Fourth Semester

INFORMATION SYSTEMS AND SERVICES

Unit wise outline of the syllabus

Unit-1

Information systems: Basic concepts, Meaning, Objectives and Functions. Components of Information System: Structure, Functions and Services, Libraries, Documentation Centres, Information centres, Data centres, Information analysis centres, Clearing houses, Data banks, Data Curation centres, Museums, Memories, Institutional Repositories, Open Archives, Referral, Translation Centres, and Publishing Houses.

Unit-2

Understanding the different systems and their services. Understanding the user communities Identification of user communities; Introduction to the user centered approach to Information seeking behavior. User Education - methods and techniques. User studies.

Unit-3

Study of National Documentation Centres, Information Systems and programmes- NISCAIR, DESIDOC, NASSDOC. Study of International Information Systems and programmes- CAS, INSPEC, AGRIS, BIOSIS, INIS, MEDLARS, ASINFO, COMPENDEX. ISI.

Information policies and programmes. Planning, Design and Evaluation of Information systems.

Unit-4

Information Services- Reference and Documentation Services: Introduction to references services, Examination of reference collection for various types of Libraries. Current Awareness Services (CAS): SDI service. Abstracting service - Abstracting techniques, Types of abstract, abstracting writing (style, content) Abstracting bulletins. Indexing services. Alerting services- List Services and other email based services. Survey of List services in different disciplines. FAQs –Developing FAQs- methods and techniques. Virtual Reference Desk. VRD- Management, technology and resources. The evolution of VRD. Major VRD projects. Virtual Libraries. Developing portals and virtual Libraries. Data mining for Information.

Edited by

Mahesh B.

UNIT - 1

QP-2022: What is information system? Discuss its structure and components.

QP-2021: What is information system? Explain its objectives and function.

QP-2020: State and explain the components of information system

Information system:

Basic concepts: Information systems (IS) are sets of interrelated components that collect, manipulate, store, and disseminate information and provide a feedback mechanism to meet an objective. An information system is a specific type of system that consists of hardware, software, and telecommunication networks to collect useful data, especially in an organization. The following are some fundamental concepts of information systems:

1. Information: Information is data that has been processed, organized, or structured in a meaningful way to convey meaning and support decision-making. It is the core output of an information system.

2. Data: Data are raw facts and figures without any context or meaning. They become valuable when they are processed and interpreted to produce information.

3. Information Systems (IS): An information system is a set of interconnected components that work together to collect, process, store, and distribute information to support decision-making, coordination, control, analysis, and visualization within an organization.

4. Components of Information Systems

a. **Hardware**: Physical devices and equipment used to process, store, and transmit data, such as computers, servers, networking devices, and storage devices.

b. **Software**: Programs and applications that enable users to process and manipulate data, such as operating systems, databases, and productivity software.

c. **Data**: Raw facts and figures that serve as input for information processing.

d. **Procedures**: Standardized methods, guidelines, and processes that dictate how data is processed, accessed, and managed within the system.

e. **People**: Users, stakeholders, and personnel who interact with the system to input, process, and retrieve information.

f. **Communication Networks**: Infrastructure that facilitates the exchange of data and information between different components of the information system.

Meaning:

An information system is a structured combination of people, technology (software and hardware), data, and processes. Its main purpose is to collect, process, store, and distribute data in a way that provides valuable information for decision-making, problem-solving, and organizational tasks. It's like a tool that takes raw data and turns it into useful insights that help individuals and organizations operate more effectively and make informed choices.

Definitions:

“Information systems are combinations of hardware, software, and telecommunications networks that people build and use to collect, create, and distribute useful data, typically in organizational settings.”

“Information systems are interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization.”

Objectives of Information Systems:

1. **Support Decision-Making**: One of the primary objectives of information systems is to provide accurate and relevant information to assist individuals and organizations in making informed decisions.

2. **Improve Efficiency**: Information systems aim to streamline processes and operations, reducing manual effort and minimizing errors, which leads to increased efficiency and productivity.

3. **Enhance Communication and Collaboration**: Information systems facilitate communication and collaboration among individuals and teams within an organization, breaking down geographical and departmental barriers.

4. **Enable Strategic Planning**: Information systems provide data and insights that aid in long-term planning, helping organizations align their goals with market trends and opportunities.

5. **Increase Competitive Advantage**: By effectively utilizing information, organizations can gain a competitive edge by responding quickly to changes, identifying emerging trends, and adapting their strategies accordingly.

6. **Support Operational Activities**: Information systems manage routine operational activities such as transaction processing, inventory management, and order tracking, ensuring smooth day-to-day operations.

7. **Ensure Data Integrity and Security**: Information systems include measures to maintain the accuracy, consistency, and security of data, protecting it from unauthorized access, manipulation, and loss.

8. **Facilitate Innovation**: Information systems provide a platform for experimentation and innovation by allowing organizations to test new ideas and strategies based on available data.

Functions of Information Systems:

1. **Data Collection**: Information systems gather data from various sources, both internal and external to the organization.

2. **Data Processing**: They process raw data into meaningful information using calculations, sorting, categorization, and other methods.

3. **Data Storage**: Information systems store data in organized formats, such as databases, files, or cloud storage, for easy retrieval and analysis.

4. **Data Retrieval**: They enable users to access and retrieve specific data or information when needed, ensuring timely decision-making.

5. **Data Analysis**: Information systems provide tools for analyzing data, identifying patterns, trends, and relationships that can guide decision-making.

6. **Reporting and Presentation**: They generate reports, summaries, and visualizations to present information in a comprehensible format for users at different levels of the organization.

7. **Communication and Collaboration**: Information systems facilitate communication and collaboration through emails, messaging, video conferencing, and shared platforms.

8. **Transaction Processing**: They handle routine business transactions like sales, payments, and order processing, ensuring accuracy and efficiency.

9. **Support for Decision-Making**: Information systems offer tools for modeling scenarios, conducting what-if analyses, and generating insights to aid in decision-making.

10. **Knowledge Management**: Some information systems focus on capturing, storing, and sharing an organization's knowledge and expertise for future use.

11. **Security and Privacy Management**: Information systems implement security measures to safeguard data, including encryption, access controls, and user authentication.

12. **Integration**: They enable the integration of various business processes and systems to create a unified and seamless flow of information.

The Components of Information Systems

Technology

Technology can be thought of as the application of scientific knowledge for practical purposes. From the invention of the wheel to the harnessing of electricity for artificial lighting, technology is a part of our lives in so many ways that we tend to take it for granted. As discussed before, the first three components of information systems – hardware, software, and data – all fall under the category of technology. Each of these will get its own chapter and a much lengthier discussion, but we will take a moment here to introduce them so we can get a full understanding of what an information system is.

Hardware

Information systems hardware is the part of an information system you can touch – the physical components of the technology. Computers, keyboards, disk drives, iPads, and flash drives are all examples of information systems hardware. We will spend some time going over these components and how they all work together in chapter

Software

Software is a set of instructions that tells the hardware what to do. Software is not tangible – it cannot be touched. When programmers create software programs, what they are really doing is simply typing out lists of instructions that tell the hardware what to do. There are several categories of software, with the two main categories being operating-system software, which makes the hardware usable, and application software, which does something useful. Examples of operating systems include Microsoft Windows on a personal computer and Google's Android on a mobile phone. Examples of application software are Microsoft Excel and Angry Birds.

Data

The third component is data. You can think of data as a collection of facts. For example, your street address, the city you live in, and your phone number are all pieces of data. Like software, data is also intangible. By themselves, pieces of data are not really very useful. But aggregated, indexed, and organized together into a database, data can

become a powerful tool for businesses. In fact, all of the definitions presented at the beginning of this chapter focused on how information systems manage data.

People

When thinking about information systems, it is easy to get focused on the technology components and forget that we must look beyond these tools to fully understand how they integrate into an organization. A focuson the people involved in information systems is the next step. From thefront-line help-desk workers, to systems analysts, to programmers, all theway up to the chief information officer (CIO), the people involved with information systems are an essential element that must not be overlooked.

Process

The last component of information systems is process. A process is a series of steps undertaken to achieve a desired outcome or goal. Information systems are becoming more and more integrated with organizational processes, bringing more productivity and better control to those processes. But simply automating activities using technology is not enough – businesses looking to effectively utilize information systems do more. Using technology to manage and improve processes, both within a company and externally with suppliers and customers, is the ultimate goal. Technology buzzwords such as “business process reengineering,” “business process management,” and “enterprise resource planning” all have to do with the continued improvement of these business procedures and then integration of technology with them. Businesses hoping to gain advantage over their competitors are highly focused on this component of information systems.

QP-2019: Explain the library and information centre as a system.

Libraries

Definition of a library

The word ‘Library’ is derived from the Latin word “libraria” meaning ‘a book place’. It originates from the term ‘liber’ which means ‘a book’.

According to the Oxford Companion to the English Language – “Library is a collection of books, periodicals and/or other materials, primarily written and printed.”

Functions

The functions of a library are given below:

- Collect and provide books as well as other non-book materials to help the people to become aware of the thinking of others and to think and act independently.
- Foster and promote the spread of knowledge, education and culture
- Provide facility for formal and informal life-long self-education in the community
- Preserve the literary and cultural heritage of humanity for posterity as vehicles of culture and material for research
- Provide reliable information for all kinds of users irrespective of age, caste, creed, colour, religion, sex, etc.
- Collect resources in order to promote an enlightened citizenship and to enrich personal life; and
- Facilitate advancement of culture in the community. In view of the above, functions of a library can be broad

Structure of Libraries:

Libraries are structured to effectively manage and provide access to various types of resources while offering a range of services to their users. The structure of libraries can vary based on their size, type, and focus, but they generally include the following components:

1. **Collections**: Libraries house collections of resources, which can include books, journals, magazines, newspapers, audiovisual materials, digital content, and more.

2. **Cataloging and Metadata**: Resources are organized and cataloged using standardized systems, making it easier for users to search and find materials. Metadata (descriptive information) helps users understand the content and relevance of resources.

3. **Physical Spaces**: Libraries have physical spaces for reading, studying, and accessing resources. These spaces might include reading rooms, study areas, computer labs, and specialized zones like quiet study areas.

4. **Digital Spaces**: Libraries also offer digital spaces, such as online databases, digital libraries, and websites, which provide access to electronic resources and services.

5. **Staff**: Libraries employ librarians, information specialists, assistants, and support staff who assist users, manage collections, provide guidance, and offer various services.

6. **Technology Infrastructure**: Libraries use technology for cataloging, circulation, online access, and more. They often have computer systems, servers, and networking infrastructure to support their operations.

7. **Services**: Libraries offer a variety of services to meet the needs of their users. These services can range from research assistance to technology support.

Services:

1. **Reference Services**: Librarians assist users in finding information, answering questions, and conducting research. They guide users in using library resources effectively and provide expert advice on search strategies.

2. **Research Assistance**: Libraries offer research support through one-on-one consultations, workshops, and online guides. Librarians help users navigate databases, locate scholarly articles, and develop research strategies.

3. **Interlibrary Loan**: If a library doesn't have a specific item, users can request it from another library within a network or consortium. Interlibrary loan services broaden users' access to materials beyond their library's collection.

4. **Access to Print and Digital Collections**: Libraries provide access to a wide variety of resources, including books, journals, magazines, newspapers, e-books, e-journals, multimedia materials, and digital archives.

5. **Online Databases and E-Resources**: Libraries offer access to electronic databases, online journals, e-books, research repositories, and other digital resources for academic and professional use.

6. **Library Catalog and Online Public Access Catalog (OPAC)**: Users can search for library materials, check availability, place holds, and manage their accounts through the library's online catalog.

7. **Information Literacy Workshops**: Libraries conduct workshops to enhance users' information literacy skills, teaching them how to search for reliable sources, critically evaluate information, and cite properly.

8. **Technology Support**: Libraries offer computer access, Wi-Fi, printing, scanning, and assistance with using digital tools and software.

9. **Quiet and Group Study Spaces**: Libraries provide quiet areas for focused studying and research, as well as group study rooms for collaborative work.

10. **Children and Youth Services**: Libraries often host storytelling sessions, reading programs, and educational activities for children and teenagers to promote literacy and learning.

11. **Community Programs and Events**: Libraries organize lectures, workshops, book clubs, author talks, cultural events, and exhibitions to engage the community and foster a love for reading and learning.
12. **Language Learning Resources**: Libraries may offer language learning resources, such as books, online platforms, and audio materials, to help users acquire new languages.
13. **Accessibility Services**: Libraries ensure that their services and resources are accessible to users with disabilities, offering tools like assistive technology and accessible formats.
14. **Archiving and Special Collections**: Libraries often have special collections of rare books, manuscripts, historical documents, and artifacts that researchers and enthusiasts can access.
15. **Digital Preservation**: Libraries take steps to preserve digital content and ensure its availability for future generations.
16. **Career and Job Services**: Some libraries offer resources for job seekers, including resume-building workshops, career resources, and access to job listings.
17. **Community Engagement and Outreach**: Libraries collaborate with local organizations, schools, and institutions to provide resources and services that benefit the broader community.
18. **Reader's Advisory**: Librarians provide recommendations based on users' interests, helping them discover new authors, genres, and books.

QP-2018: What are documentation Centers? Discuss their need, importance, functions and services in India.

QP-2019: Explain the meaning, Objectives and functions of a Documentation centre.

Documentation Centers

The progress of civilization and advancements in science and technology resulted in tremendous growth of literature. The explosion of knowledge in multi-disciplinary subjects was not only recorded in macro documents such as books but also in latest research periodicals, research and technical reports ,patents, standards and specifications, trade transactions, circulars, reprints, off-prints, etc.

Definitions

A ‘document’ is a single piece of written or printed matter which furnishes evidence or information on any subject. It can be graphic record of some idea in words, sound or image.

The term ‘documentation’ is the process connected with identification, recording, organisation, storage and dissemination

Objectives of documentation centers:

- Information Collection
- Information Organization
- Information Dissemination
- Research Support
- Decision-Making Support
- Education and Training
- Archiving and Preservation
- Professional Networking
- Accessibility and Inclusivity
- Promotion of Knowledge
- Continuous Improvement
- Public Engagement
- Ethical Use of Information

Need for Documentation Centers:

Documentation centers fulfill a crucial role in collecting, organizing, and disseminating information and resources in specialized fields. Here's why documentation centers are important:

1. **Information Centralization**: Documentation centers consolidate a vast array of resources related to a specific subject or field, making it easier for users to access comprehensive information from a single source.

2. **Research Support**: Researchers and professionals often require access to extensive and accurate information for their work. Documentation centers provide a repository of relevant materials that aid in research and analysis.

3. **Decision-Making**: Industries, governments, and organizations rely on accurate information to make informed decisions. Documentation centers offer credible and up-to-date resources that contribute to effective decision-making.

4. **Education and Training**: Academic institutions and professionals need resources for teaching, learning, and training purposes. Documentation centers support education by providing learning materials and references.

5. **Preservation of Knowledge**: Documentation centers contribute to preserving historical documents, research papers, reports, and other materials that hold valuable knowledge for current and future generations.

Functions of Documentation Centers:

1. **Resource Collection**: Documentation centers gather a wide range of information resources, including books, journals, reports, research papers, technical documents, patents, maps, multimedia materials, and more.

2. **Cataloging and Classification**: Resources are cataloged and classified using standardized systems to ensure efficient organization and easy retrieval.

3. **Reference Services**: Documentation centers assist users in locating relevant resources, answering queries, and providing guidance on research strategies.

4. **Interlibrary Loan**: Many centers participate in interlibrary loan programs, allowing users to borrow materials from other institutions' collections.

5. **Online Access**: Documentation centers often maintain online databases, digital libraries, and portals, offering remote access to digital resources and materials.

6. **Research Support**: These centers provide resources for literature reviews, data collection, and in-depth research in specialized areas.

7. **Archiving and Preservation**: Documentation centers play a role in preserving historical and valuable documents, reports, and other materials for future reference.
8. **Professional Development**: Documentation centers support professionals by offering access to the latest research, trends, and developments in their fields.
9. **Collaboration and Networking**: Centers collaborate with institutions, organizations, and researchers to share resources and knowledge.

Services of Documentation Centers:

1. **Access to Resources**: Documentation centers provide physical and online access to a wide range of resources, ensuring that users have access to relevant information.
2. **Reference and Research Assistance**: Librarians and specialists offer assistance in locating resources, answering queries, and guiding users through their research.
3. **Interlibrary Loan Services**: Users can request resources that are not available within the center's collection and borrow them from other institutions.
4. **Online Databases and Portals**: Many centers offer online platforms that allow users to search, browse, and access digital resources and databases.
5. **Archiving and Preservation**: Centers preserve historical documents, reports, and materials to ensure their availability for future generations.
6. **Professional Training and Workshops**: Some centers offer training sessions, workshops, and seminars to help users enhance their research and information literacy skills.
7. **Collaboration and Networking**: Centers collaborate with other institutions, researchers, and organizations to share resources, expertise, and information.
8. **Research Support**: Documentation centers provide resources and assistance to researchers, including literature reviews, data collection, and access to specialized information.

QP-2021: Write a detailed note on Institutional repositories.

Information centers

Information centre is an organisation that (a) selects, acquires, stores and retrieves information in response to requests, (b) prepares abstracts, extracts and indexes of

information, and (c) disseminates information in anticipation and in response to requests. Information centres are attached to highly specialized research and development (R&D) organizations. Information Centre provides various services such as referral service, literature search,translations, bibliographies, abstracting, etc. to its large number of users.

There are varied forms of information centres viz.

(a) Information Analysis Centres

(b) Clearing Houses

(c) Data Centres and Data Banks.

1. **Information Analysis Centres:** They collect literature produced in a particular field, evaluate its utility and communicate to the specialists conducting research in directly usable form on request. The centre verifies the collected information for its validity, reliability and accuracy before dissemination. The reports of these analysis centres play an important role in strengthening research, pinpointing gaps in knowledge or short comings.
2. **Clearing Houses:** They are set up either on a cooperative basis or by a national or international agency. They provide a single point of access to information originating from different sources, countries and languages. They compile bibliographies of particular disciplines and circulate them to the organisations interested in them. A copy of the available document, if requested, is also provided.
3. **Data Centres and Data Banks:** Data centres collect, organise and store numerical data pertaining to specific subject field to answer specific queries. They collect information in anticipation of the future requirements of their users. Data Banks are usually concerned with a broader field. They extract raw data from the collected data and relevant literature. They keep these structured files ready to provide right answers to user's queries.

DIFFERENCE BETWEEN LIBRARY, DOCUMENTATIONAND INFORMATION CENTRE

A documentation/information centre differs from a library in many ways.Libraries provide macro-documents to their users whereas documentation/information centres provide micro-documents. Library differs from documentation/information centres in the types of documents, types and levels of users, provision of information rather than the document, rendering services to both internal and external users. Apartfrom collecting, processing and disseminating information, documentation/ information centres also carry out analysis and presentation of information.

A major difference thus is that, a library provides only the address of the document but a documentation/information centres provides not only the address of the document but also the details of the contents of the document.

Data centres

What Is a Data Center?

At its simplest, a data center is a physical facility that organizations use to house their critical applications and data. A data center's design is based on a network of computing and storage resources that enable the delivery of shared applications and data. The key components of a data center design include routers, switches, firewalls, storage systems, servers, and application-delivery controllers.

What defines a modern data center?

Modern data centers are very different than they were just a short time ago. Infrastructure has shifted from traditional on-premises physical servers to virtual networks that support applications and workloads across pools of physical infrastructure and into a multicloud environment.

In this era, data exists and is connected across multiple data centers, the edge, and public and private clouds. The data center must be able to communicate across these multiple sites, both on-premises and in the cloud. Even the public cloud is a collection of data centers. When applications are hosted in the cloud, they are using data center resources from the cloud provider.

Why are data centers important to business?

In the world of enterprise IT, data centers are designed to support business applications and activities that include:

- Email and file sharing
- Productivity applications
- Customer relationship management (CRM)
- Enterprise resource planning (ERP) and databases
- Big data, artificial intelligence, and machine learning
- Virtual desktops, communications and collaboration services

What are the core components of a data center?

Data center design includes routers, switches, firewalls, storage systems, servers, and application delivery controllers. Because these components store and manage

business-critical data and applications, data center security is critical in data center design. Together, they provide:

Network infrastructure. This connects servers (physical and virtualized), data center services, storage, and external connectivity to end-user locations.

Storage infrastructure. Data is the fuel of the modern data center. Storage systems are used to hold this valuable commodity.

Computing resources. Applications are the engines of a data center. These servers provide the processing, memory, local storage, and network connectivity that drive applications.

How do data centers operate?

Data center services are typically deployed to protect the performance and integrity of the core data center components.

Network security appliances. These include firewall and intrusion protection to safeguard the data center.

Application delivery assurance. To maintain application performance, these mechanisms provide application resiliency and availability via automatic failover and load balancing.

What is in a data center facility?

Data center components require significant infrastructure to support the center's hardware and software. These include power subsystems, uninterruptible power supplies (UPS), ventilation, cooling systems, fire suppression, backup generators, and connections to external networks.

What are the standards for data center infrastructure?

The most widely adopted standard for data center design and data center infrastructure is ANSI/TIA-942. It includes standards for ANSI/TIA-942-ready certification, which ensures compliance with one of four categories of data center tiers rated for levels of redundancy and fault tolerance.

Tier 1: Basic site infrastructure. A Tier 1 data center offers limited protection against physical events. It has single-capacity components and a single, nonredundant distribution path.

Tier 2: Redundant-capacity component site infrastructure. This data center offers improved protection against physical events. It has redundant-capacity components and a single, nonredundant distribution path.

Tier 3: Concurrently maintainable site infrastructure. This data center protects against virtually all physical events, providing redundant-capacity components and multiple independent distribution paths. Each component can be removed or replaced without disrupting services to end users.

Tier 4: Fault-tolerant site infrastructure. This data center provides the highest levels of fault tolerance and redundancy. Redundant-capacity components and multiple independent distribution paths enable concurrent maintainability and one fault anywhere in the installation without causing downtime.

QP-2020: Write a detailed note on information analysis centers.

Information analysis centres

Difference between a Library, Information Centre and Information Analysis Centre

In order to know, the difference between information analysis centre and other information services, which are available through libraries and information centres, let us look at the working definitions of library, information centre and information analysis centre. The definitions are as follows:

Library: A library is a collection of books and similar material organised and administered for reading, reference and study.

Information Centre: An organisation which selects, acquires stores and retrieves specific information in response to requests; announces, abstracts, extracts and indexes information; and disseminates information from documents in response to requests or in anticipation.

Information Analysis Centre (IAC): An organisation directed towards the collection of technical information and data in a specific area and its evaluation and filtering into a form of condensed data, summaries and state-of-the-art reports.

Information analysis and synthesis: definition

“Information Analysis is a process of determining and isolating the most salient information conveyed by a given information source and separating this information source into its constituent elements on the basis of predetermined evaluative criteria”.

During analysis, the contents of selected source(s) are studied to identify salient information conveyed by the source(s). Then the relevant information is extracted, assessed and verified. Finally the extracted information is organised and sorted into headings and sub-headings according to some pre defined scheme.

Processes in analysis and synthesis

These preliminary operations constitute the following:

- Study of the subject area or mission in which the information will be analysed.
- Study of the potential user and uses for which the analysis will be done.
- Organisation and systemisation of the contents or characteristics of the subject or mission, i.e. a prior creation of a table-of-contents, classification, typology, or analysis and synthesis.
- Consideration of objectives, resources and constraints of the system or work within which analysis and synthesis is performed.
- Determination of evaluation criteria for use as the base for analysis and synthesis.

Selection of Information Sources

Selection is an important component of building information sources for information analysis centre and it needs proper attention. Selection of information sources involves three important elements. They are: 1) Selection policy, 2) Selection aids, and 3) Selection process.

1) Selection policy is a set of criteria and principles adopted and used by an information analysis centre for decisions on acceptance and rejection of information sources.

2) Selection aids are the tools employed in selection, evaluation and verification of the sources.

3) Selection process involves the people, methods and procedures used in arriving at decision.

