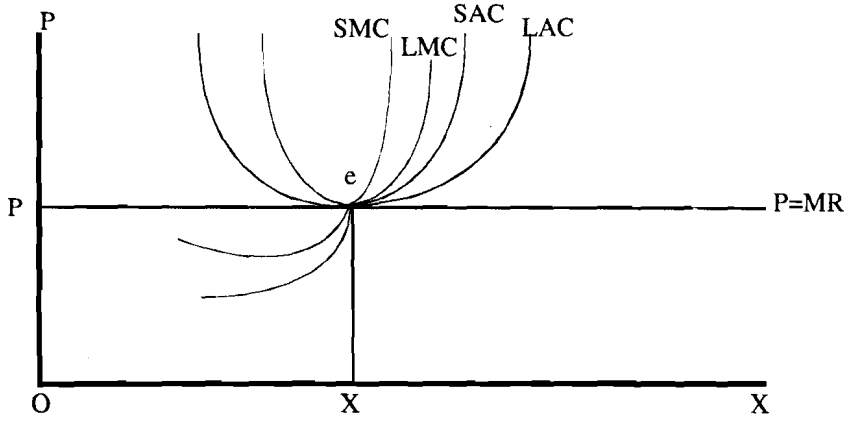
In the following figures:

DD1 = Demand; SS1 = Supply; OP = Price; OQ = Quantity; Equilibrium is at e.



INDUSTRY

For a particular library or information centre price is determined where marginal cost (MC) meets the marginal revenue (MR) and that happens to be the lowest point of the



average cost curve (AC).

Here arises a very crucial question - what is meant by this 'demand'? Is it true or real demand of the users of information or does it need to be backed by the purchasing power of the consumer, i.e., readers or users of information? Whether they can afford to satisfy exact demand? In that case though everyone is need to know the causes and effects of everything and every phenomenon of this universe - they may not have the enough purchasing power (money) to procure these information. Can we afford to laid a large section of the community off, devoid of knowledge and information? And by that way can the society prosper?

Yes, State may come to the rescue of the situation. Government may subsidize the library and information service and allocate the same from the state revenue, considering the mal-distribution of the resources of a nation. Even UNESCO like international organisation can do the same thing.

However, whoever pays, the library and information service is ultimately paid. Hence, the library or information centr is directly earning the revenue fron it's clientele or they are getting it from the Government or other agencies – does not matter much in the totality of the economics of information.

At the same time we require to measure the skills of library and information professionals. It can be through the traditional Job Analysis Questionnaires. The preface of the questionnaire could be like - 'You will be asked about different activities - which may or may not be part of your job. At this stage we are only interested in finding out in what types of activities your job involves and how important they are'[5]. Thus we can evaluate the price of hiring professionals, which involves in measuring total cost.

Some Inferences

Considering the first case cited in the introduction — we have to agree with them to some extent — so far the non-performance of the large number of libraries in India. The major part of our population is covered under the Rural libraries or Unit libraries of the urban area. They do have their budget constraints. They could procure only a little of the massive publication. But one important point to note here is — do they utilize properly, what they posses. Do they take necessary initiation to change the non-library goers to the habitual library goers?

Now-a-days TV network is spread into the most remote village. Internet is slowly getting access even at the furthest corner of the country. If we can relate these technological advancement with our traditional libraries - and judiciously make the services complementary with library services (though situation appears otherwise, i.e., supplementary) probably we can produce the marvel. Along with regular library system, people who uti-

lize technology show increased learning gains and it also assists in increasing motivation to learn and attentiveness [6]. Here the librarians have to cater the needs of common man, solve their day-to-day problem as in Community centres of the advanced countries. Once the culture is developed, once a person becomes elegant user of the library for a very specific need (say, for a particular new publication) he may be able to knock at the right place in right time. The smaller the better, because they are easy approachable. It's a good news that in some parts of India, as in Pondichery, libraries are developing in this line.

Regarding the point we mentioned about the British Library in the Introduction, one thing we are tempted to mention here. Last year British Library chief Mr. Brian Lang was here in Kolkata - for the Fiftieth Anniversary of the British Library of Kolkata. He mentioned that the largest public construction in UK is their Public Library. How can the same people wipe out some of their establishments in India! Is it just by performing the cost-benefit analysis of the respective centres or something else?

About Britannica, the problem is a bit different. Once the proprietors understand that the audio-visual impact is gaining popularity, they could have shifted their onus swiftly towards the multimedia versions in the CD format. Apparently there is no reason - why can't they stand the cut-throat competition from a new entrant of the business. After all, the content is same, only the presentation is different. Besides, complete replacement of the print media by anything is impossible at the present condition. Through print media, they can find the winning edge of the new technology. With their glorious background (huge goodwill) and broad base in the market, soon they can start the damage control exercise.

None can ignore that library and information centres are part and parcel of a society, the yardstick of the development of any civilization. Whether the state adopts the open market economy (if it is really so!) or the economy is engineered by the state, the library and information centres need to survive for the survival of the civilization itself. It is blood for its life, speed and accuracy for its efficiency, creation and recreation of the source of joy for eternity.

All may not feel the necessity, some may consider it as wastage of state revenue (if subsidize) — still there is hope. Even entrepreneurs are there to preserve the information of present generation for the posterity. It is in the form of capsules inside the dark caves. It is the question of understanding the real need. It is very difficult to judge. The dilemma is nicely expressed in the words of the saint-poet Kabir. The vendor of milk has to roam all the lanes and by-lanes to sell it off, but the liqueur monger can do tha same sitting at a corner. One can consider the feeling like emotion. Economists have paid little attention to this sort of emotions. Even in one of their deterministic model [7] says — why one might bring forward an unpleasant experience to shorten the period of dread, get delay a pleasant

experience in order to savor it. Library and Information professionals of developing countries should realize that this is our seedtime and before that we need to prepare our fields also

Conclusion

It is said that the countries which are presently underdeveloped were lacked behind due to delay in their own industrial revolution, but the countries are going to be poor in future, who are delaying in the fray to join in the information revolution. We truly believe that where immediate practical application of information is involved economic prosperity emerges. On the other hand, where practical application of information is remotely connected, those economic activities take a back seat. Economics of information may be slightly different in different conditions, and sometimes misunderstood due to lack of realization in the paramount need of the society — but the economic implications of information is as transparent as the sunlight, even the intoxicant can't ignore.

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