Steps in Analysis and Synthesis

On completion of the preliminary operations, the analysis proceeds on the following lines:

- The first step happens to be familiarisation with the total contents of a given document or set of documents acquired by the centre.
- The contents acquired are sorted or categorised on the basis of subject contents of documents on a tentative manner using evaluative criteria, tools like classification schemes such as DDC, UDC, thesaurus or subject headings lists, such as LCSH, MESH, SHE, etc. can be used for sorting purpose (first evaluation).
- The third step is selection and extraction of the most pertinent or salient features, filtering out of not needed information and reduction of materials.
- Verification of the contents or data in individual extracts (second evaluation) is the main objective of this step.

- Sorting of extracted information into classes and sub-classes (headings and sub-headings) according to the table-of-contents, classification scheme or typology for the specialised subject or mission.

  The next part i.e. the synthesis consists of the following steps:

- Comparative arrangement and merging of extracted information within each class and sub-class.
- Comparative evaluation of different extracts or data in each class or subclass (third evaluation).
- Resolution of conflict (if any) or decision to present conflicting information in synthesis.
- Compression of the information into a structure and form suited to intended users and uses and in accordance to objectives, resources and constraints of the system or centre as a whole.
- The evaluation of the final product according to criteria related to users and use (fourth evaluation).

Examples of information analysis centres

International

- Carbon Dioxide Information Analysis Centre (CDIAC)
- DoD Information Analysis Centres

National

- The Energy and Resources Institute (TERI)
- Centre for Monitoring Indian Economy (CMIE)
- IDSA (Institute for Defence Studies and Analysis)

Clearing houses

What is a Clearing House?

A clearing house acts as a mediator between any two entities or parties that are engaged in a financial transaction. Its main role is to ensure that the transaction goes smoothly, with the buyer receiving the tradable goods he intends to acquire and the seller receiving the right amount paid for the tradable goods he is selling.

Example of Clearinghouse

Explanation

Mr. C can buy from Mr. R only 5,000 stocks at $849. The price will move down. Then, you can see Mr. B can buy from Mr. Q at $848 to 10,000 stocks. Mr. Q will remain with

10,000 stocks at $848. Mr. Q can increase his price to $849 and sell to Mr. C stock for 5,000.

The price will not move until one of the parties to the transaction modifies its costs. So, all these happen in seconds on the stock market. The stock exchange here is the mediator facilitating the trade.

Functions

- The first and foremost thing is to ensure a smooth transaction flow.
- It guarantees the occurrence of the transaction in the manner planned by the said parties.
- This guarantee is given by checking the repaying capacity and credibility of the parties involved. That applies irrespective of whether the parties are natural or artificial persons.
- It ensures that the system is available during trading hours. That makes sure that the market is liquid.
- A clearinghouse also provides standardized norms regarding the quality, quantity, price, minimum ticks, maximum movement of cost within a day, and contract maturity.

Importance

- Each trader’s basic risk is non-honoring the contract and default risk on the buyer’s side.
- Clearinghouse eliminates such risks, thereby assuring the financial transaction.
- It is responsible for settlement between the parties, the time limit within which the transaction should get completed, and monitoring the adequacy of margins placed on the accounts of each trader.
- Clearinghouse ensures that the variable margin is called for if a trader breaches the maintenance margin.

Benefits

- Ease of transaction.
- It is a secure way of dealing in a financial transaction at a negligible cost.
- Reduction in human-oriented errors.
- Faster processing of transactions.

- There is no need to search eligible **counterparty** to the transaction.

Disadvantages

There are very few disadvantages to the clearinghouse. The clearinghouse system has emerged due to flaws in the earlier physical settlement system. They made the clearinghouse to advantage the public at large. It can never default due to stringent regulations imposed by the government. We can better call it the limitations rather than the disadvantages.

- Limited settlement hours since the exchange is not available 24×7.
- A specific quantum of orders is required. So, you cannot trade in **odd lots** at your convenience.
- A slower internet connection may delay placing your orders.
- There is a slight risk of default from the sub-brokers to the clearinghouse.

Data Banks

What Does Data Bank Mean?

A data bank is a well-organized and maintained collection of data for easy consultation and use. This data repository is made accessible on local and remote servers, and can contain information about a single, dedicated subject or multiple subjects in a well-organized manner.

Data bank definition

A data bank is a structured collection of data that is organized in a way that allows for efficient storage, retrieval, and manipulation of information. Data banks are used by businesses, science and healthcare facilities, and government agencies to store and manage large volumes of data.

Using data banks

- Business. Data banks are used to manage customer data, sales transactions, inventory, and supply chain information. They are also used for marketing, customer relationship management, and business analytics.
- Healthcare. Electronic health records are a type of data bank that contains patients' medical records, lab results, and treatment plans. Healthcare providers use them to manage patient care, track treatment outcomes, and conduct research.

- Education. Data banks are used by educators to manage student information, grades, attendance records, and curriculum. They are also useful for analyzing student performance and conducting research.
- Finance. Banks and financial institutions use data banks to manage customer accounts, transactions, and financial data, as well as risk management, fraud detection, and regulatory compliance.
- Government. Data banks are used by government agencies for managing public records, census data, law enforcement information, disaster response, public health surveillance, and policy-making.

What are data banks used for?

A data bank is a place where information can be stored and retrieved. It is typically used by commercial organizations to store customer information, financial data, sales data, and other essentials for business operations.

What kind of data banks collect?

Banks can apply analytics to customer data such as income, credit history, and current debt levels to generate credits, which help them determine the risk associated with lending to a particular individual.

Data curation centres

QP-2022: Write a detailed note on Data curation centres and museums

What Is Data Curation?

Data curation, as defined by The University of Illinois' Graduate School of Library and Information Science: "is the active and ongoing management of data through its life cycle of interest and usefulness." Sayeed Choudhury, Associate Dean for Research Data Management at Johns Hopkins University (JHU) and leader of theData Conservancy, further breaks down Data Curation iterative activities to:

- **Preserving:** Collecting and taking care of research data.
- **Sharing:** Revealing data's potential across domains
- **Discovering**: Promoting the re-use and new combinations of data

Other Data Curation Definitions Include:

- "Digital curation involves maintaining, preserving and adding value to digital research data throughout its lifecycle." (**Digital Curation Centre**)

- "The **process of "caring"** for Data, including to organizing, describing, cleaning, enhancing and preserving data for public use. Through curation the ICPSR (the International Leader in Data Stewardship) provides meaningful and enduring access to data." (ICPSR)
- "A means of managing data that makes it more useful for users engaging in data discovery and analysis." (**Alation**)

Businesses Perform Data Curation To:

- Enable data discovery and retrieval
- Maintain Data Quality
- Add value
- Provide for data reuse over time
- **Maximize Access**
- Leverage human responses towards customized knowledge
- Compliment work in **Data Governance**

Data Curation Processes:

- Make **machine learning** more effective
- Better handle **data swamps**
- **Educate audiences**
- **Speed innovation**

Museums

Museums are buildings in which we see many things of artistic, cultural, historical, traditional and objects of scientific interest. It is a great source of knowledge. It not only gives us knowledge but also makes us familiar with our history, culture, civilization, religion, art, architecture of our country. In the museum, there are many things which are kept for the public.

Types of Museums

Museums can be divided into following categories:

- **Fine arts:** They contain all types of paintings, drawings, sculpture, architecture etc.

- **Historical Museums:** These museums illustrate historical events or period, personalities etc. They have weapons, statues, artifacts made of stones and other material.
- **Science and Technology:** It contains all the things which are representative of the evolution of history, science, and technology such as fossils of dinosaurs.
- **Museum-house:** It is located in the birthplace of a famous person such as Sabarmati ashram, Dr. Bhim Rao Ambedkar's home, Tipu Sultan palace etc.
- **Archaeological Museum:** It contains all the objects related to history.
- **General Museum:** They contain more than one subject and therefore these museums are called multidisciplinary museums.

Museums of India

Most of the museums are specific and have items pertaining to a particular field or area such as Railway, statues, Airforce, doll etc.

1. National Museum

The national museum is the largest museum in India which is established in 1949 in Delhi. It contains a variety of articles from ancient to modern work of art. It has around 200,000 works of Indian and foreign art, covering over 5,000 years.

2. Doll's Museum

International Dolls Museum is a large collection of dolls in Delhi. It was set up by K. Shankar Pillai, a political cartoonist. 6000 dolls from 85 countries like Japan, Africa, and different states of India such as Madhya Pradesh, Rajasthan, West Bengal etc are on display at this museum.

3. The National Rail Museum

National rail museum is situated in Delhi and opened on the 1 February 1977. This museum focuses on the rail heritage of India and one of the most popular attractions for people of all age. It is one of the most popular tourist attractions in Delhi and describes the railway history of India.

4. Tipu Sultan's Palace

This historical Museum is dedicated to Tipu Sultan the king of Mysore and his troop is located in Dari Daulat, Karnataka. The palace has various items which are associated with Tipu Sultan. There are several oil paintings, clothes, weapons, crown, utensils and pencil sketches of Tipu Sultan and his family.

5. Indian Museum

Indian Museum is the ninth oldest museum in the world and largest museum of India which is located in Kolkata. It is founded by the Asiatic Society of Bengal in 1814 and has a rare collection of antiques, ornaments, fossils, skeletons, mummies and Mughal paintings

Importance of museum

- Museums collect and preserve our objects and materials of religious, cultural and historical value.
- They are a good source of entertainment.
- These museums help to preserve and promote our cultural heritage.
- Museums are a storehouse of old artefacts, sculptures, objects, history etc.
- Museums help in research and study.
- They are the main attraction for tourist.
- They are a good source of knowledge.

Memories

In the context of information systems and services, "memories" often refer to various ways in which users can store, access, and retrieve data, content, or experiences. Memories in this context can encompass both digital and human-related aspects. Here are a few interpretations of "memories" in terms of information systems and services:

1. **Digital Memories:** In the realm of digital information systems and services, memories can refer to various types of data storage and retrieval mechanisms. This includes cloud storage, databases, file systems, and data warehouses that allow users to store and access their digital assets, such as documents, images, videos, and more. These digital memories provide a way for users to preserve and recall information whenever needed.
2. **Social Memories:** With the rise of social media and online communities, memories can also refer to the digital records of personal experiences and interactions that individuals share online. Platforms like Facebook, Instagram, and Twitter allow users to document and share their experiences, photos, and thoughts, creating a digital timeline of memories that can be revisited later.
3. **Service Memories:** In the context of services provided by businesses and organizations, "memories" can refer to the collection of data related to customer interactions, preferences, and behaviors. This information is often used to

personalize services, improve customer experiences, and tailor offerings to individual needs. Customer relationship management (CRM) systems often play a role in managing and utilizing these service memories.

4. **User Experiences and Personalization:** Memories can also be associated with the concept of providing personalized user experiences. For instance, e-commerce websites and streaming platforms often use user activity history and preferences to recommend products, content, or services that align with the user's interests and past interactions.

5. **Historical Data and Analytics:** Memories can involve historical data stored in information systems, which can be analyzed to gain insights, make informed decisions, and identify trends or patterns. Businesses use these insights to understand their past performance and make strategic choices for the future.

6. **Collaborative Memories:** In collaborative environments, such as project management tools or shared document platforms, memories can refer to the collective knowledge and history of a team's activities. These systems store past discussions, document revisions, and project progress, allowing team

Institutional Repositories

What is Institutional Repository?

An institutional repository (IR) is a digital platform designed to collect, preserve, and provide access to the intellectual output of an institution. It serves as a centralized and organized repository for scholarly and creative works produced by the institution's faculty, researchers, students, and staff. Institutional repositories typically include a wide range of materials, such as research articles, conference papers, theses, dissertations, datasets, multimedia content, and more.

Definitions of Institutional Repositories:

According to Lynch (2003) "a university based Institutional Repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members."[1]

Foster and Gibbons (2004) defined Institutional Repository as "an electronic system that captures preserves and provides access to the digital work products of a community".

Importance of Institutional Repository

Institutional repositories (IRs) hold significant importance in the academic and research landscape. They provide numerous benefits to institutions, scholars, researchers, and

the wider public. Here are some key reasons why institutional repositories are important:

1. **Open Access to Knowledge:** Institutional repositories promote open access to scholarly and research outputs. By making research articles, conference papers, theses, and other materials freely available, IRs remove barriers to accessing information. This accessibility fosters collaboration, innovation, and knowledge dissemination, benefiting researchers, students, educators, and the public.

2. **Increased Visibility and Impact:** IRs enhance the visibility and impact of an institution's research and scholarly outputs. By showcasing intellectual works in a centralized platform, IRs make them discoverable and accessible to a global audience. This increased visibility can lead to higher citation rates, collaborations, and recognition, furthering the institution's reputation and individual researchers' careers.

3. **Preservation of Intellectual Capital:** Institutional repositories play a crucial role in preserving and archiving institutional intellectual capital. By implementing robust digital preservation strategies, IRs ensure the long-term accessibility and usability of scholarly outputs. This preservation safeguards research and scholarly works, protecting them from loss or deterioration and allowing future generations to benefit from the accumulated knowledge.

4. **Showcasing Institutional Excellence:** IRs serve as showcases of an institution's intellectual excellence and achievements. They provide a comprehensive overview of the institution's research capabilities, expertise, and scholarly activities across various disciplines. This exposure enhances the institution's reputation and attracts talented faculty, researchers, and students. IRs also contribute to the institution's marketing and recruitment efforts.

5. **Compliance with Funding Agency and Institutional Policies:** Many funding agencies and institutions require researchers to make their outputs openly accessible. Institutional repositories offer a convenient and compliant avenue for meeting these requirements. By housing research outputs in an IR, institutions can ensure adherence to policies related to open access, data sharing, and public access mandates.

6. **Collaboration and Interdisciplinary Research:** IRs facilitate collaboration and interdisciplinary research. By providing a platform for researchers to access and share a wide range of scholarly works, IRs encourage interdisciplinary interactions and collaborations. Researchers can explore works outside their specific fields, fostering cross-disciplinary pollination and innovative research.

7. **Usage Statistics and Impact Assessment:** Institutional repositories generate usage statistics and metrics, allowing institutions to assess the impact of their research outputs. By analyzing download counts, citation rates, and other metrics, institutions can evaluate the reach and influence of their research. This data can inform future decision-making and resource allocation.

Objectives of Institutional Repository

1. Open Access and Knowledge Sharing
2. Preservation and Long-Term Access
3. Research Visibility and Impact
4. Collaboration and Interdisciplinary Research
5. Institutional Branding and Showcasing Excellence

Contents of Institutional Repositories

Institutional repositories (IRs) house a wide range of scholarly and research outputs, providing a comprehensive and organized collection of an institution's intellectual capital. The contents of institutional repositories vary depending on the institution's focus, but here are some common types of materials found in IRs:

- Research Articles and Preprints
- Theses and Dissertations
- Conference Papers and Presentations
- Books and Book Chapters
- Research Data and Datasets
- Multimedia Materials
- Institutional Publications
- Student Works
- Technical Reports and Working Papers
- Open Educational Resources (OER)

Benefits of Institutional Repository

A. Benefits for users

- Increased access to research

- Improved research collaboration
- Enhanced research impact

B. Benefits for institutions

- Increased visibility and prestige
- Improved research culture
- Enhanced reputation

C. Benefits for society

- Improved education
- Enhanced public understanding of science
- Accelerated innovation

Types of Repositories

1. Subject or Domain-Specific Repository
2. Institutional Repositories
3. Harvesting Repository
4. National Repository
5. Data Repository

Here are a few notable institutional repositories from around the world:

1. MIT DSpace
2. Harvard DASH
3. Stanford Digital Repository
4. Cambridge University's Apollo Repository
5. University of California eScholarship
6. OpenUCT (University of Cape Town)
7. Edinburgh Research Archive
8. Texas A&M University's OAKTrust
9. University of Queensland eSpace
10. University of Oslo's DUO

Open Archives

An Open Archival Information System (or OAIS) is an archive, consisting of an organization of people and systems, that has accepted the responsibility to preserve information and make it available for a Designated Community. The OAIS model can be applied to various archives, e.g., open access, closed, restricted, "dark", or proprietary.

The term "Open Archives" is often associated with the concept of "Open Access" and the development of repositories or databases that store and provide access to academic and scholarly content. These repositories are designed to ensure that research output is not locked behind paywalls, subscription fees, or other restrictions, enabling greater dissemination of knowledge.

The reference model:

- provides a framework for the understanding and increased awareness of archival concepts needed for long term digital information preservation and access.
- provides the concepts needed by non-archival organizations to be effective participants in the preservation process.
- provides a framework, including terminology and concepts, for describing and comparing architectures and operations of existing and future archives.
- provides a framework for describing and comparing different long term preservation strategies and techniques.
- provides a basis for comparing the data models of digital information preserved by Archives and for discussing how data models and the underlying information may change over time.

Requirements of the system

The reference model (ISO 14721:2003) includes the following responsibilities that an OAIS archive must abide by:

- Negotiate for and accept appropriate information from information Producers.
- Obtain sufficient control of the information provided to the level needed to ensure Long-Term Preservation.
- Determine, either by itself or in conjunction with other parties, which communities should become the Designated Community and, therefore, should be able to understand the information provided.
- Ensure that the information to be preserved is Independently Understandable to the Designated Community. In other words, the community should be able to understand the information without needing the assistance of the experts who produced the information.

The functional model

- Ingest function
- Archival Storage function
- Data Management function
- Administration function
- Preservation planning function
- Access function

Referral service

Referral services Referral means suggesting where a user can find information that is not available in the resource centre. Referral services are among the most important services offered by a resource centre.

No resource centre can hold all the materials available on all the subjects of interest to their users. It is important to know about other sources of information, so that users can be referred to them if necessary.

Other sources of information may include members of a network (see Section 8.3: Networks and networking), or other resource centres, either in the same country or elsewhere, that provide enquiries services or document supply services.

It is possible to find out about other resource centres and information services by:

- scanning or reading newsletters on the subject areas that the resource centre covers
- networking with staff in other resource centres – those in the same country specialising in any subject area, and those specialising in similar subjects, either in the same country or elsewhere
- joining e-mail discussion groups, such as ASIALIB
- searching the World Wide Web

Here are some common examples and characteristics of referral services:

1. **Medical Referral Services:** In the healthcare sector, medical referral services help patients find specialized doctors, hospitals, clinics, or healthcare providers for specific medical conditions or treatments. These services often consider factors like location, insurance coverage, and patient preferences when making recommendations.

2. **Legal Referral Services:** Legal referral services connect individuals in need of legal assistance with qualified attorneys or legal professionals. These services

can help people find lawyers who specialize in specific areas of law, such as family law, criminal defense, or personal injury.

3. **Job Placement and Recruitment Services:** Job placement agencies and recruitment firms serve as referral services for job seekers and employers. They match candidates with job openings that align with their skills, qualifications, and career goals.

4. **Home Services Referral:** Platforms like Angie's List and HomeAdvisor connect homeowners with contractors, plumbers, electricians, and other home service professionals. Users can find service providers based on reviews, ratings, and specific project requirements.

5. **Business Networking and Referral Groups:** Business networking organizations, such as BNI (Business Network International), facilitate referrals among their members. Members refer each other's businesses to potential clients or customers within their networks.

6. **Education and Tutoring Referrals:** Education referral services help students and parents find tutors, educational programs, schools, or courses that suit their learning needs and objectives.

7. **Social Services Referral:** Social service agencies and community organizations often provide referral services to connect individuals in need with resources such as housing assistance, food banks, counseling services, and more.

8. **Online Marketplaces and Platforms:** Some online marketplaces, like Airbnb and Uber, operate as referral services, connecting users seeking accommodations or transportation with hosts or drivers.

9. **Online Review and Recommendation Platforms:** Websites and apps like Yelp, TripAdvisor, and Amazon provide reviews and recommendations that serve as a form of referral service, helping users make informed decisions about products, services, and businesses.

10. **Financial and Investment Referral Services:** These services connect individuals with financial advisors, investment opportunities, and banking services based on their financial goals and preferences.

Translation Centres

Translation centers, also known as language or translation services centers, are organizations or facilities dedicated to providing professional translation and language-related services. These centers play a crucial role in bridging language barriers

and facilitating communication between individuals, businesses, and organizations that operate in multilingual environments.

What are Translation Services?

Common people are not habituated with day to day professional translation, surely, assistance in some way is required. Translation services are the consultancies that render facilities for conversion of different kinds of languages and help the seekers in the process. This could be for business, finance, literature, medicine, website, or legal and others and the mastery of the translator is determined based on the type of conversion.

Why do you need Translation Services?

Among the many uses, the most common reasons for the requirement of translation services would be for financial, business and banking translations in the growing corporate world. The conversion of the related documents and any other type of material like website content, reports, presentations, etc. aids in the advancement in the globalization and expansion of the business. The assistance provided is professional and certified which in return ensures the accuracy of the work.

Who needs Translation Services?

Almost every sector needs a language to language conversion of some kind at some point in their careers, from schools and hospitals to law firms and business organizations. Translation services for families are availed for documents that are generally required for documents like birth certificate, marriage certificate, driving licenses, passports, and so on; while translation services for schools are needed to translate material like brochures, school website, textbook material, school leaflets, etc.

Types of Translation Services

Translation can be needed for different reasons in different areas, for different languages, for instance, translation services for business or for legal documents. We at PEC provide services for quite a wide range of utilities. Our services are listed below:

1. Business Translation

It is the kind of document conversion that is related to commercial and administrative documents of business capital. The process can be carried out for in-organization purposes or for out of organization causes.

2. Technical Translation

Translating technical material like user manuals, patents, technical brochures, etc. is what comprises this particular section. The translators need to be thorough with the technical terms for this kind.

3. Legal Translation

Legal documents are converted for various law-related reasons and generally require attestation of the translated document. Certified translators are required for this type of language conversion.

4. Medical Translation

Medical content requires conversion as there are various kinds of documents that are necessitated by distinct medicine-related organizations like research papers, patient information, medical prescriptions, and so on.

5. Financial Translation

The conversion of bank documents and others that indicate financial or economic information, is included in this type. The documents translated comprise of balance sheets, financial reports, bank statements, and others.

6. Literary Translation

As the name suggests, this section consists of the conversion of any text or content that is related to literature. Poems, novels and novellas, blogs, and many others are the types of literature material that are translated.

7. Academic Translation

The conversion of academic documents is what this kind of conversion is comprised of. Academic certificates, textbooks, brochures, etc are the kind of documents that are translated in academics.

8. Website Translation

Easy to understand, the conversion of web pages from one language to another is what this section is all about. Various kinds of websites are converted to reach to the intended audience and get desired traffic.

9. Script Translation

The translation of dialogues and scenes that are composed in the script are translated in this process. These scripts are of different types, they could be stage plays, movies, online short videos, and others.

National translation centers in India

1. Central Institute of Indian Languages (CIIL
2. Bureau of Parliamentary Studies and Training (BPST
3. National Translation Mission (NTM)
4. Sahitya Akademi
5. Indian Translators Association (ITA)
6. Language Departments in Universities
7. State Governments
8. Academic and Research Institutions

Publishing Houses

Publishing houses, also known as publishing companies or publishers, are organizations responsible for producing, distributing, and marketing printed and digital content, including books, magazines, journals, newspapers, and other written materials. They play a crucial role in the dissemination of knowledge, literature, and information to the general public and specialized audiences.

Here are some key aspects and functions of publishing houses:

1. **Acquiring and Producing Content:** Publishers acquire manuscripts, articles, or content from authors, writers, and contributors. They may work with both established and emerging authors to produce a wide range of written materials, from novels and textbooks to scholarly articles and reference books.
2. **Editing and Proofreading:** Publishers employ editors and proofreaders to review and refine the content for clarity, accuracy, grammar, and style. Editing ensures that the final product meets high editorial standards.
3. **Design and Layout:** Publishers work with graphic designers and layout artists to create visually appealing and reader-friendly formats for their publications. This includes cover design, page layout, and typography.
4. **Printing and Production:** Traditional publishers oversee the printing and physical production of books and other printed materials. However, with the growth of digital publishing, many publishers now produce eBooks and digital content as well.
5. **Distribution:** Publishers have distribution networks in place to ensure that their publications reach bookstores, libraries, online retailers, and other distribution

channels. Distribution can be physical (e.g., shipping printed books) or digital (e.g., making eBooks available for download).

6. **Marketing and Promotion:** Publishers are responsible for marketing and promoting their publications to reach their target audiences. This includes creating marketing campaigns, arranging author events, and leveraging digital marketing strategies.

7. **Copyright and Licensing:** Publishers handle legal aspects such as copyright clearance, licensing, and intellectual property rights, ensuring that they have the necessary permissions to publish and distribute content.

Examples:

1. Penguin Random House
2. Simon & Schuster
3. HarperCollins Publishers
4. Hachette Book Group
5. Macmillan Publishers
6. Scholastic Corporation
7. Oxford University Press
8. Cambridge University Press
9. Bloomsbury Publishing
10. Harvard University Press
11. Penguin Classics

National Geographic Books

UNIT - 2

QP-2022: What is user community? Explain the different methods used in identifying user community

Understanding the user communities – identification of user communities

What is a user community?

User communities represent a unique organizing structure for the exchange of ideas and knowledge. They are organizations composed primarily of users working collaboratively, voluntarily, and with minimal oversight to freely and openly develop and exchange knowledge around a common artifact.

Understanding user communities is important for businesses of all sizes. By understanding the needs and interests of their users, businesses can better tailor their products and services to meet those needs. They can also use this information to improve customer support, develop new marketing campaigns, and identify new opportunities for growth.

Understanding user communities is important for a variety of reasons. It can help businesses to:

- Identify their target audience
- Develop products and services that meet the needs of their users
- Improve customer support
- Create more engaging and relevant content
- Build stronger relationships with their users

One way to understand user communities is to identify them. This can be done by looking at the following factors:

- Shared interests: What do the users in the community have in common? Are they interested in a particular product, service, hobby, or topic?
- Interaction: How do the users in the community interact with each other? Do they share information, ask questions, or provide support?

- Activity: How active is the community? Are there new posts and discussions happening regularly?
- Demographics: What are the demographics of the community? What are the age, gender, and location of the users?

Once you have identified the user communities, you can start to understand them better by collecting data and conducting research. This data can include:

- User profiles: This information can include the user's name, email address, location, and interests.
- Post and discussion data: This information can include the content of the posts and discussions, as well as the number of views and comments.
- Social media data: This information can include the user's social media activity, such as their posts, likes, and shares.

By collecting and analyzing this data, you can get a better understanding of the needs, interests, and behaviors of the users in your community. This information can be used to improve your products and services, create more engaging content, and build stronger relationships with your users.

Here are some of the methods that can be used to identify user communities:

- Manually: This involves identifying the communities by looking at the content that is being shared, the interactions that are happening, and the demographics of the users.
- Machine learning: This involves using algorithms to identify the communities based on the data that has been collected.
- Hybrid approach: This involves using a combination of manual and machine learning techniques.

The best method to use will depend on the size and complexity of the community, as well as the resources that are available.

Different methods used to identify user communities:

1. **Demographic and Psychographic Analysis:**
    - Gather data on users' demographics, such as age, gender, location, occupation, and income. This helps in identifying broad user segments.

- Psychographic data, which includes users' values, interests, hobbies, and lifestyles, provides a deeper understanding of their motivations and preferences.

2. **Behavioral Analysis:**
    - Examine user behavior on your platform, website, or app. Look at how they interact with content, products, or services.
    - Analyze user engagement metrics, such as click-through rates, time spent, and conversion rates, to identify active and engaged user segments.
3. **Surveys and Feedback:**
    - Conduct surveys, interviews, or feedback sessions with your users. Ask questions about their interests, preferences, and reasons for using your product or service.
    - Use this qualitative data to identify common themes and trends among users.
4. **Social Media Listening:**
    - Utilize social media monitoring tools to track conversations related to your brand, product, or industry.
    - Identify hashtags, mentions, and keywords associated with your niche and discover user communities engaging in these discussions.
5. **Online Forums and Communities:**
    - Explore online forums, discussion boards, and social media groups related to your industry or product.
    - Observe the conversations, topics, and interactions within these communities to identify user segments.
6. **Keyword and Topic Analysis:**
    - Use keyword research tools to identify popular search terms and topics in your field.
    - Create content or products that align with these keywords to attract users interested in these subjects.
7. **Competitive Analysis:**

- Study your competitors and their user communities. Identify where they engage with their users and the strategies they employ.
- Look for opportunities to differentiate yourself and attract users from competitor communities.

8. **User Personas:**
    - Develop user personas based on the collected data and insights. These personas represent different segments within your user community and help in targeted marketing and product development.
9. **AI and Machine Learning:**
    - Implement AI and machine learning algorithms to analyze large datasets and discover hidden patterns and trends in user behavior and preferences.
10. **Community Building and Engagement:**
    - Actively participate in and contribute to the identified user communities to better understand their needs and build strong relationships.
11. **Measure Success:**
    - Define KPIs to assess the effectiveness of your community identification efforts. Metrics may include user retention, engagement rates, and conversion rates within specific communities.
12. **Feedback Loops:**
    - Continuously gather feedback from the user communities you engage with and iterate on your strategies based on their input.

THEORIES OF INFORMATION NEED

Concept of S.R. Ranganathan's Five Laws of Library Science

Meaning and Definitions

Information

Information Need

Information Seeking Behaviour

Purpose of User Studies

Types of User Studies

Methods of user studies

Models

Wilson's 1981 Model

Wilson's 1996 Model

Ellis's Model

Kuhlthau's 1993 Model

Conclusion References

QP-2022: Write a detailed note on information seeking behavior

QP-2021: Give an account on information seeking behaviour of user community.

QP-2018: What do you Understand by information seeking behavior? Explain the steps involved in identifying information needs of use

THEORIES OF INFORMATION NEEDS AND SEEKING BEHAVIOUR

Introduction

User studies are one of the most important and useful areas of research in library and information science. These studies form a large body of literature in the discipline. The present study recounts the evolution of user studies by exploring the related key concepts of the field, but user studies/ surveys on law library users are very rare in India. On the other hand, enormous studies have been undertaken in the western countries and their number is constantly increasing.

Libraries have been collecting traditionally various kinds of sources and holding them ready for use by the users. Due to an exponential growth of knowledge, there have been complexities in the information generation, handling and use. The impact of ICT (Information and communication technology), web technology and database technology have compelled the libraries to use these technologies effectively to provide services to the users. With the growing number of e-sources, it has become essential for the law library and information professionals to play the critical and exhibit the professional skills and techniques. In order to maximize the impact of law library services and the maximum use of their resources and services, it is essential on the part of Library and Information professionals to know about the users and their needs. The only they can deliver is the need based information services. The user characteristics are an important component of the user studies. The user characteristics are innumerable and could be clustered in different groups in various ways.

Concept of User Studies

In order to improve the existing system of library and its services, the library administrators should modify or develop the libraries in accordance with the users' needs and interest. This is by undertaking the user studies and collecting opinion of the users in the form of feedback. The user feedbacks provide platform for the assessment of the quality of library and quality of the services and their extent of utility. Hence, as the user plays a pivotal role in the improvement of the library system, it is necessary to know the user psychological behaviours such as their information needs, the way of gathering information, the extent of use of library resources, the problems facing while using existing resources and their expectations from the system. Thus, the concept of user studies developed and over the period of time it is inevitable to conduct the user studies periodically to improve and develop the library as a system.

“User studies look for similarities and differences among the users in terms of their backgrounds like status, age, experience, education, specialization, field of research, etc when the analysis is at the organization level (against individual level) they look for differences in nature of organizations and at the same time users were also grouped as theoreticians or fundamental research workers, practitioners, etc.”

(Sridhar, 2002).

Meaning and Definition

As the words depict, it is a study focused on the users to understand directly or indirectly their needs, difficulties, behavior and use pattern of the library and its services as a whole. “The term ‘user study’ is preferred to ‘library surveys’ because the studies of information need or information use behavior focus upon a wider range of information sources and channels rather than on simply libraries. A user study comprises the study of people’s need for, and use of information. study may be defined as systematic study of information requirements of users in order to facilitate a meaningful exchange between information systems and users” (Kawatra, 1997).

Information

“The information may be reasonably considered a primitive concept, as are energy, electricity, distance, power, and work. One understands each of them intuitively, but there are no adequate definitions for them. Their lack of precise definition has not prevented men and women from studying their properties, behaviours, and interrelationships within systems and organizations” (Pao, 1989)

Belkin is “not concerned with definitions of information, but rather with concepts of information. The distinction is that a definition presumably says what a phenomenon defined is, whereas a concept is always of looking at, or interpreting the phenomenon. By accepting the idea of a concept, one becomes free to look for a useful concept rather than a universally true definition of information” (Belkin, 1978). “While information needs may be influenced by factors relating to the individual as above, there are also other more general characteristics of information needs that enter into the equation. Two examples of these general factors are frequency and complexity” (Bresnick, 1988).

Information Need

The “information need” is another term that has been discussed and approached from many different perspectives. Much of the discussion has been orientated towards the clarification of other related concepts such as “wants”, “requests”, “demands”, and so on.

Information Seeking Behaviour

“Information seeking is a human process that requires adaptive and reflective control over the afferent and efferent actions of the information seeker. Information seeking behavior (ISB) resulted from the recognition of some needs, perceived by the user, who as a consequence makes demand upon on formal system such as libraries and information centres, or some other person in order to satisfy the perceived information need. The information seeking behavior essentially refers to locate discrete knowledge elements. It is concerned with the interactive utilization of the three basic resources namely, people, information and system. Further in order, to satisfy the information needs, the user actively undergoes the information seeking process. The attempt of the user in obtaining the needed information results from the recognition of some needs, perceived by the user” (Singh & Satija, 2006).

QP-2020: Write a detailed note on user studies.

Purpose of User Study

The purpose of user studies is primarily to identify the users’ perceptions of library resources. Occasionally, they conduct surveys to compare themselves with other institutions. To mention following are the few factors to assess:

- Patterns, frequency, ease, and success of use
- User needs, expectations, perspectives, priorities, and preferences for library collections, services, and systems
- User satisfaction with library tools, library collections, services, staff, and Web sites
- Service quality
- Shifts in user attitude and opinion
- Relevance of collections or services to the curriculum

Types of User Studies

User Studies can be classified broadly as two categories;

1. User Centered Studies
2. System Centered Studies.

In both kinds of studies, the target group for the collection of data is the user only. User centered studies are designed to assess the user by types of users, needs, behaviours, problems faced by them etc. the main purpose is to understand the users whereas in System centered studies, the information is gathered from the users to know the loopholes, advantages of the services offered by the system. The main purpose of the

system centered study is to improve and develop the system as a whole. In other words, first one is to know the user later one is to know the system.

QP-2018: What is user study? Explain the methods and tools used to conduct user studies.

A user study is a research method used to gain insights into the behaviors, needs, preferences, and experiences of users when interacting with a product, service, or system. User studies are commonly conducted in fields like user experience (UX) design, product development, usability testing, and human-computer interaction (HCI). These studies aim to inform design decisions, improve user satisfaction, and ensure that products meet users' expectations. Here are some common methods and tools used to conduct user studies:

Methods for Conducting User Studies:

1. **Surveys:** Surveys involve creating questionnaires or online forms to collect structured data from a large number of participants. They are useful for gathering demographic information, opinions, and preferences. Tools like Google Forms, SurveyMonkey, and Typeform are commonly used for creating and distributing surveys.

2. **Interviews:** Interviews involve one-on-one or group discussions with users to gather qualitative insights. Open-ended questions are used to explore users' experiences, opinions, and specific pain points. Interviews can be conducted in person, over the phone, or through video conferencing tools like Zoom or Skype.

3. **Usability Testing:** Usability testing involves observing users as they interact with a product or prototype to identify usability issues and gather feedback on the user interface. Specialized usability testing software like UserTesting and Optimal Workshop can be used to conduct remote usability tests.

4. **Contextual Inquiry:** This method involves observing users in their natural environment while they perform tasks related to the product or service. Researchers aim to understand the context in which users interact with the system and identify challenges they face. Video recording and note-taking tools are essential for this method.

5. **Card Sorting:** Card sorting is a method used in information architecture and website navigation design. Participants organize and categorize content or items into groups to help designers create intuitive navigation structures. Online card sorting tools like OptimalSort and Treejack are available for remote studies.

6. **Eye Tracking:** Eye tracking technology is used to monitor where users focus their gaze while interacting with a digital interface or physical product. This method

provides insights into visual attention and can help optimize design elements. Popular eye tracking tools include Tobii and EyeQuant.

7. **A/B Testing:** A/B testing involves presenting different versions (A and B) of a product or webpage to different groups of users and measuring their responses to determine which version performs better. Tools like Google Optimize and Optimizely are used for A/B testing.

8. **Field Studies:** Field studies involve researchers spending time with users in their natural environments to gain a deep understanding of their needs, challenges, and behaviors. This method is often used in ethnographic research.

9. **Remote Testing:** With the advent of remote work and online collaboration tools, many user studies can be conducted remotely using video conferencing, screen sharing, and remote usability testing platforms.

Tools for Conducting User Studies:

1. **Online Survey Tools:** Tools like Google Forms, SurveyMonkey, Typeform, and Qualtrics make it easy to create, distribute, and analyze surveys.

2. **Video Conferencing:** Platforms like Zoom, Microsoft Teams, and Skype are essential for conducting remote interviews and meetings with participants.

3. **Usability Testing Tools:** UserTesting, Optimal Workshop, and UserZoom are specialized platforms for remote usability testing and user research.

4. **Screen Recording and Capture Software:** Tools like Camtasia and OBS Studio can be used to record user interactions during usability testing sessions.

5. **Note-Taking and Analysis Tools:** Tools like Microsoft OneNote, Evernote, and NVivo are helpful for organizing and analyzing qualitative data from interviews and observations.

6. **Eye Tracking Hardware and Software:** Companies like Tobii and EyeQuant provide hardware and software solutions for eye tracking studies.

7. **A/B Testing Platforms:** Google Optimize, Optimizely, and VWO (Visual Website Optimizer) are popular tools for running A/B tests.

8. **Card Sorting and Information Architecture Tools:** OptimalSort, Treejack, and Optimal Workshop are commonly used for card sorting and information architecture research.

When conducting user studies, it's crucial to carefully plan the research process, recruit representative participants, and analyze the data systematically to derive meaningful insights that can inform design and decision-making. The choice of methods and tools

depends on the research objectives, budget, and the nature of the product or service being studied.

QP-2019: Explain the concept of information seeking behaviour with the help of T.D. Wilson's model.

Models

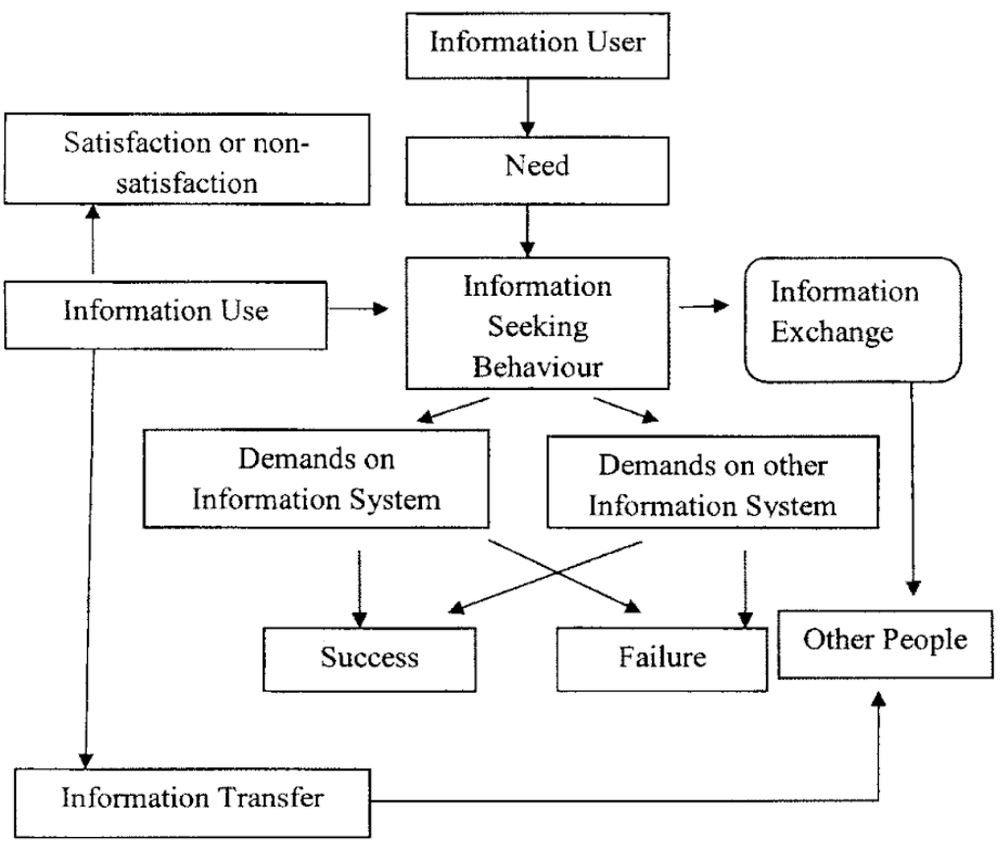
Wilson defines a model as “A model may be described as a framework for thinking about a problem and may evolve into a statement of the relationships among theoretical propositions. Most models in the general field of information seeking behaviour are of the former variety: they are statements, often in the form of diagrams that attempt to describe an information-seeking activity, the causes and consequences of that activity, or the relationships among stages in information-seeking behavior”. Rarely do such models advance to the stage of specifying relationships among theoretical propositions: rather, they are at a pre- theoretical stage, but may suggest relationships that might be fruitful to explore or test.

The models that have been developed to date by information behavior researchers are not necessarily applicable to all user groups. Research seems to indicate that various factors influence specific information needs and information seeking behaviour that are often context-specific, such as, the users’ work role.

Some models comprehensively study users from information behaviour, information-seeking and information needs perspectives whereas other models only focus on aspects of information retrieval. Furthermore, a model intended for a study of information behaviour should allow for a description and explanation of user behaviour and should focus on the user.

Some models comprehensively study users from information behaviour, information-seeking and information needs perspectives whereas other models only focus on aspects of information retrieval. Furthermore, a model intended for a study of information behaviour should allow for a description and explanation of user behaviour and should focus on the user.

4.6.1 Wilson's First 1981 model of information behaviour



Source: Wilson T.D., 1999. P 251.

Wilson labels his models 'information behaviour models' to distinguish them from the 'information search models' as they are understood by information retrieval researchers. These models are more concerned with user behaviour surrounding the actual initiation of information-seeking and have a broader

perspective of the information search than the use of computer-based information retrieval systems. The aim of Wilson's 1981 model was to outline the various areas covered by what he proposed as 'information-seeking behaviour' as an alternative to 'information needs'.

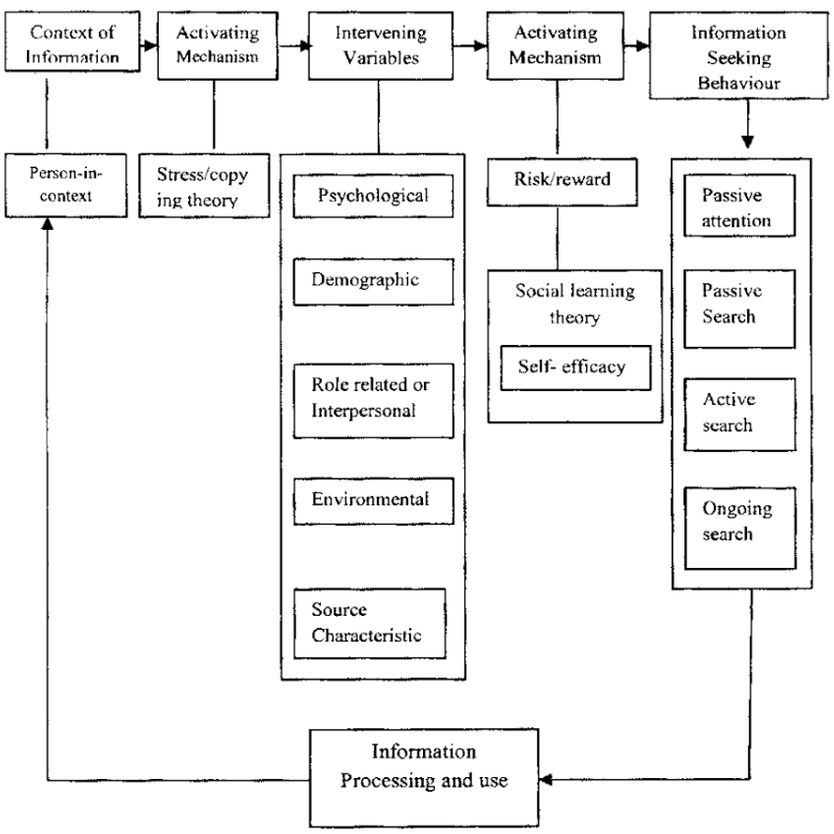
Wilson's first 1981 model suggests that information seeking behavior arises as a consequence of a need perceived by an information user. In order to satisfy that need, the user then makes demands upon formal or informal information sources or systems. These demands for information result in success or failure in finding relevant information. The successful retrieval of information results in user satisfaction while failure would result in non-satisfaction and require the user to adapt his search using a different information system.

Wilson's first 1981 model shows that part of information seeking behaviour may involve other people through information exchange. The information perceived as useful may also be passed on to other people as well as by the person seeking the information a threefold view of information-seeking. Although Wilson's model only draws attention to gaps in research it continues to serve as a framework in present research with as much validity as at the time of its conception.

Wilson 1996 model of information behavior

Wilson made major revisions to his 1981 model of information behaviour, in his 1996 model. He drew upon research from a variety of fields other than Information Science. These fields include decision-making theory, psychology, innovation, and health communication and consumer research. The model pictures

the cycle of information activities, from the rise of the information need (context of information need) to the phase when information is being used (information processing and use).



Source: Wilson T.D., 1999. P257.

The basic framework of Wilson's 1981 model remains in the 1996 model. The 'intervening variables' (as illustrated in the third group of concepts in figure) now represent the information-seeking barriers, that is psychological, demographic, role-related or interpersonal, environmental and source characteristics.

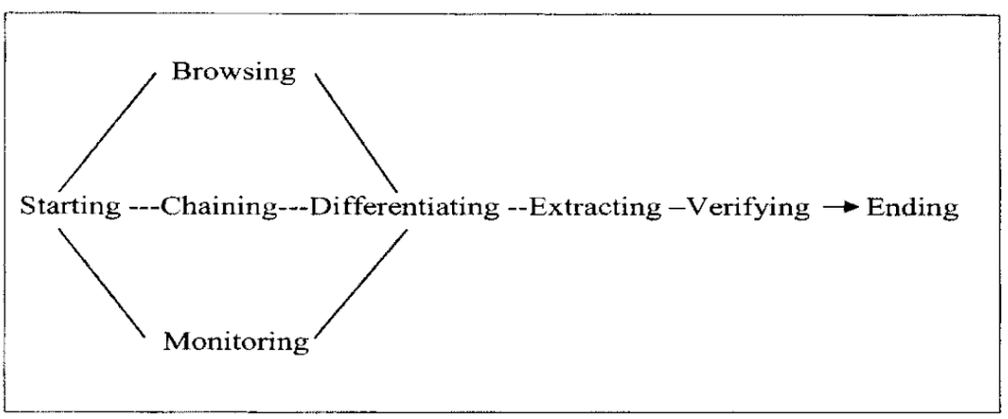
The 1996 model now also identifies 'information-seeking behaviour' (in the fifth group of concepts in the figure), namely passive attention, passive search, active search and ongoing search. The suggestion is that the impact of the intervening variables may support and prevent information use while information seeking behaviour consists of more types of information-seeking behaviour than identified in the 1981 model. If information needs are to be satisfied, 'information processing and use' becomes an essential part of the feedback loop shown at the bottom of the model.

The 1996 model also presents three relevant theoretical ideas as activating mechanisms to explain user behaviour. In the second and fourth group of concepts in figure these mechanisms are represented as and the stress/coping, risk/reward, social learning theory and 'self-efficacy'. The activating mechanisms are psychological factors which are explained by these different theories and which prompt the user to proceed with the information seeking process.

Stage process version of Ellis' (1994) behavioural framework

Ellis first described his model of information-seeking behaviour in 1984 and has since then developed the model in information-seeking studies of various groups of researchers, including engineers. Ellis derived eight generic characteristics of the information-seeking patterns of social scientists. Ellis later extended this work to physicists, chemists and engineers. The figure given below is a stage process version of Ellis' model.

A stage process version of Ellis's behavioural framework



Source: Wilson T.D., 1999. P255.

The eight characteristics of Ellis' model of information-seeking behavior represents the types of activities, rather than the stages that the users of information systems might want to accomplish through the systems and do not directly provide any design specifications for the systems. These are starting or surveying; browsing, chaining, monitoring, differentiating, extracting, filtering or verifying and ending.

Starting: Starting activity is characteristic of the initial search for information and involves identifying the initial materials to search through and select starting points for the search.

Browsing: Browsing involves a semi-directed searching in an area of potential interest as a monitoring activity going through the scanning ofjournals and tables of contents etc, to find the something of particular interest.

Chaining: Chaining is when the information seeker follows the chains of citations or other forms of referential connection between materials to identify new sources of information. Chaining can be forwarded where the user is looking for new. sources that refer to the initial source or follows footnotes and citations in an information source.

Differentiating: Differentiating is characterized by activities in which the user ranks the information sources based on their relevance and value to his or her information need.

Monitoring: Monitoring is similar to searching for the information for current awareness purposes where the user maintains an awareness of developments in his field of interest through the monitoring of particular sources.

Filtering: Filtering involves the use of certain criteria or mechanisms when searching for information to make the information as relevant and precise as possible, mainly through computerized literature searches.

Extracting: The user systematically works through a particular source to locate material of interest in the extracting mode. This implies the selective identification of relevant material in an information source and represents a major feature of the information-seeking patterns of many researchers.

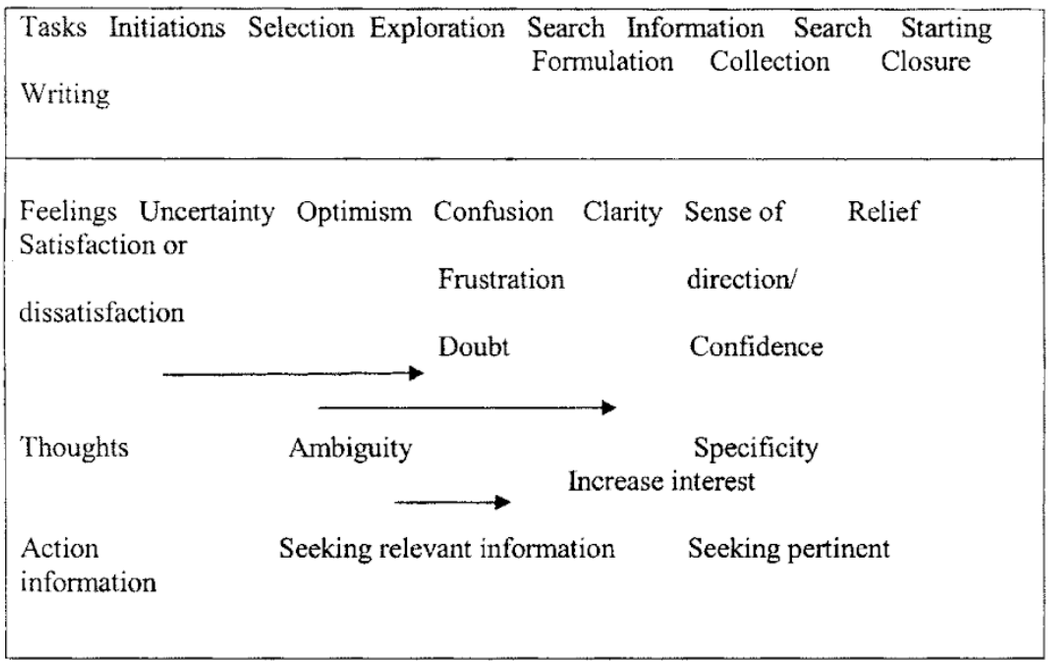
Ending: Ending involves 'tying up the loose ends' through a final search.

Kuhlthau's (1993) information search process model

Kuhlthau's information search process (ISP) model focuses on the affective and cognitive aspects of the information search process. According to Pettigrew, Fidel and Bruce her study is "a landmark study" which sets the scene for researchers "within the cognitive framework." Fidel maintains thaf'the study is one of the best examples of holistic research in which three realms were incorporated: the affective (feelings), the cognitive (thoughts) and the physical (actions) that are common to each stage of the information search process." The model has also been employed in a number of later

empirical studies, most of them dealing with relevance criteria or web information retrieval.

Kuhlthau's (1993) information search process model



Source: Kuhlthau C.C., 1993.

The different stages identified by Kuhlthau in the Information Search Process model are task initiation, topic selection, exploration, search formulation, information collection, search closure, and starting writing.

Initiation: The user becomes aware of an information need. Uncertainty and apprehension are the common feelings at this stage.

Selection: The user identifies and selects the general topic for seeking information. The user experiences a brief sense of optimism and a readiness to begin the search.

Exploration: This stage involves the seeking and investigation of information on the general topic. Feelings of uncertainty, confusion and doubt frequently increase during this stage.

Search Formulation: The user is now able to structure the problem which needs to be solved. Feelings of uncertainty diminish as user confidence increases.

Collection: Pertinent information for the focused topic is gathered. Uncertainty subsides as the user's interest and involvement in the project deepens.

Search Closure: The search is completed. This enables the user to put the information to use and report on his or her findings.

Conclusion

The information seeking behavior basically refers to the strategies and measures undertaken to locate the distinct knowledge essentials. The information use studies over the years have attempted to make clear the information use phenomenon, to understand information use behavior and improve information use by manipulating necessary conditions. The information seeking behavior results from the recognition of some need experienced by the user. Over the years there has been a change in the understanding of the information use behavior. Many studies in the past have stressed on the psychological aspect of the information seeking behavior. The user's information behavior is reflected in his affiliation to the information providing system such as library and its various products and services.

USER EDUCATION

1. INTRODUCTION
2. MEANING AND DEFINITION
3. NEED FOR USER EDUCATION
4. AIMS AND OBJECTIVES OF USER EDUCATION
5. METHODS OF USER EDUCATION
6. IMPACT OF INFORMATION TECHNOLOGY (IT) ON USER EDUCATION
7. INTERNATIONAL SCENE
8. THE INDIAN SCENE
9. RECENT TRENDS IN USER EDUCATION
10. CONCLUSION

REFERENCES

"If you give a man a fish,

1. INTRODUCTION

Libraries amass vast amount of information, which is available in print form such as books, journals, reports and now increasingly, in non-print forms such as CD-ROMs, e-journals, online databases via Internet and WWW. Information is the basic product that librarians handle and the needs to link effectively these huge and costly stores of information into the requirements of the parent organization curricula are the philosophical, economic and educational reasons for a user education program [1].

The Education of user plays a pivotal part and is a major landmark of Academic College Librarianship. Many colleges offer user education programs incorporating the objectives and practices specified, and aimed at providing confidence in approaching study in the widest sense, making a more effective, efficient student[2] during the period of his/her study at college, and making him a life long learner thereafter. The user specific collection and coupled with a solid background of theory and principles makes the users to adopt themselves easily to library practices. It is the library collection, which turns the students from classroom to wider study and to a contemporary society and scholarship.

Library user education is closely related to resources available in the library and off the library. This should be regarded as one of the most important activity of the modern library. User education has become information literacy because of the changing agenda in education, and the impact of the hybrid library[3]. This should include the use of modern methods of information handling – the use of bibliographical tools serving the production, abstracting and indexing of knowledge. Dr. Ranganathan emphasized this aspect of library in his Five Laws of Library Science and the "beehive" activity of the library.[4] Sir Charles Grant Robertson, a former Vice-Chancellor of one of the leading Universities in England, said that "If he were a dictator, he would reduce the time devoted to lectures to a third of that usually is occupied by them, and insist on the students spending three hours every day in the library"[5].

2. MEANING AND DEFINITION

The term user education has risen from the concept of reference service. The concept of user education was discussed by the American Library Association at its first conference held at the end of the 19th century. According to Norman Highman, there are three aspects of user education: firstly, helping them to use the library; secondly, help them to use the literature; thirdly, using the literature for them[6].

The term user education, user orientation, Bibliographic instruction, and user assistance are synonymous and have been often used interchangeable. The word user education is a broader term and encompasses orientation, bibliographic instruction, and user awareness.

Further, user education is derived as, user education is a combination of two words, User meaning who use anything and Education meaning systematic training and instruction. In the context of library the meaning of user education is systematic training and instruction to those who use library. At layman level, user education means, 'Guidance or instruction to the library user for using library resources. The term user education is further defined to make it very clear. The following definitions will highlights what user education is;

According to ALA Glossary of Library and Information Science, "User education encompasses all types of activities, designed to teach us about library services, facilities and organization of library resources and search strategy"[7].

Nancy Fjallbrant and Ian Malley defined user education as, "User education is concerned with the whole information and communication process and one part of this involves the total interaction of the user with the library. This should be continuous process starting with school and public libraries and with possibility of extension into academic and specialized libraries"

In the Parry Committee Report 1967, it is mentioned "all students should be given primary guidance on the layout of the library, its regulations and procedures. At a later stage, seminars should be held and lectures be delivered on the use of bibliographical tools and on guidance to the literature of students own subject".

Jacques Toctalian, former Director General of Information program of UNESCO, defined User Education in a generic way to include any effort or program, which will guide and instruct existing and potential users, individually or collectively, with the objective of facilitating;

- the recognition of their own information needs
- the formulation of these needs
- the effective and efficient use of information services and
- the assessment of these services[8] .

According to Mews, "Readers instruction" is taken to mean instructions given to readers to help them to make the best use of a library, particularly academic library [9].

Hence, it is a program designed to teach users the necessary skills to access the required information independently.

3. NEED FOR USER EDUCATION

The later part of the twentieth century saw the burgeoning of the library as an access point on information networks. Web based digital resources are becoming more and more prevalent and encompass more than 'surfing the net'. User education is becoming increasingly important for the users. Different methods are being tested as to how to incorporate technology skills into the research process.

Electronic resources and Internet access has made remote access to information a reality for users. In order to optimally utilize their information sources, user education program is tantamount in providing information users with the evaluation tools to function in the electronic

age. End user education is a new term used by researchers who rely on technology for accessing information. As remote users continue to grow as a segment of our academic library community, our instruction services have to change and accommodate their needs as well. With the increase in number of databases in various disciplines, the need of user education has become evident[10].

With the tremendous growth of information in various fields of human endeavor, new methods of bibliographic control, the introduction of new media of communication and the increasing focus on individual duty require the users of libraries especially academic libraries to have systematic rather than haphazard approach to their use. These factors have created confusion and bewildered many students. The application of new technology in information retrieval requires training for users. The changing pattern of education has also increased the necessity and the urgency for user education. Today, most of the libraries are using computers for information storage and retrieval. The need for instructing students in the proper use of library resources and services is a continuous one. Thus users need assistance to use library sources at various levels. The need of such programs is:

- To acquaint the user with learning techniques
- To enhance the academic level of students
- To make user handle library resources independently
- To develop awareness among users for maximum utilization of its resources
- To increase the knowledge of the user about CD-ROM databases, Online databases etc.
- To increase in the use of resources so that under utilization of the library resources can be tapped.

4. AIMS AND OBJECTIVES OF USER EDUCATION

The aims and objectives on a user education program are generally laid on the basis of the concept of user requirement.

The general aim as stated in UNISIST proposals, should be to reach a situation at each stage in the progress of science and in the development of information technology, when most if not all scientists recognize their information needs clearly can assess the strength and weakness of existing and experimental service[11].

The general objectives of user education program are as follows-

1. a general orientation to available facilities and resources
2. the teaching of the organization of literature in various disciplines as well as basic reference tools in each discipline
3. to create an awareness and understanding of the basic relevant library and information sources and services
4. to bridge the gap between the potential user and the collections
5. to enhance user's abilities to select appropriate information sources and systems for a given information need
6. to offer instruction in the effective and efficient use of the available library facilities and resources
7. to teach basic skills and strategies required to handle information in print and electronic form.[12] [13]

5. METHODS OF USER EDUCATION

With the migration to electronic information, librarians are shifting the bulk of user instruction to online searching using the World Wide Web. Based on various types of users, different modes of instruction training will be designed. Emphasis will be on revising existing user instruction to provide users with appropriate information skills.

Traditionally academic libraries have adopted the following ways to provide user education to the users.

- Introductory Briefing in the Orientation Program
- Library Brochure
- Library Tours – to make the user familiar with the layout and structure of the library

- Lecture
- Printed Guides
- Demonstration
- Individual Instruction
- Small Group Instruction
- Special Promotional Activities
- Role Play/Simulation activities
- Scheduled Workshop/seminars
- Audio-Video Lecture

But due to impact of IT on library resources and services, libraries have adopted new methods to introduce the users to electronic information resources and services, the new trend in user education methods are;

- Computer-Assisted-Instruction (CAI)
- Online Instruction
- CD-ROM Instruction
- Web based user education program

Educational techniques - such as tours and demonstrations, active learning, problem-based learning, social or community-based learning, self-directed or independent learning, and action learning can all be adapted for the range of traditional, electronic, and virtual learning environments. In each environment, it is important to consider what array of approaches to instruction - such as formalized classes during the course time, voluntary-attendance workshops, online assistance, and one-on-one consultations - provide the most effective support for learners. Approaches for the development of effective library assignments, resources, and tutorials in print and online deserves more concentrated research. The challenge before the library professionals are;

1. Can traditional teaching methods be successfully applied to Web-based instruction?
2. How effective is online instruction as compared to more traditional instruction methods?

3. Are problem-based assignments more effective than library-created assignments?
4. How effective are stand-alone assignments compared to course-integrated assignments?
5. How can assignments effectively integrate print and digital information sources?
6. What is the relationship between effective instruction and the timing of assignments?
7. How effective are different types of delivery methods for course-related instruction?
8. How can libraries effectively build upon the relationships between formal library instruction, one-on-one consultations, and integrated information literacy skills?[14]

6. IMPACT OF INFORMATION TECHNOLOGY (IT) ON USER EDUCATION

The introduction of information technology in library has necessitated changes in the user education program. Lectures, Library tour, Printed guides, seminars and workshops, introduction in the orientation program, and audio-visual method etc are the traditional methods of user education. Earlier card catalogue form is mostly used in the library for locating any document. Now a day due to automation of the libraries OPAC has replaced the card catalogue thereby reducing the duplication of work. Initial knowledge of computer is required for users. In the electronic age almost all the users should have preliminary knowledge about the computer. Librarians can educate the user in new systems by showing films, videotape and audiotape etc. Some programs of user education can be fed in these media.

During the last 25 years, from mediated online database searching to the World Wide Web, astounding strides have been made in the accessibility of information. These changes have revolutionized the use of libraries and library instruction. Libraries will be radically altered, as new modes of storage and dissemination of information become available. As access to

the, CD-ROM databases, Online Databases, e-journals continue to grow, so does its complexity. Artificial intelligence and expert systems will facilitate more user-friendly and human- machine interfaces. Natural language questions will replace keyword and Boolean searching. The need for training and education of users will grow, and librarians will find themselves to be the "information educators" on campus. These librarians will be responsible for understanding and using the various electronic media of which the library of the future may solely consist. As the librarians' roles will become more expansive and complex, they will have to be active learners who use and apply the resources they teach. They must keep pace with the changes of the Information Age, with the changes in our society and with technology [15]. The challenge of the future is not how to access some or enough information, but how to use and manage all this information in an effective way.

The following are the factors, which have influenced the change in the culture of user education program.

1. Technological Developments

The storage media of information are also seen innovation from magnetic tape to CD-ROM, DVDs etc. The attractive benefits like less space, quick access and 24x7 availability of information influenced libraries to metamorphose.

2. Electronic Publications

Information Technology or more pin-pointedly the Internet has changed the trend of publication. The wide use of technologies enforced the traditional publishers to go for electronic forms to keep themselves in the market. The fastness in publication, review leads to better version of the work. Therefore, to acquire the same library has to go for digitization.

3. Increase in usage of Electronic Information

The rate of electronic information users is doubling every year. Now the Internet based digital libraries are providing full text access to

books, theses and dissertations. The distance from the library to home / work place is no longer a barrier.

4. New Delivery Techniques

The e-mail messages, ftp, bulletin board services, home pages etc. have emerged as new information delivery techniques. These avoid errors of transcription, reduce the time and cost involved, provide flexibility of timings and overcome barriers of distance.

Librarians have begun to use the Internet and other new technologies to teach user education. New innovations have improved the information and telecommunications technologies, ever more powerful computers are being developed, and the Internet is growing at an increasing rate, and the classroom has moved away from campus. Students no longer need to come to the college campus to take classes, but with a computer can participate in degree programs from anywhere in the world. The same technology for accessing these programs can be used to access library services. Online library catalogs, dial-in bibliographic databases, full text articles, entire books, and information located on the Internet itself are providing better access to library services and information. If a student is not on campus and does not have access to the services of a librarian, he or she has to still learn how to apply the increasingly sophisticated and sometimes complicated online search methods of the various information sources available online. The most complete full-text online databases are useless unless the student knows how to find and retrieve the information. The off-campus student needs instruction in conducting library research and in the effective use of library resources, especially those available electronically on the Internet [16].

7. INTERNATIONAL SCENE

The origin of user education can be traced back around two centuries[17]. Louis Shores employed the term 'Library – Arts College' in 1934 for

changing the mode of instruction from the classroom lecture arrangement with the library as a supporting agency to the carrel or room in the library with the teaching/learning process dependent upon the individual and independent effort of the student. This term gradually changed itself into "Library College" when it was used by Robert Zorden for the first time in 1962. The systematic use of the term user education owes its origin to Patricia B. Knapp. The names of Louis Shores, Patricia B Knapp and Thomas G Kirk along with the names of undergraduate colleges like Monteith, Earlham, Swarthmore, Hamshire and Wabash are recorded as most significant landmarks in the history of user education. Patricia B. Knapp completed her report, "An experiment in co-ordination between teaching and library staff for changing students use of university library resource in 1964 in pursuant to a contract with the United States, office of Education, Department of Health, Education and Welfare. The project was undertaken at Monteith College in April 1960 for "exploring methods of developing a more vital relationship between the library and college teaching". It was Patricia B. Knapp who attempted to build a theoretical framework for user education, "because it is useful with regard to library skills to the academic community[18]. At this stage the user education was identified with bibliographic instruction and/or course related library instruction with its own strategy.

The Council of Library Resources and the Association of College and Research Libraries in USA, The British Library, Research and development department and the Centre for Research in user studies at the University of Sheffield, UK took lead in propagating user education programs and research in this area. During 1970s institutionalized patronage gave birth to some important user education projects such as Library Outreach Orientation Program, 1970, Library Orientation Exchange Project (LEOX), 1975, Programmed Logic for Automatic Teaching Operation (PLATO), 1979, followed by LEOX, the Traveling Workshops Experiment (TWE) at then Newcastle Tyne Polytechnic and the establishment of the Library Instruction Material Bank (LIMB) at the Loughborough University of Technology and the Centre for Research on User Studies (CRUS) at the University of sheffield were significant steps in this direction.

At Bangkok and Rome Seminars in 1976 UNISIST considered user education as an important factor in the national information policy of any country. The Rome Seminar recommended that the "National Policy on User Education should be formulated as an integral part of the national policy and in correlation with the national education policy". — reference ?

8. THE INDIAN SCENE

Instructing patrons on library use is not new for academic libraries in India and is recognised as a significant task for staff. The situation is similar in developing countries especially with the development of electronic information sources since the 1990s. In India user education continue to equate with library orientation.

The Indian Agriculture Research Institute offer a special course on 'Library use, reference compilation, scientific paper writing and proof correction for agriculture scientists. The contents of the course is as follows; (i) Library use (two lectures) (ii) literature search (five lectures) (iii) preparation of scientific documents (three lectures) and critical literature evaluation (three lectures). There was some effort by Subbiah Arunachalam of the Council of Scientific and Industrial Research, New Delhi, who took initiation in conducting information learning program for selected research institutes with the help of some volunteers, with the help of tape/side kits, cassette recorder and automatic slide projector[19].

A good number of the university libraries in India organize library orientation for new students at the beginning of the academic year. With limited time and a large number of students, this orientation provides an introduction about the library, resources, organization of material in the library, its services etc. New students, who arrive with different educational and environmental backgrounds, are given this orientation on how to use the library. Library tour is the preferred method of used in almost all libraries. However, other methods are also followed in user education program viz. traditional classification and cataloguing skills and information about library sections where book and archival materials could be traced; ability to access information stored on microfiche, audio-visual

format and on CD-ROMs; learning to open and close a computer; composing, sending and receiving e-mails; and using the OPAC. However, the University of Hyderabad Library conducts user-training sessions in small groups with hands-on experience for all users about OPAC. This university library, in contrast with the others, conducts training programs throughout the year with new students being trained at the time of joining the institution as part of the orientation program.

Despite India being one of the first countries to launch the National Information System called NISSAT (National Information System for Science and Technology). It is observed that the awareness about user education / information literacy is gaining importance in India. But still there are no set standards and guidelines available at national level. Hence, the user education in academic institutes in India is yet to make right stride. User education in school libraries is a far off question; as such schools have only "namesake" libraries with negligible numbers of books and managed by non-professionals. The INSDOC produced an instructional kit entitled "Let us find out", meant for the use of libraries by school children. SNDT Women's University, Bombay prepared a tape slide presentation for user education in mid 1980s, and recently it started providing user education through workshop.

Users need to learn to retrieve information and also how to organize, evaluate and communicate it. In this sense, in addition to acquiring library skills, there is a need to impart learning and communications skills. A few examples of organizations that have organized user education programs of this nature include: ASCI (Hyderabad) and BHEL (Hyderabad) in association with the INSDOC and the SENDOC respectively.

Teaching faculty and library staff should share this program in order to make it successful in a real sense. A few examples in this regard are: the experiment at the Centre for the Study of Social Systems, JNU carried out by Girja Kumar and P.K. Jayaswal in1984-85; the use of Faculty Workshop Experiments Social Welfare Information Learning Packages and Mechanical Engineering Information packages for the teaching was highly structured and problem oriented. In many of the short-term specialized

training program conducted by SIET, Hyderabad, for potential entrepreneurs, close involvement of teachers and library information specialists was found essential in the completion of the project/feasibility reports. There has also been Mathur's Experiment of a Personalized System of Instruction at the Indian Institute of Technology (IIT), Delhi in 1978 [20].

No doubt academic libraries in India have now realized the importance of user education in their services, but in practice no academic institution is in a position to provide regular user education programs in a real sense for the benefit of all their users. Some of the research institutions like IIT are using audio-visual methods to orient their users, but the majority of academic libraries have not even paid sufficient attention to providing an adequate signage system to guide their readers.

A few seminars and workshops were promoted by INSDOC, DRTC, ILA, IASLIC, IATLIS, UGC, etc. are:

- a national conference on user education organized by the IASLIC in Waltair in 1981;
- a seminar on "Development in user studies and user education" held in the Department of Library and Information Science of Osmania University, Hyderabad, on 22 June 1985;
- A national seminar on 'User Education in Academic Libraries in India', organized by the Department of Library and Information Science, Lucknow University, in November 1986.
- A 51st All India national conference on 'Libraries, Information Literacy and Lifelong Learning', held at Kurukshetra, December 16-18 2005, organized by the Indian Library Association, Delhi, 2005.
- A national workshop on 'Application of Instructional Technology to Information Literacy Programs', jointly organized by the Dept. of Library and Information Science and Dept. of Education, Univ. of Mumbai during 30th November to 2nd December 2006.
- A national seminar on 'Information Literacy and Higher Education' 29-30 January 2007, Dept. of information science, University of Madras, Chennai.

On the whole it can be said that user education in most of the academic libraries in India continues to be equated with library orientation. As a result, the other important components get neglected. In fact, the necessary infrastructure to sustain programs of user education is lacking in India.

9. RECENT TRENDS IN USER EDUCATION

Many of the earlier models for teaching user education were based on the teaching process[21]. Currently in higher education, emphasis has shifted from teaching towards facilitating learning. Learning can be described as a process of change in which the process and the outcomes vary in different people. Students approaches learning describe the way that they set out to tackle a given learning task or piece of work. One important concept in research in student learning is that there are different approaches to learning. The approach can also vary with the type of task that is the approach is context-specific. Learning is measured in terms of the quality of understanding and its relevance to the learning situation. It is based on the assumption that knowledge is relational, where the relation is between the knower and the object. This provides valuable insight for the teaching/learning situation, which is dependent not only on the knowledge of the lecturer, but also on the way in which that can be experienced by the students.

During the last four decades there has been a gradual but steady growth in user education. In the last decade, in particular, teaching about electronic information retrieval has widely spread in academic institutions. This is due to the abundant availability of information in various forms such as CD-ROMs. VCDs, DVDs, CD-ROM Databases, e-journals, e-books, Online Databases etc. User education is still best developed in the subject areas[22] which are providing regular courses such as Arts, Science and Commerce.

Beginning in 1973, the Instructional demands on librarians are changing as the focus on instruction shifts from print to electronic resources. User

education has emerged to enjoy widespread though not universal, acceptance in academic libraries in the last twenty five years. Using learning theories and additional knowledge from education, psychology and other disciplines, instruction librarians have developed sophisticated user – education programs. Advancing beyond an earlier emphasis on library orientation and individual research tools, these new approaches focus on concepts such as information structure and research strategy and use innovative learning approaches such as guided design. Course related and course-integrated instruction displaced the library tour as the preferred form of presentation. Most of the instructional programs, however still focus on the use of research tools in the library, whether it is print or machine-readable format.

Efforts to incorporate electronic media into instructional programs have focused on CD-ROM instruction, computer-assisted instruction, and online instruction. Recently, efforts are also made to provide web-based library instruction with the help of subject guide to reliable Internet sites for research purposes on the library home page and also the development of web based on line tutorials linked to the library web site so that users have immediate access to instruction.

10. CONCLUSION

Now the physical form of materials is drastically changed to electronic form viz. CD-ROM, DVDs, Online databases, etc. thereby reducing the gap between the information generation and use. To cope up with these library have changed their ways of organizing material and providing services. The impact of information technology (IT) has changed the way librarians used to think, visualize and act. The continuous development in the field of IT will continue to influence the library profession. Therefore, the library professionals have to devise the ways and means to make the users lifelong learners. Particularly in electronic environment there is dire need to develop the user education program on the lines of the guidelines and standards brought out by ACRL, UNISIST etc. at International level. Many of the users are to a large extent ignorant of the methods of using the current mode in which information is stored, the nature and type of services available and also the existence of information sources that may be of relevance. Hence, planning and conducting user education program not only to provide every reader his/her document but also to ensure every document its reader.

UNIT – 3

Study of National Documentation Centers, information systems and programmes-

India has a well-developed library and information system in most of the disciplines covered by science and technology. There are five documentation and information centers in India

established in the eighties, including the National Center for Science Information in Bangalore and the Indian National Scientific Documentation Centre (INSDOC). The National Documentation Centre (NDC) is a unique information resource center that provides access to documentation on all aspects of the subjects of health and family welfare. The National Social Science Documentation Centre (NASSDOC) collects, stores, and disseminates techno-managerial information pertaining to MSMEs and conducts need and demand-based research

National Information Systems, Services, and Products: NISCAIR

QP-2021: Discuss the objectives and functions of NISCAIR

I. Objectives

• To get an insight in to the wide variety of activities, resources, projects, and services of NISCAIR – a premier S&T Institute in the field of Information Science in India

1. Introduction

National Institute of Science Communication and Information Resources (NISCAIR), New Delhi, came into existence on 30 September 2002 after the merger of National Institute of Science Communication (NISCOM) and Indian National Scientific Documentation Centre (INSDOC). Both NISCOM and INSDOC, the two premier institutes of the Council of Scientific and Industrial Research (CSIR), were devoted to dissemination and documentation of Scientific and Technological (S&T) information.

INSDOC was established in the year 1952 and was engaged in providing S&T information and documentation services through many activities such as abstracting and indexing, design and development of databases, translation, library automation, providing access to international information sources, human resource development, and consultancy services in setting up modern library-cum-information centres. Besides these activities, INSDOC was also host to the National Science Library (NSL) and the SAARC Documentation Centre. On the other hand, erstwhile NISCOM came into being with the renaming of the Publications and Information Directorate (PID) in 1996. PID was formed by merging two separate publication units, viz., Dictionary of Indian Raw Materials and Economic Products, renamed as Wealth of India (1948) and Journal of Scientific and Industrial Research, instituted in 1942.Over the years, NISCOM diversified its activities, and through a host of its information products, comprising research and popular science journals, encyclopaedic publications, monographs, books, and information services, it had been reaching out to researchers, students, entrepreneurs, industrialists, agriculturists, policy planners and also the common man.

With the formation of NISCAIR, all the above multi-faceted activities have been combined, making NISCAIR, an institute capable of serving the society using modern IT infrastructure in a more effective manner and taking up new ventures in the field of science communication, dissemination and S&T information management systems and services. Broadly, the core

activity of NISCAIR is to collect/store, publish and disseminate S&T information through traditional and modern means for the benefit of various segments of society. NISCAIR is one of the premier institutes of Council of Scientific & Industrial Research (CSIR) serving the society using modern IT infrastructure. Since its inception, it has been laying emphasis on the benefits of information technology to effectively serve the national and international community and to be an institution of international standard and repute. The concerned areas are: knowledge networking, databases on natural resources, science communication, science popularization and S&T information management systems and services.

With a view to understanding various activities of NISCAIR, the same have been categorized under the main headings as Information Products and Services; Information resources; and Projects. A description of these activities is presented in this module.

2. Mission and Objectives

The mission of NISCAIR is to become the prime custodian of all information resources on current and traditional knowledge systems in science and technology in the country, and to promote communication in science to diverse constituents at all levels, using the most appropriate technologies. Its mandate and objectives are:

• To provide formal linkages of communication among the scientific community in the form of research journals in different areas of S&T;

• To disseminate S&T information to general public, particularly school students in order to inculcate interest in science among them;

• To collect, collate and disseminate information on plant, animal and mineral wealth of the country;

• To harness information technology applications in information management with particular reference to science communication and modernizing libraries;

• To act as a facilitator in furthering the economic, social, industrial, scientific and commercial development by providing timely access to relevant and accurate information;

• To develop human resources in science communication, library, documentation and information science and S&T information management systems and services; and

• To collaborate with international institutions and organizations having objectives and goals similar to those of NISCAIR.

3. Information Products and Services

3.1 Bibliometric Service

Bibliometric services are carried out for studying growth, development and spread of any area of research, and also for identifying centres of excellence, influential authors, etc. The services are useful for heads of departments/institutions, research planners, policy makers and individual scientists. These services include Citation analysis, Impact factor, Bibliometric analysis, and Multifaceted Bibliometric analysis, etc.

3.2 Contents, Abstracts, and Photocopy Service (CAPS)

CAPS is an innovative personalised information service provided by NISCAIR. A list of over 7,000 core journals in various disciplines has been identified. The researchers are required to select from this list (available free, on request) the journals of their choice. After going through the table of contents, researchers can receive the abstract or full text of desired articles through NISCAIR's Document Copy Supply Service.

3.3 Foreign Language Translation Service

NISCAIR provides translation of S&T documents from 20 foreign languages into English. The languages include Chinese, Czech, Danish, Dutch, French, German, Hungarian, Italian, Japanese, Norwegian, Polish, Portuguese, Rumanian, Russian, Serbo-Croatian, Spanish, Swedish, etc. The clients include National Laboratories, S&T institutes, R&D Organisations, Corporate and Public Sector Undertakings, Universities, Research Scholars, etc.

NISCAIR also provides reverse translation, i.e., English into foreign language. Translation of English text of maximum of one page into French, German, Russian and Spanish is undertaken. For Japanese language, translation of full English documents is undertaken, besides interpretation and consultancy assignments in this language.

Recently, ongoing S&T translation services have been initiated. The languages covered are: Chinese, French, Japanese, Russian, and Spanish

3.4 Document Copy Supply Service

NISCAIR provides this service to the Indian scientific community by supplying copies of articles from Indian and foreign journals. Copies of Indian and foreign patents and standards can also be obtained from NISCAIR.

3.5 Literature Search Service

NISCAIR offers literature search service and compiles bibliographies on demand from indigenous as well as from international databases in the areas of S&T, engineering, industry, etc.

3.6 Human Resource Development (HRD)

NISCAIR with necessary facilities and man power trains and prepares science communicators, R&D personnel, and library and information science professionals for meeting the challenges of current times. NISCAIR's HRD Programmes are categorized as follows:

3.6.1 Short-term Training Programmes

NISCAIR conducts short term courses in the field of Library and Information Science and other related areas. These pertain to Information technology for information management, Office automation, Bibliometric tools, Library automation and networking, Digital libraries, and Science communication,

3.6.2 On-site Training Programmes

Under this programme, NISCAIR organizes training courses as per requirements of the clients at their premises subject to minimum 10 and maximum 25 participants respectively.

3.7 Consultancy Services

NISCAIR provides consultancy services in the areas of automation, modernization and reorganization of libraries and information centres; design and development of specialized databases for organizations on turnkey basis; editing, designing, production and printing; and publication jobs.

3.8 Research Journals

3.8.1 Online Access to NISCAIR's Research Journals

NISCAIR has been able to host online its research journals through a solution called “NISCAIR ONLINE PERIODICALS REPOSITORY (NOPR)” which is implemented based on the open source digital repository system software. All the 18 research journals of NISCAIR have been added under open access mode for accessing full text [http://nopr.niscair.res.in]. Research communities, including students not only in India but all over the world, are being benefited by open access availability of NISCAIR journals. Current issues of all the research journals are published in NOPR for open access well before the publication of print version. The repository has data spanning from 2007 till current issues and for some journals from 2002 onwards. The repository contains around 6400 articles. Further, to increase visibility of NISCAIR journals, all the journals are registered with Directory of Open Access Journals (DOAJ), Registry of Open Access Repositories (ROAR), Directory of Open Access Repositories (DOAR), Google Analytics and all of the prominent search engines. The list of 18 research journals published by NISCAIR is available on its website.

3.9 Abstracting Journals

3.9.1 Indian Science Abstracts (ISA, semi-monthly)

ISA is a semi-monthly abstracting journal reporting current Indian scientific work published in India and abroad. It reports scientific work done in India since 1965. Original research articles, short communications, review articles, and informative articles published in current scientific and technical periodicals, proceedings of conferences and symposia, monographs and other publications, as well as patents, standards and theses are reported in ISA. Besides

the print version, ISA is now available online and its various issues from the year 2004 can be browsed.

3.9.2 Medicinal and Aromatic Plants Abstracts (MAPA, bi-monthly)

MAPA is a bimonthly abstracting journal covering world literature on agronomy, botany, pharmacognosy, and biological activities of medicinal and aromatic plants. MAPA is produced by scanning, selecting and abstracting relevant papers from about 600 primary journals published from about 65 countries and in 25 languages, research reports, conference proceedings and patents. Each issue and volume of MAPA is supported by a keyword index. From 1988 onwards, MAPA is available on CD-ROM also.

3.10 Popular Science Magazines

NISCAIR publishes three well-circulated popular science magazines, viz. Science Reporter (English, monthly), VigyanPragati (Hindi, monthly) and Science-ki-Duniya (Urdu, quarterly). These magazines publish informative popular science articles on contemporary science topics apart from a rich flare that includes humour and fiction, puzzles, quizzes and crosswords, amazing scientific facts, inventions and discoveries, science projects and biographies of scientists.

3.10.1 Science Reporter

Science Reporter is one of the oldest English language popular science monthlies published in India since 1964. From its initial objective of making the people of India aware of the innumerable technologies being developed within our scientific establishments, Science Reporter has today grown into being much more than just a vehicle for relaying information about technologies being developed in the national laboratories. Presently, it is a popular platform for exchanging ideas about the state of science in the country, matters of science policy, and discussing the future course that science in India should take. Besides, it is also a one-stop solution for students on the lookout for latest updates from the world of science. They find in Science Reporter a comprehensive package of information, which helps them not only during competitive exams but also throughout their careers.

3.10.2 VigyanPragati

In 1952, the publication of VigyanPragati was started as a newsletter disseminating information on scientific research carried out in the CSIR institutes. Subsequently, it was converted into apopular science magazine to inculcate scientific temper among the common people, helping them to remove superstitions. Since then, in consonance with its title VigyanPragati, it is continuously making people aware of the progress science is making.

3.10.3 Science Ki Duniya

Started in 1975, Science-ki-Duniya is the only Indian popular science journal in Urdu. Over the period, this quarterly journal has published articles by various eminent scientists such as

Prof. Abdus Salam (Nobel Laureate), Prof. D.S. Kothari, Prof. A.R. Kidwai, Prof. A.M. Khusro, Dr.KishanLal, Prof. M. Shafi and Prof. A. Rahman. It provides a package of varied columns such as Science Quiz, Science Models, Crime and Science, Cartoons, Science News, and Science for Children apart from other topical and absorbing articles in each issue.

3.11 R&D Newsletters: CSIR News and CSIR Samachar

NISCAIR brings out two newsletters viz. CSIR News (in English) and CSIR Samachar (in Hindi). CSIR news is fortnightly, while CSIR Samachar is a monthly. The purpose of these publications is to create an effective link between various CSIR constituents and users of information on various R&D programs and other activities of CSIR, other R&D organizations, university departments and industry. R&D programs include new processes and products developed, programs undertaken, collaborative projects, sponsored projects and consultancies. In addition, news on technology demonstrations, marketing, transfer of technology, Intellectual Property Rights (IPR), etc. are also covered. S&T activities include conferences, seminars, workshops, training programs, honours and awards, appointments of CSIRDirectors, etc.

3.12 National Prior Art Search Services Facility (NPASF)

NISCAIR has instituted NPASF for the benefit of researchers, inventors, scientists of national research facilities and science planners. Under NPASF, the following services are provided:

3.12.1 Patent Drafting

Under this service, professionals help in the preparation of patent drafts enabling complete description of the embodiment of a process, machine, matter is provided. This is done as per technical requirements, viz. title, cross references, background, summary, description (both brief and detailed), claims, abstract, and sequence listing.

3.12.2 Prior Art Search

Under the Prior Art Search facility, one can reveal prior inventions that bear close resemblance to any patent or non-patent literature. A search is conducted on patent literature, product literature, research journals and databases. One can obtain search and analysis report for proposed idea/query with respect to their novelty and inventiveness. This helps in filing of patent application or initiating new research proposals.

3.12.3 Patent Informatics Service

Patent Informatics is the analysis of multiple patent data at macro level. Under this service, analysis is carried out on large volumes of patent data in order to have an idea about the technology landscape. This results in unearthing of strengths and weaknesses of technologies, markets and portfolios. This helps in policy decisions, R&D strategy, technical auditing and investment decisions

3.13 International Standard Serial Number (ISSN)

NISCAIR's National Science Library (NSL) is the National Centre of the ISSN International Centre for assigning ISSN numbers for serials published in India. ISSN is a worldwide identification code used by publishers, suppliers, libraries, information services, bar coding systems, union catalogues, etc. for citation and retrieval of serials such as Journals, Newspapers, Newsletters, Directories, Yearbooks, Annual Reports and Monograph series, etc. ISSN is useful in international publicity and recognition as the concerned serial is automatically included in the International Serials Directory Database. ISSN International Centre is a network with its Headquarters at Paris.

3.14 Natural Products Repository

NISCAIR has launched a quarterly online open access repository entitled, Natural Product and Resources Repository (NPARR) from 2010. It plans to include abstracts of papers along with citation and correspondence address through collection and collation from various core and noncore journals. There is also a provision for authors for sending soft copies of abstracts of their published papers, technologies/know-how developed at their institute/university (during current year) for including under respective group of products/technologies

3.15 Editing

NISCAIR provides editorial services for Conference Proceedings, Scholarly Books, Popular Science Books, etc. for other organizations on man-hour basis. Editing jobs cover content editing as well as copy editing and stylization

4. Information Resources

One of the core activities of NISCAIR is to collect, organize and disseminate S&T information generated in India as well as in the world which has relevance to Indian S&T community. Under this programme, the institute is building comprehensive collection of S&T publications in print as well as in electronic form and disseminating through traditional as well as modern means benefiting various segments of the society. **Major resources under this activity are Wealth of India, Bharat Ki Sampada, National Science Library, Scholarly books and Monographs, Popular science books, Indigenous Databases, National Union Catalogue of Scientific Serials in India, and Raw Materials Herbarium and Museum. A brief description of these resources is provided below**.

4.1 National Science Library

NSL has a comprehensive collection of S&T publications in the country and is offering services on a national scale. It also acts as a referral centre and clearing house for the best utilisation of the existing collection in the country. Set up in 1964, NSL aims at acquiring all important S&T publications published in the country and strengthening its resource base for foreign periodicals by acquiring the journals on CD-ROM or other electronic form as far as possible. NSL has a rich collection of over 2,40,000 volumes including monographs and

bound volumes of journals in the various fields. Its print resources include-reference material/secondary sources in most of the fields of science and technology, information technology, library and information science, proceedings of conferences/seminars/symposia held in the field of science and technology in and outside the country; foreign language dictionaries; Indian scientific and technical periodicals; important foreign serials in the field of science and technology; specialized collection in the field of information science and library studies; and reports of R&D organizations. The services of NSL include- OPAC, E-journals, and ISSN besides routine activities of a library. NSL provides its scientists/members/users the facility to access/browse and download any paper for their use from 4256 international e-journals published by 16 publishers/societies (as per details provided in other section on NKRC). Besides this, users have access to over 2500 open access journals. (Students are advised to visit official Web site of NISCAIR for current details)

4.2 Wealth of India (WOI)

WOI is an authoritative reference standard for information on raw materials of India particularly in the current global trend to incorporate traditional knowledge systems into the proprietary mainstream. It is also a ready reckoner for researchers, entrepreneurs, plant-based industrialists and policy makers. Policy-planners use the information to prevent bio-piracy. It has in the recent past played a major role in India's claim for priority in the US patent case on turmeric. WOI is considered as an encyclopaedic series on India's raw material resources of plants, animals and minerals, details their occurrence, distribution, description, composition, utilization and trade. The series, known for its authenticity, is the essence of information scattered in a wide range of information sources. Each resource profile is a monographic presentation beginning with the correct nomenclature, the known names in vernacular, gives a brief description, chief areas of distribution in India, broad parameters of cultivation in case of plants, pathological problems in case of plants and animals, chemical constituents, products, utilization, production, consumption (in case of minerals), and trade data.

4.3 Bharat Ki Sampada

NISCAIR brings out wide range of Hindi publications ranging from research journals to popular science books and magazines. With continuous increase in the wealth of information and IT revolution with relevance to dissemination of science in Hindi, the role of NISCAIR has become all the more significant. Bharati Ki Sampada – PrakritikPadarth is an encyclopaedia on Indian raw materials based on flora, fauna and minerals, in which the entries appear in Devnagari alphabetical order. A series publication of 12 volumes and two supplements, Bharat Ki Sampada is the Hindi version of The Wealth of India - Raw Materials series with a difference in subject matter, volume-wise. Prepared by the experts, the articles in Bharat Ki Sampada series cover those plants, animals and minerals which render medicines, food products, beverages, fruits, nuts, spices & condiments, fats & oils, essential oils, masticatory, fumigatory, fibre, pulp, wood, and forest products, etc Each entry in its series provides correct identification of plants and their scientific and vernacular names, in addition to relevant references, and index on the names in Indian languages. Articles on crop plants

cover the aspects pertaining to cultivation, harvesting, storage, diseases and pests and their control, etc. For raw materials, the series covers information on the occurrence in the country, data about their production, yield, import and export.

4.4 Scholarly Books & Monographs

NISCAIR publishes comprehensive state-of-the-art reports on specialized subjects for the benefit of research scientists and academicians. The details of various publications are available on the NISCAIR website.

4.5 Popular Science Books

NISCAIR has brought out as many as 60 popular science books in English under different series, viz. CSIR Golden Jubilee Series (25), Sci-Fun Series (7), Q-series (3), Vistas in Biotechnology Series (10), Foundations of Biotechnology Series (6), Others (9), AIDS, Science and Society in the 21st century, Healthcare Education & IT, The Road Ahead and the encyclopaedic publication Golden Treasury of Science and Technology (New Enlarged Diamond Jubilee Edition). Also 28 books have been brought out in Hindi.

4.5.1 IT for All

The institute has launched a new series of books on 'IT for All'. Topics of these books include Microsoft Word for Beginners, Microsoft Power Point, Web dot Com, Build your web home, C++ for beginners, The 'C' Adventure, Visual Basic. Apart from English, all the seven books are available in Hindi, Punjabi, Urdu, Kannada, Gujarati, Marathi, Tamil, Bengali, and Malayalam.

4.6 Raw Material Herbarium & Museum

With a view to catering the needs of scientists, researchers, industrialists, students and the public at large, NISCAIR has set up a Herbarium and Museum. It houses economically important raw materials of plant, animal and mineral origin from India at one place. The Herbarium houses over 8000 specimen of economic and medicinal plants of India and the Museum comprises over 3000 samples of crude-drugs, animal and mineral specimens. The NISCAIR Herbarium & Museum has been assigned the acronym RHMD (Raw Materials Herbarium & Museum, Delhi) by the International Association for Plant Taxonomy, which appeared in the publication ‘Index Herbarium, New York, USA (1990)’. The herbarium provides information on folk-lore, ethnomedicine and traditional medicine and is a source of knowledge for development of new herbal medicines.

4.7 National Union Catalogue of Scientific Serials in India (NUCSSI)

NUCSSI is one of the oldest services of NISCAIR and its database serves as an ideal tool to access journal holdings information. It is a data repository of a large number of unique journal titles and library holdings belonging to major universities, S&T institutions, R&D units of industries, higher institutes like Indian Institute of Science (IIS), IITs and professional

institutes spread all over the country. NUCSSI provides information regarding the availability of journal titles in the libraries. Regular updation of the database is enhanced with the online access granted to the participating libraries via internet, so that users may get the updated information free of cost. Further, a user friendly interface and powerful search enables easy and improved access to locate a particular journal and its availability in various libraries. Regarding its statistics, so far a total of 45541 journals have been listed, total holdings are 264834, while total participating libraries are 564.

5. Projects

5.1 Science Communication through Multimedia (SCM)

Established in 2010, SCM-Division is responsible for communication of science through multimedia. The mandate of the division is three fold viz. to carry out research in the area of scientific temper, public understanding of science and communication of science; to collate existing audio-visual material and generate fresh content using multimedia and make it accessible to the public at large; and to interact with common citizens, scholars, experts and institutions on issues of science and science communication. The Division is engaged in carrying out research in the area of development of communication models, probing the shifts of conceptual models, indicators and tools for measuring public understanding of science and scientific temper and administering survey studies among public.

SCM Division has constructed a CSIR-NISCAIR-Tube, a platform to collect all the science films that have been produced by CSIR labs and other science departments in the country. There is also a provision for individuals to approach NISCAIR to upload material which is being produced in the country including their power-point presentations. The content generated by SCM division is also uploaded regularly on the CSIR-NISCAIR-Tube.

As a new initiative, the SCM Division is planning to take up a series of activities to connect to the larger audience. For example, CSIR-NISCAIR Social Networking site is being constructed to provide better, efficient and fast interaction between the scientists. This platform is also likely to connect the scientist with the public where a common citizen could pose questions, which could be directed to a scientist or a group of scientists for providing explanation.

5.2 National Knowledge Resources Consortium (NKRC)

With a view to strengthening R&D in CSIR laboratories, NISCAIR has developed a "Consortium for CSIR Laboratories for Accessing e-journals" as its nodal agency. The activity ranges from creation to monitoring of the access facility of scientific periodicals published by leading international institutions. Under this scheme, CSIR scientists are able to access these journals and download material for their use.

The National Knowledge Resource Consortium (NKRC), established in year 2009, is a network of libraries and information centres of 39 CSIR and 24 DST institutes. NKRC's origin goes back

to the year 2001, when the CSIR set up the Electronic Journals Consortium to provide access to 1200 odd journals of Elsevier Science to all its users. Over a period of time, the Consortium has grown in terms of the number of resources and also in terms of the number of users as more and more institutes have shown their interest to join the Consortium. Currently, NKRC facilitates access to 5,000+ e-journals of all major publishers, patents, standards, citation and bibliographic databases. Apart from licensed resources, NKRC is also a single point entity that provides its users with access to a multitude of open access resources.

5.3 Digital Information Resource Facility (DIRF) Data Centre

NISCAIR is functioning at two separate locations viz. Pusa location and SatsangViharMarg with 250 and 360 nodes respectively having 4 Mbps Leased Line Internet connectivity. The volume of data, being managed at NISCAIR, in the form of Databases and CDs, is in Tera Bytes with an exponential growth. NISCAIR also acts as repository on Library and Analytical facilities under CSIR. With new ICT tools, the knowledge repositories are growing at exponential rates and require massive and updated capabilities for management of information resources and services including hosting and sharing. Further, NISCAIR scientists are making use of the IT Infrastructure for data transfer, communication, exchange of manuscripts and data with authors and referees. The services and data hosted on serversare in unorganized manner without any redundant infrastructure, major security and archival/backup facility. This has significantly impacted level and quality of NISCAIR's services. With a view to overcome the existing constraints, NISCAIR has proposed to set up a project on Digital Information Resource Facility (DIRF), as an integrated facility. The focus of the facility is to provide uninterrupted, authorized and secure access to NISCAIR and CSIR Resources to the scientific community and researchers all over the world. After the establishment of DIRF all these applications will be migrated on the servers kept in Data Centre in coordination with NISCAIR. The project, setting up of Digital Information Resource Facility (DIRF) has a single focus on setting up an integrated state-of-art facility for managing and sharing digital information resources of CSIR.

Its main Objectives are:

- Managing and securing the digital assets systems created by NISCAIR
- Providing uninterrupted data services.
- Providing long-term scalable storage infrastructure.
- Managing high volume of incoming and outgoing content.
- Streamlining net-centric operations, and
- Providing authorized and secure access. (Remote & Local Both)

5.4 CSIR Knowledge Gate Network Project

CSIR Knowledge Gateway & Open Source Private Cloud Infrastructure (KNOWGATE) is 12th Five Year Plan (FYP) Network Project under Information Sciences cluster. The project would be implemented in phased manner by dividing CSIR KRCs (Knowledge Resource Centres) in

four groups a network mode by CSIR-NISCAIR as nodal laboratory. Participating laboratories include CSIR-M Complex & CSIR-HQ. Its Objectives are:

• To enhance the capacity and capability of CSIR computing power through CSIR private cloud infrastructure and Open Source Software Technology Solution Cell (OSSTSC),
• To provide CSIR KRCs an Integrated Library Management Solution using open source Software,
• To share information resources among CSIR laboratories by creating CSIR Distributed Library: catalogue sharing, inter library loans, & referral service for document supply service, and
• To analyse CSIR research, technology and related data using multi-dimensional analysis.

DESIDOC

Defence Research and Development Organisation, DRDO

DRDO is the R&D wing of **Ministry of Defence, Govt of India**, with a vision to empower India with cutting-edge defence technologies and a mission to achieve self-reliance in critical defence technologies and systems, **while equipping our armed forces with state-of-the-art weapon systems and equipment in accordance with requirements laid down by the three Services**. DRDO's pursuit of self-reliance and successful indigenous development and production of strategic systems and platforms such as **Agni and Prithvi series of missiles; light combat aircraft, Tejas; multi-barrel rocket launcher, Pinaka; air defence system, Akash; a wide range of radars and electronic warfare systems; etc**., have given quantum jump to India's military might, generating effective deterrence and providing crucial leverage.

"BalasyaMulamVigyanam"—the source of strength is science-drives the nation in peace and war. DRDO has firm determination to make the nation strong and self-reliant in terms of science and technology, especially in the field of military technologies.

DRDO was formed in 1958 from the amalgamation of the then already functioning Technical Development Establishment (TDEs) of the Indian Army and the Directorate of Technical Development & Production (DTDP) with the Defence Science Organisation (DSO). DRDO was then a small organisation with 10 establishments or laboratories. Over the years, it has

grown multi-directionally in terms of the variety of subject disciplines, number of laboratories, achievements and stature.

Today, DRDO is a network of more than 50 laboratories which are deeply engaged in developing defence technologies covering various disciplines, like **aeronautics, armaments, electronics, combat vehicles, engineering systems, instrumentation, missiles, advanced computing and simulation, special materials, naval systems, life sciences, training, information systems and agriculture. Several major projects for the development of missiles, armaments, light combat aircrafts, radars, electronic warfare systems etc** are on hand and significant achievements have already been made in several such technologies.

Vision

Empowering the nation with state-of-the-art indigenous Defence technologies and systems.

Mission

- Design, develop and lead to production state-of-the-art sensors, weapon systems, platforms and allied equipment for our Defence Services.
- Provide technological solutions to the Services to optimise combat effectiveness and to promote well-being of the troops.
- Develop infrastructure and committed quality manpower and build strong indigenous technology base.

Defence Scientific Information & Documentation Centre (DESIDOC)

DESIDOC has various verticals like ***Defence Science Library, Network Services, Digital Library & E-Services, Publications, Multimedia, Marketing and Printing***. All these Divisions work…

Vision

To provide essential science and technical research, development information rapidly, accurately and reliably to support DRDO's Scientists' needs.

Mission

- To establish an integrated resource centre and state-of-the-art information management system encompassing knowledge centre, publishing, e-services, printing and multi-media
- To collaborate with national and international institutions/academia/ organizations for cooperative partnerships to improve upon quality and bring visibility to DRDO's R&D Publications
- To introduce new innovative Defence Research Journals for the benefit of R&D community
- To improve the role of DESIDOC's Defence Science Library by reinventing library functions and services with focus on the perception and expectation of the users
- Embracing advanced technologies to provide library and information services on emerging digital platforms
- Introducing digital imprint of DRDO to connect with the scientific and civil society through online community
- Building a "single window" facilitation by improving the quality of print-media, multi-media and network services.

Defence Scientific Information and Documentation Centre (DESIDOC)

QP-2019: Explain the information services of DESLDOC

Has its beginning as Scientific Information Bureau (SIB)**which was established in 1958 as division of the Defence Science Laboratory,** which later became Defence Science Centre and subsequently now known as Laser Science & Technology Centre (LASTEC).

It became a self-accounting establishment 29 July 1970.

In pursuit and promotion of science, DESIDOC acts as a science and society interface of DRDO and plays a very important role in promoting S&T, and bringing public awareness and understanding of science in the scientific and civil society.

DESIDOC has the vision, "to provide essential science and technical research, development information rapidly, accurately and reliably to support DRDO's scientists' needs". The academic pursuit of DESIDOC's through its in-house publications is a step towards contributing in the knowledge economy of the country and improving DRDO's connectivity with the outside world and the common man.

DESIDOC collaborates with librarians, academicians, researchers and scholars to popularise science and technology and bringing knowledge to life in meeting with the needs of varied user communities. DESIDOC disseminate knowledge through online platforms with intuitive user interface and works for enhanced discoverability for journals and reference work.

DESIDOC publications are covered in major S&T abstracting and indexing databases and are available full-text on Internet and Intranet. DESIDOC supports DRDO labs, national S&T organisations, academia/institutions, Armed Forces, MoD, and Indian Missions in foreign countries. These endeavours have seen a widespread and growing recognition of DRDO and help DRDO in its global outreach. This issue of Technology Focus is dedicated to DESIDOC's activities, services, and facilities in support of DRDO labs.

Defence Scientific Information and Documentation Centre (DESIDOC)

DESIDOC started functioning in 1958 as Scientific Information Bureau (SIB). It was a division of the Defence Science Laboratory (DSL) which is presently called as Laser Science & Technology Centre (LASTEC).

The Defence Research and Development Organisation (DRDO) library which had its beginning in 1948 became a division of Scientific Information Bureau (SIB) in 1959. In 1967 SIB was reorganised with augmented activities and named Defence Scientific Information and Documentation Centre (DESIDOC). It still continued to function under the administrative control of Defence Science Laboratory (DSL). Defence Scientific Information and Documentation Centre (DESIDOC) became a self-accounting unit and one of the laboratories of DRDO on 29 July 1970. The Centre was functioning in the main building of Metcalfe House, a landmark in Delhi and a national monument. In August 1988 it moved to its newly built five-storied building in the same Metcalfe House complex. Since it became a self-accounting unit, DESIDOC has been functioning as a central information resource for DRDO. It provides science & technology information, based on its library and other information resources, to the DRDO headquarters, and its various laboratories at various places in India.

a) Organization: DESIDOC has been divided into various sections such as Documentation Section, Translation Section, Reprography Section, Technical Section, Administrative Section, Library Section, Multicopier Section, Publication Section, etc.

b) Services and Facilities Available: The main services of DESIDOC are -

i) Information Processing & Dissemination*:* Collection of Science and & Technology information of DRDO interest, provide current awareness services to DRDO Scientists. This includes Newspaper Clippings Service, IEE/IEEE contents, Current contents in Military Science and Technology.

ii) Training:Training in the areas of library automation, database development, online searching, e-mail and internet use, technical communication, multimedia development and other relevant aspects of information technology.

iii) Technical Services:Providing reprography (photography, audio, video presentation materials), translation, communication (e-mail, Internet) and printing services.

Defence Science Library :

Defence Science Library (DSL) is a fully automated **nerve centre** to provide information on defence, science, technology to the research community of DRDO.

Library has a very rich collection of books in physics, chemistry, materials, electronics, aerospace, life sciences, computer science, mathematics, remote sensing, and defence science technology, etc.

DSL subscribes scientific and technical journals, print and e-journals, reports, conference proceedings, books and CD-ROM databases.

It has a special collection on Jane's publication, SPIE Proceedings, lEE/IEEE publication and databases on specilised subjects.

DSL also supports other labs of DRDO. DSL is fully automated and use integrated library management system to cater administrative and management of library functions. Common bibliographic database is used for raising user demand, placement of supply order, acquisition of books, subscription of serials, technical processing, Online Public Access Catalogue (OPAC), circulation of documents, new arrivals, RSS feeds and **e-mail alerts**. Users can use online facilities to reserve their books.

Radio Frequency Identification (RFID) system is used in DSL which operates at a frequency of 13.56 MHz. The chips are inserted in the book for enabling the issue, return, renewal and stock verification of books. Through RFID a user can also get the books issued/returned by their own self. An electronic article surveillance system is also deployed at the main entrance of the DSL.

Services of DSL revolves around the specific and general needs of scientist, officers, and staff of DRDO. DSL's efforts are aimed at strengthening the information and electronic resources for supply of information on demand as well as in anticipation.

The DSL provides a range of services in digital and print form including document supply service, CDROM and internet searching, as well as profile-based specialised services for projects.

Online Public Access Catalogue

Online Public Access Catalogue (OPAC) is accessible through Intranet. It covers bibliographic details of books, Conference Proceedings and technical reports held by the DSL. Users can search the OPAC by simple and advanced searches using boolean operators. Search can also be performed by author/editor, title, accession number, descriptors, subject, ISBN, report number and any word occurring in the title.

Digital Reference Desk

This service was started for the DRDO scientific community who needed information that was not available in their laboratory. The users send their requirements to DESIDOC which are generally fulfilled within two working days if available with DESIDOC.

The non-available documents are obtained from national and international organisations and delivered. Users can look for information on this page for printing or downloading. Referred article section lists article/documents provided by DESIDOC to users.

This service is fully automated using PHP and MySQL. Once the demand is uploaded, an automatic e-mail alert is sent to the user. The database also has search facility to find out the documents uploaded earlier.

New Books and Reports

This service provides list of new collection held at DSL on books, SPIE Conference Proceedings, etc,. Each record contains the name(s) of author(s)/ editor(s), title, place of publication, name of publisher and year of publication, accession number and ISBN.

Current Periodicals

DESIDOC subscribes to a number of journals in the fields of science and technology. The current journal search option allows searching of a current journal and old issues. The database provides bibliographic details of around 200 S&T journals subscribed by DSL. The search options, simple and advanced, help users in searching the database on title, subject or keyword and allow sorting on different fields to know their availability for issue.

Union Catalogue of Periodicals

It is a database developed by using PHP and MySQL as tool to access journal holdings information across all DRDO libraries. Its collection covers all the periodicals subscribed by the labs from various publishers. The labs can also update their titles after receipt of the new issues. Using this database, users can check the availability of the journals from sister labs and can send the demand to the lab directly.

Union Catalogue of Books

The software system has been developed for unified online library catalogue of books available in all DRDO libraries. The union database contains bibliographic description, location and holdings information for books in all subject areas available in DRDO libraries across the country. A web-based interface is designed to provide easy access to the merged catalogues. This catalogue is a major source of bibliographic information that can be used for inter-library loan, collections development as well as for copy cataloguing and retro-conversion of bibliographic records.

Translation Database

This is the one of the important databases maintained by DSL covering French, German and Japanese language articles translated into English language. The articles translated nearly 25 years back were all digitised and made available in a digital library. A user can search the articles on title, author, and language.

Strategic Information Service (SIS)

To keep the project leaders of high priority projects up-to-date about the latest trends in their subject areas, SIS identifies and collects information from print, electronic, web and databases and compile them in a document form and send to users.

Newspaper Clipping Service

This service is one of the highly used and appreciated services by the DRDO research community. It is a compilation based on daily newspapers (covering 17 newspapers) on topics related to DRDO, defence, science and technology, etc,. This service is available on DRDO Intranet and Internet. The end user can search/browse the contents on the said topics. (http://www.drdo.gov.in/ drdo/English/index.jsp?pg=newsclipping.jsp)

DRDO e-journals Service

The DRDO e-journals service (consortium) came into being on 01 January 2009. Its aim is to build a digital environment for DRDO's scientific community. DESIDOC administers the access of e-journals through a consortium approach. Online access of e-journals is available to scientists/officers on 24x7 basis by using RemoteXs authentication. Monthly usage statistics of all DRDO labs and useful information related to e-journals are prepared and uploaded on website. Some of the key features of consortium are:

Browsing of e-journals by title, publisher and lab Remote access facility to access e-journals anytime, anywhere Extension of access to HQrs, DG's office and remotely located units Perpetual access All subscribed contents of IEEE and ACS is available on intranet All circulars and information are available on website on DRDO Intranet

Publications

DESIDOC is the central publishing agency of DRDO. It brings out number of regular and ad-hoc/ special publications to disseminate information on research and development activities carried out by various DRDO labs/estts. DESIDOC is involved in editing, designing, press work and digital printing of publications. Many ad-hoc publications/books/ proceedings of the DRDO HQrs and other DRDO laboratories/establishments are brought out by DESIDOC from time to time besides DESIDOC's regular publications. In a year DESIDOC publishes about 200 documents. Defence Science Journal Started in 1949, Defence Science Journal is a bimonthly peerreviewed, research journal in the area of defence science and technology. Major subjects covered include: aeronautics, armaments, combat vehicles and engineering, biomedical sciences, computer sciences, electronics, material sciences, missiles, naval systems, etc,. It is covered by Science Citation Index Expanded (Web of Science), Cambridge Scientific Abstracts, Chemical Abstracts, Elsevier databases (EMbase, Compendex, Geobase, EMbiology, Elsevier Biobase, Fluidex, World Textiles, Scopus), Scimago Journal Ranking, Indian Science Abstracts, International Aerospace Abstracts, ProQuest, Google

Scholar, DOAJ, Indian Science Citation Index, Omnifile Full-text Mega, Omnifile Full-text Select, and NTIS database (World News Connection), Ulrich's International Periodical Directory, Web of Science, Open Academic Journals Index (OAJI), Bielefeld Academic Search Engine (BASE).

Defence Science Library

Defence Science Library (DSL) is a fully automated and an ISO 9001:2008 certified library and a nerve centre for providing information related to Defence Science and Technology to the project leaders, top management, and research community of DRDO within least possible time. It is equipped with RFID technology and has a rich collection in the fields of physics, chemistry, materials, electronics, aerospace, life sciences, computer science, mathematics, remote sensing and defence science technology. It is spread into five floors of DESIDOC and having rich collection of 75,000 books, one lakh technical reports, 30,000 SPIE conference proceedings and latest defence related reference materials. It has special collection of standards, specifications, Jane's publications etc. to meet the information requirement of scientific community. It subscribes to 600 online journals and 200 print periodicals. DSL has one lakh bound volumes of journals from various publishers.

The following services are extended to the scientific community of DRDO

- Digital Library & E-Services (DILES)
- Koha OPAC
- Current Awareness Service
- Selective Dissemination of Information Service
- Infowatch Service(Cluster based)
- Reference Service
- Newspaper Clipping Service
- Current Periodicals of DRDO

Digital Library & E-Services

DILES complements the activities of traditional library (DSL) of DESIDOC. With the advent of Information and Communication technology, the users require library services through digital

media like internet and Mobiles on 24X7 basis. Accordingly, this division is working the following major fronts:

- It is providing Library Automation Service to all DRDO TIRCs and subsequently, will integrate the OPACs of all these libraries, so that DRDO users will be able to search the library holdings of any DRDO TIRC through a single interface
- It is a digital library platform for DRDO, so that all the library resources (OPACs and E-resource like e-Journals, e-Books etc) can be accessed (searched or browsed) through this single platform. This platform provides access to a pool of openly available e-resources also. Presently 3000 DRDO scientists/ staff are benefitting from this e-Library by enrolling themselves as members.
- This digital library platform of DRDO is also accessible through mobiles and other hand-held devices to ensure 'Anywhere-Anytime Access' of e-resources. To ensure this, the division has developed dedicated mobile-app for library services.
- DILES also looking after the National Digital Library related activities of DESIDOC which is the nodal agency on behalf of DRDO.

E-Journals

DESIDOC provides DRDO E-Jls service to DRDO fraternity. The service was established with the objective to share the resources among DRDO libraries having common mission, goals and users. DESIDOC is the nodal agency that administrates and monitors the service on behalf of DRDO. Using this service > 50 lakh full text articles were viewed by users.

- The service provides access to 626 e-journals from 08 publishers, To access e-journals anytime, anywhere beyond campus Remote Access Service was established.

Network Services

DESIDOC is responsible for designing; hosting and maintenance of DRDO website on Internet, DRDO Intranet administration and co-ordination, designing, hosting, maintenance of DESIDOC website, Internet services through OFC based leased lines. The division is also engaged in software development, hardware maintenance, network management

DRDO Internet Website

As the internet website of DRDO is viewed globally, maintaining its smooth operation, timely updating and above all, its security from imminent cyber attacks, have been a responsibility of utmost importance. The DRDO Website successfully propagates different achievements, policy decisions and recruitment details of the organisation to general public in bilingual manner. The DRDO Website has remained one of the highly visited websites among the Government websites hosted at NIC. The website recorded total 1.8 Cr hits during the year 2018. The website maintained more than 99.85 percent uptime during the year and therefore 24x7 operation of the website was effectively ensured. The website is regularly updated with latest news, events and information related to DRDO labs/ establishments. To meet the growing users' requirement and maintaining pace with emerging technologies, a new DRDO internet website has been developed and inaugurated in 2019 which is full dynamic, responsive and interactive.

DRDO Publications

DESIDOC brings out publication of three peer-reviewed journals; Defence Science Journal (DSJ), Defence Life Science Journal (DLSJ) and DESIDOC Journal of Library & Information Technology (DJLIT). DESIDOC also publishes Monographs and special publications authored by retired eminent scientists. Further, it brings out a monthly DRDO Newsletter which is bilingual and a bi-monthly magazine Technology Focus

Defence Science Journal

Defence Science Journal is a peer-reviewed, primary research journal in the area of defence science & technology publishing since 1949. The Journal is published bi-monthly by the Defence Scientific Information & Documentation Centre (DESIDOC), Delhi on the behalf of Defence Research & Development Organisation (DRDO), Ministry of Defence, India. It covers various disciplines of science, technology and engineering. The major subject fields covered include: aeronautics, armaments, combat vehicles and engineering, biomedical sciences, computer sciences, electronics, material sciences, missiles, naval systems, etc.

Defence Life Science Journal

DRDO's Life Science cluster has a very good potential of publishing research papers/articles, review papers in the interdisciplinary subjects like molecular biology, biophysics, biochemistry, enzymology, psychology, physiology, biotechnology, pharmacology and

toxicology (animals, plants, microbial and viral cells), and related areas like bio-medicine, bio-engineering, bio-electronics, etc. With this in mind, a dedicated publication on life science, the Defence Life Science Journal has been conceived by DESIDOC to cater to a wider community of bio-scientist of DRDO and outside.Defence Life Science Journal started as a quarterly publication in 2016.

DESIDOC Journal of Library & Information Technology (DJLIT)

DESIDOC Journal of Library & Information Technology (DJLIT), is an international, peer-reviewed, open access journal that endeavours to bring recent developments in information technology, as applicable to library and information science. It is meant for librarians, documentation and information professionals, researchers students and others interested in the field. It is published bimonthly. It was formerly known as 'DESIDOC Bulletin of Information Technology (DBIT)'. The Journal invites original research and review papers related to information technology as applied to library activities, services and products.

DRDO Monographs/Special Publications

Under the DRDO Monographs/Special Publications Series, DESIDOC publishes monographs/special publications and treatises to capture the tacit knowledge of senior scientists gained through their life-long research in their area of work. Each monograph deals with specialised literature in areas that have direct relevance to defence military science and technology. The monographs are very much sought after by DRDO scientists, research communities, academicians and students. The authors are chosen based on their expertise in a specific field.

DRDO Newsletter

DRDO Newsletter, a bimonthly house bulletin of DRDO, is an avenue to synergize important developments, events, visits and related activities of the DRDO laboratories across India. The publication completed 38 years of publishing in 2018.

DRDO Newsletter is an important tool for building ‘brand DRDO’ among services, bureaucrats, political leadership, academic institutes, public sector understanding, S&T organisations, industry and general public at large.

Technology Focus

The R&D work done at the DRDO laboratories over the years has led to the development of a large number of technologies, products and processes. Most of these have been inducted into the Services; some are under development and user trials. Technology Focus is a bimonthly publication which projects the achievements of the DRDO labs. The magazine is circulated to the three Services, Indian Missions in foreign countries, S&T institutions, universities and industry.

NASSDOC

QP-2022: State and explain the objectives and functions of NASSDOC

QP-2019: Discuss the objectives, functions and services of NASSDOC.

National Social Science Documentation Centre (NASSDOC), was established in 1970 as a Division of the ICSSR with the objective to provide library and information support services to researchers in social sciences; those working in academic institutions, autonomous research organisations, policy making, planning and research units of government departments, business and industry etc.

NASSDOC also provides guidance to libraries of ICSSR Regional Centres and ICSSR supported Research Institutes. Meeting the challenges posed by technology driven world, it exemplifies the use of digital environment for creating, applying and utilizing information with its automated library collection, WEBOPAC, online databases/e-resources etc. It has effectively attained itself to the web enabled information and is marching ahead.

The main objectives of the Centre are:

• To understand development of social sciences with a view to familiarize with tools useful to various stakeholders in imparting information,

• To sensitize in planning and designing of local/national information systems pertaining to various social sciences,

• To disseminate information about the developments in social science research,

• To provide library and information support services of the researchers in the field of social sciences,

• To provide financial assistance for bibliographic and documentation projects in social science field,

• To conduct short-term training courses for librarians, research scholars, and social scientists; and

• To make available study grant to doctoral students for collecting research material from libraries and information centres located in various parts of the country.

Facilities Available at NASSDOC

- Documentation, Library and Reference Service;
- Collection of unpublished doctoral dissertations, research project reports, current and old volumes of social science journals of Indian and foreign origin;
- Literature Search Service from digital databases, Online database and offline databases;
- Bibliography on Demand;
- E-resources for ICSSR Research Institutes and Regional Centres
- Continuing Education Programme
- Professional Skill Development & Networking;
- Current Awareness Service;
- Document Delivery Service is provided by procuring books and journals on Inter-library loan or by photocopying selected portions of the documents;
- Internet facility to access e-resources in social sciences;
- ICSSR Publications Sales and Distribution.

The National Social Science Documentation Centre (NASSDOC) is a premier national documentation centre in India that provides information products and services in the social sciences. It was established in 1976 by the Indian Council of Social Science Research (ICSSR).

The information products and services of NASSDOC include:

- Library and reference services: NASSDOC has a large collection of books, journals, reports, theses, and other documents in the social sciences. It also provides reference services, such as bibliographic searches and document delivery.
- Literature search services: NASSDOC offers literature search services from its own databases and from other online databases.
- Bibliography compilation: NASSDOC can compile bibliographies on demand on a variety of topics in the social sciences.
- Document delivery service: NASSDOC can obtain books, journals, and other documents from other libraries through inter-library loan or by photocopying them.
- Current awareness service: NASSDOC provides a current awareness service that alerts users to new publications in the social sciences.
- Professional skill development and networking: NASSDOC offers training programs and workshops on information retrieval and research methods. It also organizes conferences and seminars on social science research.

- E-resources: NASSDOC provides access to a variety of e-resources, such as online databases, e-journals, and e-books, in the social sciences.

NASSDOC's information products and services are available to researchers, students, policy makers, and other users of social science information. They can be accessed through NASSDOC's website or by visiting its library in New Delhi.

Here are some of the specific databases and publications that NASSDOC offers:

- INSSPEL database: This database contains bibliographic records of Indian social science publications.
- ICSSR Research Information Series: This series provides abstracts of research studies funded by the ICSSR.
- Current Contents: This is a weekly publication that provides tables of contents of recently published journals in the social sciences.
- Social Science Abstracts: This is a quarterly publication that provides abstracts of articles published in journals in the social sciences.
- Social Science Citation Index: This is a bibliographic database that tracks citations to articles published in journals in the social sciences.

NASSDOC has a large collection of research journals in the social sciences. Some of the most popular journals include:

- Economic and Political Weekly: This is a weekly journal that covers a wide range of topics in economics, politics, and society.



Opens in a new window www.epw.in

Economic and Political Weekly journal

- Indian Journal of Public Administration: This is a quarterly journal that publishes articles on public administration and governance.



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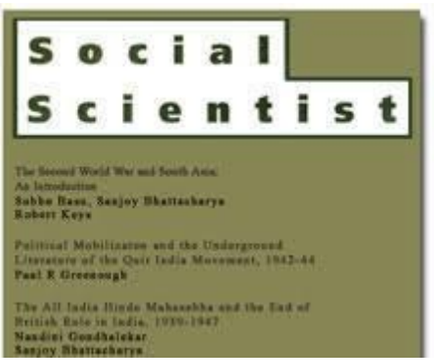
Indian Journal of Public Administration journal

- Social Scientist: This is a bi-monthly journal that publishes articles on sociology, anthropology, and social policy.



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Social Scientist journal

- Economic and Political History Review: This is a quarterly journal that publishes articles on economic and social history.



Opens in a new window mysubs.in

Economic and Political History Review journal

- Indian Journal of Social Work: This is a quarterly journal that publishes articles on social work and social welfare.



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Indian Journal of Social Work journal

- Journal of Social and Economic Development: This is a quarterly journal that publishes articles on social and economic development.



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Journal of Social and Economic Development journal

- Journal of the Indian Anthropological Society: This is a quarterly journal that publishes articles on anthropology and sociology.



Opens in a new windowwww.wilcoxjournals.com

Journal of the Indian Anthropological Society journal

- Contributions to Indian Sociology: This is a quarterly journal that publishes articles on sociology and social anthropology.



Opens in a new window mysubs.in

Contributions to Indian Sociology journal

- South Asia: Journal of South Asian Studies: This is a quarterly journal that publishes articles on South Asia.



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South Asia: Journal of South Asian Studies journal

- International Journal of Social Science: This is a quarterly journal that publishes articles on social science research.



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journalsocialscience.com

International Journal of Social Science journal

These are just a few of the many research journals that NASSDOC has in its collection. You can find a complete list of journals on the NASSDOC website.

In addition to research journals, NASSDOC also has a collection of other types of publications, such as books, reports, and theses. You can search the NASSDOC catalog to find publications on a specific topic or author.

NASSDOC's collection of research journals is a valuable resource for researchers, students, and policy makers. It provides access to the latest research in a variety of social science disciplines.

International information systems and programmes

CAS

CAS -Chemical Abstracts Service

Established in 1907, the **Chemical Abstracts Service** (CAS) is a non-profit organization of the **American Chemical Society** (ACS), located in Columbus, Ohio.

CAS, a division of the American Chemical Society, is the world's authority for chemical information and is the only organization in the world whose **objective is to find, collect and organize all publicly disclosed substance information**.

A team of scientists worldwide controls the quality of its databases, which are recognized as the most comprehensive and authoritative by chemical and pharmaceutical companies, universities, government organizations and patent offices around the world.

By combining these databases with advanced search and analysis technologies (SciFinder and STN), CAS delivers the **most current, complete, secure and interlinked digital information environment for scientific discovery**.

Chemical Abstracts is a periodical index that provides summaries and indexes of disclosures in recently published scientific documents. Approximately 8,000 journals, technical reports, dissertations, conference proceedings, and new books, in any of 50 languages, are monitored yearly, as are patent specifications from 27 countries and two international organizations. Chemical Abstracts ceased print publication on January 1, 2010.

18.1 CAS Databases

The two principal databases that support the different products are:

i. CAplus

CAplus consists of bibliographic information and abstracts for all articles in chemical journals worldwide, and chemistry-related articles from all scientific journals, patents, and other scientific publications.

ii. Registry

Registry contains information on more than 71 million organic and inorganic substances, and more than 64 million protein and DNA sequences. The sequence information comes from CAS and GenBank, produced by the National Institutes of Health. The chemical information is produced by CAS, and is prepared by the CAS Registry System, which identifies each compound with a specific CAS registry number, index name, and graphic representation of its chemical structure. The assignment of chemical names is done according to the chemical nomenclature rules for CA index names, which is slightly different from the internationally standard IUPAC names, according to the rules of IUPA.

18.2 CAS Products

CAS offers online, Web-based and desktop access to databases covering science, engineering, technology, patents, business information and much more. These products aredesigned to accommodate a wide range of information needs, for users who are

infrequent searchers or who only need a few quick answers or a professional searcher who requires a more powerful and comprehensive set of search tools.

The various CAS products are:

• CAS Client Services

• CAS CD-ROM Product

• International CODEN Service

• Free CAS Web-based Products CAS databases are available via two principal database systems:

i. STN

STN (Scientific & Technical Information Network) International is operated jointly by CAS and FIZ Karlsruhe, and is intended primarily for information professionals, using a command language interface. In addition to CAS databases, STN also provides access to many other databases, similar to Dialog.

ii. SciFinder

SciFinder is a database of chemical and bibliographic information. Originally a client application, a web version was released in 2008. It has a graphics interface, and can be searched for chemical structures. The client version is for chemists in commercial organizations. Versions for both the Windows and Macintosh exist. SciFinder Scholar is for universities and other academic institutions and lacks some supplementary features for multidatabase searching.

18.3 CASSI

CASSI stands for Chemical Abstracts Service Source Index. This formerly print-only database is now a free online resource to look up and confirm publication information. CASSI provides titles and abbreviations, CODEN, ISSN, publisher, and date of first issue (history) for a selected journal. Also included is its language of text and language of summaries. The range is from 1907 to the present, including both serial and non-serial scientific and technical publications. The database is updated annually every December.

COMPENDEX & INSPEC

Bibliographic Databases

A bibliographic database is a database of bibliographic records. It is an organized digital collection of references to published literature, including journal and newspaper articles, conference proceedings, reports, government and legal publications, patents, books, etc. The bibliographic records in these databases usually describe articles, conference papers, etc.,

rather than complete monographs, and they generally contain very rich subject descriptions in the form of keywords,

subject classification terms, or abstracts. Some of the bibliographic databases are briefly described as under:

Compendex

Compendex, was first brought in printed format, and later its CD-ROM version started to bring out the computerized online version of the Engineering Index. It is a comprehensive engineering bibliographic database which indexes scientific literature pertaining to engineering materials since 1884, compiled manually under the original title of Engineering Index. (Compendex it is now published by Elsevier, who purchased the parent company Engineering Information in 1998).The name Compendex stands for Computerized Engineering in DEX. Compendex currently contains over 15 million records and references from over 5,000 international sources including journals, conferences and trade publications. Approximately 1,000,000 new records are added to the database annually from over 190 disciplines and major specialties within the engineering field. Coverage is from 1969 to the present, and is updated on weekly basis.

INSPEC

Started in 1967, INSPEC is a major indexing database of scientific and technical literature, published by the Institution of Engineering and Technology (IET), and formerly by the Institution of Electrical Engineers (IEE), one of the IET's forerunners. INSPEC coverage is extensive in the fields of physics and computer, control, and mechanical engineering. Its subject coverage includes astronomy, electronics, communications, ergonomics, computers and computing, computer science, control engineering, electrical engineering, information technology, and physics. Primarily, the database covers journal articles and papers presented at conferences, significant books, technical reports, dissertations, etc. consisting of about 8 million records from more than 3,000 journals and about 2,000 conference proceedings, books and reports. It adds over 4,00,000 new records to the database annually.

INSPEC and COMPENDEX Guide: Overview

INSPEC covers physics, electrical engineering, electronics, communications, control engineering, computers and computing, robotics, and information technology.

COMPENDEX comprehensively covers the broad subject areas of engineering and applied science.

INSPEC & COMPENDEX Guide

This guide will show you how to use **Inspec** and **Compendex** databases. **Inspec** covers physics, electrical engineering, electronics, communications, control engineering, computers and computing, robotics, and information technology.

Compendex comprehensively covers the broad subject areas of engineering and applied science.

They **both** cover scientific and technical journals, conference proceedings, reports, dissertations and books.

The INSPEC and COMPENDEX databases are both searchable from the same interface, and you can search the databases individually or together.

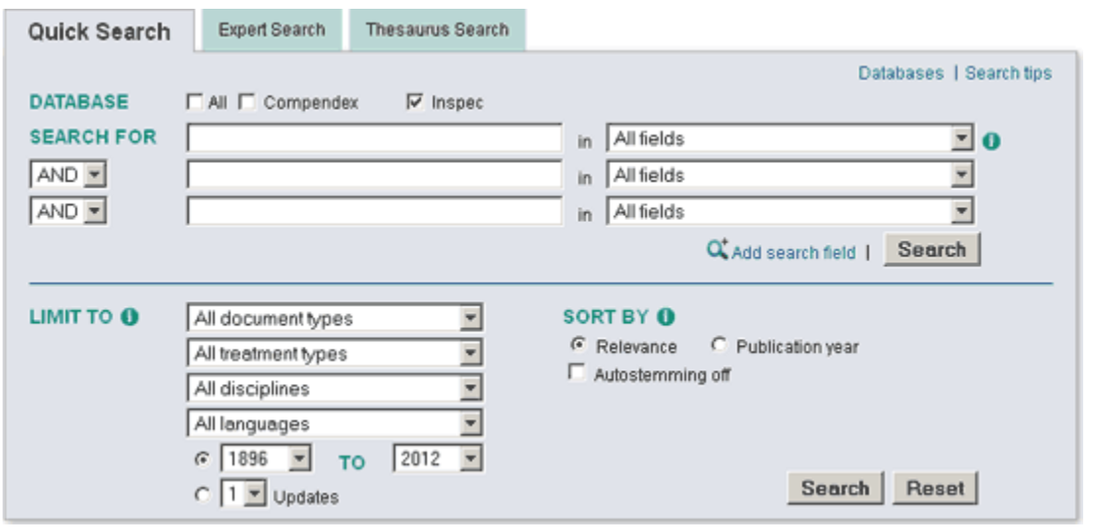
INSPEC (1896-present)

- electrical engineering and electronics
- information technology
- computing and control
- physics
- biophysics
- physical chemistry

COMPENDEX (1884-present)

- nuclear technology
- transportation
- civil engineering
- materials engineering
- aerospace engineering
- bioengineering
- chemical and process engineering control
- mechanical engineering
- petroleum engineering
- automotive engineering

The database automatically starts you in the **Quick Search** form, as shown below.



Select the database(s) you want to search. (You can search both Inspec and Compendex concurrently if you wish to by either checking the **ALL** box or checking both databases.)

Enter search term(s) in one or more of the **SEARCH FOR** textboxes. You may search a term in a specific field by selecting the field from the **SEARCH IN** pull-down menu to the right of the textbox. The three search boxes available allow you to combine terms using Boolean operators AND, OR, and NOT. To execute your search click on the **SEARCH** button.

AGRIS

QP-2022: Discuss the products and services of AGRIS

International System for Agricultural Science and Technology (AGRIS)

I. Objectives

• In this unit, we will learn about International System for Agricultural Science and Technology (AGRIS), its history, Products and services, new vision AGROVOC, OpenAGRIS, AgriMetaMaker. After reading this module you will be able to know the importance of AGRIS and its services in Agricultural Science and Technology.

1. Introduction

AGRIS became operational in 1975. It is sponsored by the UN's Food and Agricultural Organisation (FA). The AGRIS is designed to carry out the collection, storage and retrieval of information related to currently produce agricultural documents. AGRIS is a decentralized system of national and regional input centres throughout the world that provide bibliographic data to the AGRIS coordinating centre in Rome for integrating and computer processing. The subject areas of the AGRIS include agriculture, food, environment, animal science, fisheries, forestry and all other aspects related to agricultural sciences.

2. History

The AGRIS initiative was set up by the FAO in the 1970s and created a worldwide cooperation for sharing access to agricultural science and technology information. Based on available technologies, AGRIS was initially collecting bibliographic references for a central database. However, since the advent of the Internet in the late 90s AGRIS has become the brand name for a network of centres, which are promoting the exchange of agricultural science and technology information through the use of common standards and methodologies. As information management flourished in the 1970s, the AGRIS metadata corpus was developed to allow its users to have free access to knowledge available in agricultural science and technology. AGRIS was developed to be an international cooperative system to serve both developed and developing countries. With the advent of the Internet, along with the promises offered by open access publishing, there was growing awareness that the management of agricultural science and technology information would have various facets: standards and methodologies for interoperability and facilitation of knowledge exchange; tools to enable information management specialists to process data; information and knowledge exchange across countries. Common interoperability criteria were thus adopted in its implementation, and the AGRIS AP metadata was accordingly created in order to allow exchange and retrieval of Agricultural information Resources.

3. Products and Services

The AGRIS database, covering international agricultural literature is available online through ESA/IRS, DIMDI, DIALOG Information Services, Inc and the International Atomic Energy Agency. Keywords are searchable in English, French, and Spanish. Online access and SDI Services are also available through the coordinating centre and some national and regional AGRIS centres. The coordinating centre in Rome offers the AGRIS output tape to participating centres on a monthly basis.

The centre provides different services as discussed below:

3.1 AGRIS CD-ROMs

A CD-ROM (Compact Disk Read-Only-Memory) uses an electro-optical technology for storing and retrieving large amounts of data. The whole collected AGRIS information is distributed using a series of CD-ROMs:

a. **AGRIS CD-ROMs:** all collected information, stored on archival CD-ROMs and one current CD-ROM, which contains the last collected information (quarterly updated)

b. AGRIS FHN CD-ROM: contains information in the domains of Food and Human Nutrition extracted from all AGRIS CD-ROMs (semi-annually updated)

c. AGRIS FORESTRY CD-ROM: contains information in the domains of forestry and primary forest products extracted from all AGRIS CD-ROMs.

d. AGRIS and AGRIS FHN CD-ROMs are produced by SilverPlatter Information Ltd., using data prepared by AGRIS Processing Unit Vienna; the SilverPlatter's software WinSPIRS is used for retrieving the information.

e. AGRIS FORESTRY CD-ROMs are produced by WAICENT/FAOINFO of the Library and Documentation Systems Division (GIL) of FAO; The retrieving software, HEURISKO (CDS/ISIS based), is included.

f. For information retrieval from AGRIS CD-ROMs, the existing software (WinSPIRS, HEURISKO) permits different searching operations to accommodate different searching needs of users:

• Searching by descriptors defined in the AGROVOC Thesaurus

• Searching by subject category codes, authors, publication year, publication language, etc.

• Searching free text in different description fields

• Logical search operators (OR, AND, NOT, WITH, NEAR)

• Limiting search operators (less than, greater then, range, etc.)

• Truncation of words (to retrieve all variants)

• Lateral searching (forward/backward)

3.2 AGRIS Database On-line

On-line access to the global AGRIS database is provided by:

a. AGRIS DATABASE ON-LINE (FAO/WAICENT, FAO Web Server)

b. DIALOG (Palo Alto, USA): non-USA portion only

c. DIMDI (Cologne, Germany)

d. AGROVOC Thesaurus (FAO/WAICENT, FAO Web Server)

3.3 Information Services on Request

APU Vienna provides, if requested, in printed form or on magnetic media the following:

a. Retrospective searches through the entire data base;

b. Selective dissemination of information (SDI) service, by which users can request the AGRIS Processing Unit, to keep them informed of any new AGRIS entries on specific subjects of concern to them.

c. National bibliographies, containing all entries generated in a country and those concerning this country and published outside. Master copies can be prepared on a high resolution laser printer in Agrindex format, ready for reproduction by offset or photocopy.

d. Subject bibliographies, can also be prepared upon request from specialised cooperating centres such as the CGIAR IARC's, or FAO divisions.

3.4 Other Services

a. Developing and distribution of AGRIS working methodologies

b. Developing and distribution of the AGROVOC Thesaurus

c. Distribution of the UNESCOs CDS/ISIS database software for PCs

d. Developing and distribution of software for AGRIS input data preparation (AGRIN/AGCHK)

e. Training material and courses

f. Other products on Web Server (APU Vienna):AGRIS Reference Series

g. Products available on FTP Server (APU Vienna):

h. Current monthly AGRIS output file

i. AGROVOC Thesaurus

j. Agrindex (AGRIS monthly bibliography in English, French and Spanish; only up to December 1995)

k. Training materials (AGRIS Reference Series).

4. AGRIS Repository

Its content includes unique grey literature such as unpublished scientific and technical reports, theses, conference papers, government publications, and more. A growing number (around 20%) of bibliographical records have a corresponding full text document on the web which can easily be retrieved by Google.

Access to the AGRIS Repository is provided through the AGRIS Search Engine. As such, it:

• enables retrieval of bibliographic records contained in the AGRIS Repository,

• allows users to perform either full-text or fielded, parametric and assisted queries.

The AGRIS repository exploits the advantages of both open source search platform (Solr), and structured XML. It facilitates the exchange of information among developing countries and between developing and developed countries. Furthermore, it contains records from national journals - especially from developing countries that are not always represented in commercial indexing services.

The AGRIS partners contributing to the AGRIS Database use several formats for exchanging data, including simple DC, from OAI-PMH systems.

5. AGROVOC

In traditional libraries, finding works of interest is directly related to how well they are catalogued. However, complex and born-digital works require substantially more effort. AGROVOC is a comprehensive multilingual agriculture thesaurus that was developed with the cooperation of FAO member countries. It is used for indexing data in agricultural information systems and it strives for continuous improvement and updating. The first version of AGROVOC was produced in 1982 and distributed to all AGRIS centres. Vocabulary updating is done by FAO in collaboration with national AGRIS centres. Staff at the centres proposes new terms for the database to FAO subject specialists for consideration. The terms selected by the experts are added into AGROVOC. In the past, an AGROVOC supplement was then published and provided to the centres. Now the updated AGROVOC is available online. The proposing of new terms and corrections also can be done through the FAO/AGROVOC web site.

6. Limitations in AGRIS

An assessment of AGRIS was conducted in 2000. It was noted that the network had only been partially successful in achieving its goals. Limitations in AGRIS were identified in four areas: i) difficult access to the original documents, ii) incomplete coverage, iii) independent systems. and iv) structural and institutional constraints. As the AGRIS system aims to decentralise data processing and to prioritise national capacity building, enhancing autonomous management of national agricultural information; a new strategic vision has been developed.

7. The New Vision

In order to address those limitations, a “new vision for AGRIS” has been under work since 2000. In 2009, AGRIS adhered to Coherence in Information for Agricultural Research for Development (CIARD), a global initiative of international partner organizations (such as, DFID, CIARD, GFAR, etc. committed to working to increase the public benefits deriving from investment in agricultural research and innovation for development.

The underlying principle shared by CIARD's stakeholders, which FAO is contributing to with its AGRIS portal, is that, information is to be made publicly "available", "accessible" and, "applicable". At the same time, all of CIARD stakeholders equally recognize the need to respect the roles of national, regional and international institutions, whilst aligning their efforts to develop better interlinked information collections and services.

Currently, AGRIS continues its research into improving access to science technology and agricultural information globally available on the web, under the CIARD umbrella.

8. Accessibility of the New AGRIS

While AGRIS is striving to keep abreast of the technology available, enhanced resource accessibility may be identified as one of the core objectives of the new AGRIS.

According to the new vision, the AGRIS search engine should be able to retrieve and interpret a wealth of diverse information sources including full-text documents, threads from discussion fora, blog entries, news articles, and organizational, regional, national, international information (re)sources. Partnerships with established search engine technology leaders such as Google, Yahoo or Scirus will be explored in order to provide customized search capabilities.

8.1 OpenAGRIS: the New AGRIS Linked Open Data Model

AGRIS data was converted to RDF and the resulting linked dataset created some 80 million triples. AGRIS is also registered in the Data Hub at http://thedatahub.org/dataset/agris

8.2 OpenAGRIS

OpenAgris is a Web application that aggregates information from different Web sources to expand the AGRIS knowledge providing much data as possible about a topic or a bibliographical resource. Using Agrovoc as backbone, OpenAgris can interlink with a lot of existing datasets (currently DBPedia, World Bank, Geopolitical Ontology, FAO fisheries dataset, AGRIS serials dataset, and so over), showing as much information as possible about a specific topic, as statistics about fish species or geographical distribution of plants. In this way, OpenAgris will be a centralized portal that will aggregate all information the Web knows about a specific topic, research area (in the agricultural sector) or bibliographic reference.

OpenAgris is based on four internal FAO RDF datasets:

a. The AGRIS records dataset: It is the direct translation of AGRIS XML records to RDF. Considering that AGRIS contains more than 5 million of XML records, this new dataset consists of more than 130 million triples.

b. The Agrovoc RDF dataset: AGROVOC is the world's most comprehensive multilingual agricultural vocabulary that contains close to 40,000 concepts in 22 languages covering subject fields in agriculture, forestry and fisheries together with cross-cutting themes such as land use, rural livelihoods and food security.

c. The AGRIS journals dataset: since around 75% of AGRIS records are journals articles, we created a dataset of more than 22,000 agricultural journals with complete information about each journal (ISSN, start date, frequency, publisher…).

d. The AGRIS centers dataset: It contains information about data providers, thus the AGRIS, source of information.

The external datasets which OpenAGRIS is currently linking to are:

• DBPedia

• World Bank

• Google (Google Custom Search API)

• nature.com

• FAO Country Profiles

• FAO fisheries dataset

• GBIF (Global Biodiversity Information Facility)

• IFPRI • Europeana

8.3 AgriMetaMaker

The AGRIMetamaker is a web form developed using the Drupal CMS, that allows you to generate metadata as easily as possible. You can create new references and enter the information manually in a few minutes. You just need to fill in as many fields as you think are necessary to describe your document, save the reference, add as many you wish, review and edit the data, if necessary, and lastly export them to your computer. The same data, once delivered to FAO/AGRIS, is published in the AGRIS database. If your Institution or publishing company does not use a document management system and your articles have never been catalogued before, if you want to publish your data in AGRIS, you need to create bibliographic references from scratch. The AGRIS team simply receive your data and publish it in the internet in the AGRIS Database. Your data will surely acquire higher visibility, both given the international importance of the AGRIS portal as a hub of world-wide agricultural research information and to the fact that all the whole collection of 2.7 millions references is indexed by Google Scholar. AGRIS harvests and publishes data encoded in a specific XML

format. The AGRIS Application Profile describes in detail the specifications of this metadata format including a data model for bibliographic description of resources in the domain of agriculture. One of the great advantages of the AGRIMetaMaker is that it can give you the opportunity to create AGRIS data on the fly, without even knowing what XML and metadata is.

9. Summary

The International Information System for the Agricultural Sciences and Technology is created by the Food and Agriculture Organization of the United Nations (FAO). AGRIS provides worldwide bibliographic coverage of agricultural science and technology literature. Assembled by the AGRIS Co-ordinating Centre, the Food and Agriculture Organization (FAO) of the United Nations, AGRIS offers an international perspective on crucial agricultural research. The many aspects of agriculture, including forestry, animal husbandry, aquatic sciences and fisheries, and human nutrition from over 135 participating countries are covered. Literature includes unique material such as unpublished scientific and technical reports, theses, conference papers, government publications, and more. Approximately 130,000 records are added each year with key words in English, French, and Spanish. The archival discs now cover 1975 through 1990. The current disc covers from 1991 to the present.

BIOSIS

QP-2020: Discuss the products and services of BIOSIS

BIOSIS, provided by Thompson Scientific. It is serving the life science community by providing researchers, students, and librarians with references to research published and found in journal articles, conference proceedings, meetings, patents, book chapters and other sources of information. For this, BIOSIS selects more than 600,000 new entries each year. Based on the collected information, BIOSIS provides flexible information services which include databases and customised information products to the life sciences community globally.

This benefits the user community who require life sciences information quickly and efficiently. It reduces the search time of users by using authoritative BIOSIS databases which aggregate information from more sources than any user could otherwise read or have access to.

BIOSIS databases are, the most complete resource for finding life sciences information. The databases are interdisciplinary as most important subjects from different fields all over biology are covered. The coverage of these databases includes international publications with a unique indexing system that allows flexible, efficient searching. These databases are prepared by gathering information from diverse sources as citations for articles, meetings, patents, book chapters, etc.

The BIOSIS databases are used by librarians, information specialists, researchers, students, academicians, legal experts, product development experts, government officials and product development experts requiring information related to the life sciences.

BIOSIS Products and Databases Following are the BIOSIS products and databases available in print and electronic form.

Biological Abstracts (BA)

, Usually referred to as an index to the world's life sciences journal literature, BA is an abstractingjoutnal that covers articles from over 3,700 journals from all over the world and from subjects like botany, pharmacology, biochemistry, ecology and other biological areas. The publication includes over 350,000 citations each year with author abstracts. There are over 8 million archival records available from 1969. A unique feature of BA is its comprehensive coverage and context-sensitive indexing which makes available information useful for all researchers requiring life science information.

BA can be accessed on CD, through the web, or in print. Electronic versions of BA are updated quarterly. Print versions are issued twice each month.

Biological Abstracts/RRM

Biological AbstractsIRRM (Reports, Reviews, Meetings) is a complementary product to the BA. Every year, BAIRRM adds 215,000 references to non-journal documents. This information is collected from Meetings and Conferences, Literature Reviews, US patents, Books, CD-ROMs and other life science media. Updated quarterly, the non-journal information in BAIRRM usually precedes and complements the journal data thus offering a total solution to information requirements of any life sciences information user.

BIOSIS Previews

This is a comprehensive index to life sciences and biomedical research. BIOSIS Previews contains citations from Biological Abstracts (BA), and Biological Abstracts! Reports, Reviews, and Meetings (BAIRRM) (formerly BioResearch Index). Together, these publications constitute the major English language service providing comprehensive worldwide coverage of research in the biological and biomedical SCIences.

BIOSIS Search Guide

An essential tool for all users of the BIOSIS databases.

BasicBIOSIS

Life science database for students new to research.

Abstracts of Entomology

Provides insects related research from all over the world covering over 20,000 new references each year. Abstracts of Entomology is a monthly current awareness publication providing the most extensive reference to entomological studies published in world's life science literature.All references are derived from the BIOSIS Previews database. Coverage is from 5,500 international serial publications, books, conference proceedings. and other related materials.

Abstracts of Mycology

A specialised resource that indexes mycology resources. Abstracts of Mycology is a monthly current awareness publication providing the most extensive references to mycological studies reported in worldwide life science literature. All references in this publication are derived from the BIOSIS Previews database. Abstracts of Mycology contains 17,000 new references each year from about 5,000 international serial publications, books, conference proceedings and other related material references each year from about 5,000 international serial publications, books, conference proceedings and other related materials.

Zoological Record (ZR)

This indispensable reference database covers topics covering the field of animal biology, .including animal behaviour, conservation, ecology, marine biology, ornithology, parasitology, toxicology, zoology, veterinary sciences and other related areas. ZR's coverage dates back to 1864 and it has been known to the world's unofficial register of animal names. The ZR database indexes over 4,500 serials from all over the world besides books, reports, conferences, etc. Every year about 72,000 indexed records are added with about 1.5 million record archives is electronic format. ZR is available in print, CD and online formats depending on the users' requirements covering information from every field in animal biology.

INIS

International Nuclear Information System (INIS)

QP-2018: Write a detailed easy on INIS

1. **Introduction**

   The International Nuclear Information System (INIS) is the world's leading information system on the peaceful uses of nuclear science and technology. INIS is operated by the IAEA (International Atomic Energy Agency) Vienna started functioning in 1970. INIS covers all aspects of the peaceful uses of nuclear science and technology, from nuclear reactors, reactor safety and nuclear fusion to applications of radiation and radioisotopes in medicine, agriculture or industry. Many other related topics, like environmental, legal and social aspects associated with nuclear energy, as well as economic and environmental aspects of nonnuclear energy sources are also covered. INIS maintains, in co-operation with its members, a database with currently over 3.3 million bibliographic references and a collection of 300,000 unique full-text publications, which has been in operation since 1970 with127 countries and 24 international organizations are INIS Members at present. INIS is not only having conventional literature which is

commercially available through regular distribution channels, such as books and magazines, INIS also makes available other forms of literature such as scientific and technical reports, patent documentation, conference proceedings, doctoral thesis and some legal documents, commonly referred to as nonconventional or grey literature and which are difficult to obtain elsewhere. The INIS collection is freely available online since April 2009, providing easy access to reliable nuclear information on the peaceful uses of nuclear science and technology, and making nuclear knowledge readily available worldwide.

2. History

INIS represents a wealth of experience and an extensive pool of information in the nuclear field. The first INIS output products, the printed Atom index and associated magnetic tapes, were issued in April 1970. INIS has since grown into one of the most successful and comprehensive information systems on the peaceful uses of nuclear science and technology

INIS Description

The International Nuclear Information System (INIS)hosts one of the world's largest collections of published information on the peaceful uses of nuclear science and technology. It offers online access to a unique collection of non-conventional literature. INIS is operated by the IAEA in collaboration with over 150 members.

The International Nuclear Information System (INIS) is a decentralized information system operated by the International Atomic Energy Agency (IAEA) in Vienna, Austria in cooperation with its Member States and co-operating international organizations. It is the world´s leading information system on the peaceful uses of nuclear science and technology. INIS maintains a database of over 3 million bibliographic references and announces the availability of scientific literature published world-wide on the peaceful uses of nuclear energy. It also maintains a collection of full text documents that would be difficult to obtain elsewhere.

3. 1 INIS Restructuring

The Director General of the IAEA approved the overall restructuring of the Department of Nuclear Energy (NE) on 20 January 2012. This included the

creation of the Nuclear Information Section (NIS) and the establishment of a separate Nuclear Knowledge Management Section.

The newly created Nuclear Information Section consists of:

• INIS Unit

• IAEA Library Unit

• Systems Development and Support Group

This restructuring and creation of NIS provides an opportunity for further enhancement of existing information products and services, and the introduction of new ones - all geared towards the goal of higher organizational efficiency and effectiveness.

4. INIS Collection

Participants of the INIS comprise member states of the IAEA and some international organisation.

The scope and subject matter of INIS is peaceful applications of nuclear science and technology; other aspects of nuclear energy and nuclear documentation. Input is received from participating countries and international organizations.

• INIS is having 3.3 million bibliographic records. It offers online access to a unique set of non conventional literature (NCL) of over 280,000 full-text documents, such as scientific and technical reports, conference proceedings, patents and theses, not available through commercial channels.

• Leading reference collection for scientific literature published worldwide on the peaceful uses of nuclear science and technology

• Comprehensive international coverage of scientific and technical literature carried out by INIS Members and the INIS Secretariat

over 3.4 million bibliographic citations and abstracts of journal articles, scientific and technical reports, conference papers, books, patents, theses, laws, regulations and standards, and web documents, covering publications in 63 languages; all records include keywords and most have an abstract in English

• Includes a unique online collection of over 350 000 full-text documents: scientific and technical reports, conference proceedings, patents, theses, and preprints. This “grey” non-conventional literature (NCL) is not easily available from other sources

• Average annual increase of over 100 000 records.

5. INIS Products and Publications

• INIS Atom Index: a semi-monthly journal with semi-annual and annual cumulative indexes. Derived from the INIS database. It is an abstracts journal containing indexes to authors, report numbers, corporate names, subjects and conferences.

• INIS Reference Series: a set of documents containing rules, standards, formats, coder and authority lists used by the participants in the decentralized INIS program. The series is an essential tool for users, such as cataloguers, indexers, abstractors or searchers. The series has been published by the IAEA since 1969.

• IAEA-INIS/ETDE Thesaurus: "A thesaurus is a terminological control device used in translating from the natural language of documents, indexers or users into a more constrained 'system language' (document language, information language)". It is also "a controlled and dynamic vocabulary of semantically and generically related terms which covers a specific domain of knowledge". The INIS/ETDE Thesaurus is a major tool for describing nuclear information and knowledge in a structured form. The Thesaurus is available in Arabic, Chinese, English, French, German, Russian, and Spanish languages. It is of great assistance in multilingual and semantic searches. Over the years the INIS/ETDE Thesaurus has evolved as a result of systematic study and it contains over 30 000 terms.

6. INIS Services

6.1 Outreach and promotion

Outreach and promotion of INIS is undertaken jointly by the INIS Secretariat in Vienna and INIS Liaison Officers in Member States. Its aim is to increase awareness of the INIS, its products and services, and to highlight the benefits for

current and potential users. INIS Member States are responsible for organizing promotional activities in their countries while the INIS Secretariat assists by providing promotional and information materials. Activities include:

• Promotion at IAEA and other nuclear conferences, meetings, symposia and exhibitions with online and/or other demonstrations;

• Publishing articles in professional journals;

• INIS advertising in professional journals;

• Provision of promotional materials to hosts;

• Preparation and distribution of brochures, information sheets, and other promotional tools;

• INIS entries published in directories world-wide.

6.2 Capacity building (Training and distance learning)

The INIS Training Program is designed to meet a number of objectives:

• Establishment and improvement of a national information infrastructure in Member States • Transfer of modern information technology

• Fostering exchange of scientific and technical information

• High quality and coverage of the INIS Database

• Maximum utilization of INIS output products

• Responsiveness to Member States' needs

Currently the INIS Training Program comprises

6.2.1 INIS Training Seminars

INIS Training Seminars are generally held usually every other year in Vienna. The seminars are funded and staffed by INIS and emphasize INIS input skills and use of INIS output products. All aspects of INIS operations are addressed in the training events organized by the IAEA for INIS members, including selection criteria, abstracting, descriptive cataloguing, indexing, retrieval, marketing and promotion. The training events are aimed at assisting INIS Members in training personnel newly involved in input preparation and utilization of output products.

6.2.2 INIS Distance Learning Program

The INIS Distance Learning Program provides comprehensive instructions about input preparation in both: Bibliographic Description and Subject Analysis, and usage of the INIS
database. The program is available free on CD-ROM, for individualized, self-paced study addressed to the staff of the INIS Centres.

6.2.3 Technical Co-operation Assistance

Through the IAEA Department of Technical Co-operation, the INIS Secretariat provides assistance to developing countries participating in INIS in establishing and operating information systems on nuclear energy.

6.2.3.1 Regional Training

Regional Training is sponsored by the IAEA Technical Co-operation Department in conjunction with the INIS Secretariat. It is generally related to Technical Co-operation Projects and is hosted by a Member State in the Region.

6.2.3.2 Fellowships and Scientific Visits

Fellowships and scientific visits are also sponsored by the IAEA Technical Co-operation Department in conjunction with INIS. A Fellowship is designed for junior staff members in Member States, generally has two to three month duration in a single geographic area, and constitutes on-the-job training. A Scientific Visit is designed for senior staff in a Member State and has duration of one to three weeks in more than one location.

7. INIS in India

India has been actively participating in INIS from the very beginning. The Library and Information Services Division of the Bhabha Atomic Research Centre (BARC),Bombay, is the National Centre responsible for INIS activities in India. BARC is a Government research institute in the field of nuclear science and technology under the Department of Atomic Energy, India. The Centre has been quite successful in collecting information on the subject, sending the same to the centralized processing unit and the receiving and passing on the output the users in the country. From Indian centre, total number of 54554records have been input from 1970-Sep 2013. The average number of records input in the last five

years are 1967, except in the year 2013. More than 2000 records have been input from the year 2011 onwards. Collection of literature in the centre is from various sources of the country which includes conferences, journals (print/online/open sources), books/monographs and technical reports.

7.1 Activities

Some of the activities of the INIS inputting Centre, India are:

• INIS DVDs service Area Network (LAN) and online INIS through online getaway of BARC,

• Selective Dissemination of Information (SDI),

• Demo-Cum-Training on INIS Database,

•Distribute of INIS Brochures and promotional materials at conferences/symposia in India,

• Conducting training programmes on setting up INIS Inputting Centers in other member countries,

• Document Delivery Service, for example, countries like Brazil, Canada, France, Korea are regular requesters

• Development of INIS supporting software tools:

• INIS Libsoft (for converting DVD Rom bibliographic data to MS Excel sheets), and • Libdata: a software tool (Winfibre matrix file support with features like reverse author name with affiliation, insert automatic country code in tag).

• Arranging INIS Database demonstration at various conferences/symposium/poster presentation,

• Nuclear News Collection: This involves selection of nuclear and Department of Atomic energy related news from subscribed newspapers, their digitalisation in order to provide the scientists and engineers in the BARC campus through LAN as a current awareness service (CAS), and

• SIRB-Scientific Information Resource Bulletin: A Monthly News Bulletin published as an promotional activity of subscribed and open Database including INIS, conference proceedings, journals, and other digital resources within the centre.

8. Summary

INIS is the world´s leading information system on the peaceful uses of nuclear science and technology. INIS maintains a database of over 3.3 million bibliographic references and announces the availability of scientific literature published world-wide on the peaceful uses of nuclear energy. It also maintains a

collection of full text documents that would be difficult to obtain elsewhere. Currently the INIS database on Internet contains over 3.3 million bibliographic references. Bibliographic metadata is often supplemented by an English abstract. Full-text documents represent around 10% of the collection. This unique set of nonconventional or grey literature is also fully searchable. INIS offers news and information, such as special events, presentations, training, newsletters or information materials, from INIS Centres around the world.

MEDLARS

Medical Literature Analysis and Retrieval System (MEDLARS) / Medical Literature Analysis and Retrieval System Online (MEDLINE)

QP-2021: Write a detailed note on MEDLARS.

I. Objectives

In this module, we will learn about the (MEDLARS) / MEDLINE, its history, products and services. After reading this module you will be able to know the importance of MEDLARS and its services in Medical Sciences.

1. Introduction

MEDLINE (Medical Literature Analysis and Retrieval System Online, or MEDLARS Online) is a bibliographic database of life sciences and biomedical information. It includes bibliographic information for articles from academic journals covering medicine, nursing, pharmacy, dentistry, veterinary medicine, and health care. It was established in 1964 as MEDLARS (Medical Literature Analysis and Retrieval System), a computerized storage and retrieval system at the US's National Library of Medicine (NLM) to provide for bibliographic access to the NLM's large biomedical literature collection. MEDLINE also covers much of the literature in biology and biochemistry, as well as fields such as molecular evolution. Compiled by the National Library of Medicine (NLM) of United States, MEDLINE is freely available on the Internet and is searchable via PubMed and NLM's National Centre for Biotechnology Information's Entrez system.

MEDLARS, as a project grew out of the National Library of Medicine Index Mechanization Project of 1958-60. The system operated at the beginning of 1964. MEDLARS is a

computerized information retrieval system with three major types of products: (i) one-shot demand searches on questions of great complexity, (ii) recurring bibliographies in special fields of the medical sciences, and (iii) composition of a comprehensive periodical index, the Index Medicus.

2. History

The National Library of Medicine (NLM), on the campus of the National Institutes of Health in Bethesda, Maryland, has been a centre of information innovation since its founding in 1836. The world's largest biomedical library, NLM maintains and makes available a vast print collection and produces electronic information resources on a wide range of topics that are searched billions of times each year by millions of people around the globe. It also supports and conducts research, development, and training in biomedical informatics and health information technology. In addition, the Library coordinates a 6,000-member National Network of Libraries of Medicine that promotes and provides access to health information in communities across the United States.

MEDLARS (Medical Literature Analysis and Retrieval System) is a computerised biomedical bibliographic retrieval system. It was launched by the National Library of Medicine in 1964 and was the first large scale, computer based, retrospective search service available to the general public. Since 1879, the National Library of Medicine has published Index Medicus, a monthly guide to medical articles in thousands of journals. The huge volume of bibliographic citations were manually compiled. In 1957 the staff of the NLM begun to plan the mechanization of the Index Medicus; what was needed was a way to manipulate all this information to produce subsidiary products. By 1960 a detailed specification was prepared and by the spring of 1961 a request for proposals was sent out to 72 companies to develop the system. As a result a contract was awarded to the General Electric Company. The computer (a Minneapolis-Honeywell 800) which was to run MEDLARS was delivered to the NLM in March 1963. MEDLARS cost $3 million to develop and at the time of its completion in 1964, no other publicly available, fully operational electronic storage and retrieval system of its magnitude existed. The original computer configuration operated from 1964 until its replacement by MEDLARS II in January 1975. Input sources into MEDLARS included Biomedical and other health science Journals, books, technical reports, etc.

In late 1971, an online version called MEDLINE ("MEDLARS Online") became available as a way to do online searching of MEDLARS from remote medical libraries. This early system

covered 239 journals and boasted that it could support as many as 25 simultaneous online users (remotely logged-in from distant medical libraries) at one time. However, this system remained primarily in the hands of libraries, with researchers able to submit pre-programmed search tasks to librarians and obtain results on printouts, but rarely able to interact with the NLM computer output in real-time. This situation continued through the beginning of the 1990s and the rise of the World Wide Web.

In 1996, soon after most home computers began automatically bundling efficient web browsers, a free public version of MEDLINE was instigated. This system, called PubMed, was offered to the general online user in June, 1997, when MEDLINE searches via the Web were demonstrated.

3. MEDLINE

MEDLINE is the U.S. National Library of Medicine's (NLM) premier bibliographic database that contains over 23 million (in 2016) references to journal articles in life sciences with a concentration on biomedicine. A distinctive feature of MEDLINE is that the records are indexed with NLM Medical Subject Headings (MeSH). The great majority of journals are selected for MEDLINE based on the recommendation of the Literature Selection Technical Review Committee (LSTRC), an NIH-chartered advisory committee of external experts analogous to the committees that review NIH grant applications. Some additional journals and newsletters are selected based on NLM-initiated reviews, e.g., history of medicine, health services research, AIDS, toxicology and environmental health, molecular biology, and complementary medicine, that are special priorities for NLM or other NIH components. These reviews generally also involve consultation with an array of NIH and outside experts or, in some cases, external organizations with which NLM has special collaborative arrangements.

MEDLINE is the primary component of PubMed, part of the Entrez series of databases provided by the NLM National Center for Biotechnology Information (NCBI). MEDLINE database contains over 20 million references to journal articles in life sciences with a concentration on biomedicine. A distinctive feature of MEDLINE is that the records are indexed with NLM Medical Subject Headings (MeSH). MEDLINE is also the primary component of PubMed, part of the Entrez series of databases provided by the NLM- National Center for Biotechnology Information (NCBI). The time coverage of the database is 1946 to the present, with some older material. MEDLINE, therefore, functions as an important

resource for biomedical researchers. More than 5,600 (in 2016) biomedical journals are indexed in MEDLINE.

3.1 National Centre for Biotechnology Information

This centre was created by Public Law of United States of America in 1988 as part of National Library of Medicine at National Institute of Health, Bethesda, Maryland to:

• Create automated systems for knowledge about molecular biology, biochemistry, and genetics.

• Perform research into advanced methods of analyzing and interpreting molecular biology data.

• Enable biotechnology researchers and medical care personnel to use the systems and methods developed.

This centre is supported by:

a. MEDLINE

• Citations to Articles in 5,600 Biomedical Journals Selected by an Expert Panel • Subject Specialists Add NLM's Medical Subject Headings (MeSH) to Each Citation

b. PubMed

• MEDLINE Database Plus Supplementary Material From Some MEDLINE Journals • A Component of a Larger Retrieval System, Entrez

c. Entrez

• Integrates Access to Biomedical Literature and a Collection of Molecular Biology Databases.

3.2 Retrieval from MEDLINE

MEDLINE uses Medical Subject Headings (MeSH) for information retrieval. Engines designed to search MEDLINE (such as Entrez and PubMed) generally use a Boolean expression combining MeSH terms, words in abstract and title of the article, author names, date of publication, etc. Entrez and PubMed can also find articles similar to a given one, based on a

mathematical scoring system that takes into account the similarity of word content of the abstracts and titles of two articles.

3.2.1 MeSH

MeSH, the Medical Subject Headings comprise NLM's controlled vocabulary used for indexing articles, for cataloging books and other holdings, and for searching MeSH-indexed databases, including MEDLINE. MeSH terminology provides a consistent way to retrieve information that may use different terminology for the same concepts. MeSH organizes its descriptors in a hierarchical structure so that broad searches will find articles indexed more narrowly. This structure also provides an effective way for searchers to browse MeSH in order to find appropriate descriptors. The MeSH vocabulary is continually updated by subject specialists in various areas. Each year hundreds of new concepts are added and thousands of modifications are made.

3.3 MEDLINE Usage

PubMed usage has been on the rise since 2008. A service such as MEDLINE strives to balance usability with power and comprehensiveness. In keeping with the fact that MEDLINE's primary user community is professionals (medical scientists, health care providers), searching MEDLINE effectively is a learned skill as untrained users are sometimes frustrated with the large numbers of articles returned by simple searches. Counter intuitively, a search that returns thousands of articles is not guaranteed to be comprehensive. Unlike using a typical Internet search engine, PubMed searching of MEDLINE requires a little investment of time. Using the MeSH database to define the subject of interest is one of the most useful ways to improve the quality of a search. Using MeSH terms in conjunction with limits (such as publication date or publication type), qualifiers (such as adverse effects or prevention and control), and text-word searching is another.

The great majority of journals are selected for MEDLINE based on the recommendation of the Literature Selection Technical Review Committee (LSTRC), an NIH-chartered advisory committee of external experts analogous to the committees that review NIH grant applications. Some additional journals and newsletters are selected based on NLM-initiated reviews, e.g., history of medicine, health services research, AIDS, toxicology and environmental health, molecular biology, and complementary medicine, that are special

priorities for NLM or other NIH components. These reviews generally also involve consultation with an array of NIH and outside experts or, in some cases, external organizations with which NLM has special collaborative arrangements.

3.4 Broad Subject Coverage

The subject scope of MEDLINE is biomedicine and health, broadly defined to encompass those areas of the life sciences, behavioural sciences, chemical sciences, and bioengineering needed by health professionals and others engaged in basic research and clinical care, public health, health policy development, or related educational activities. MEDLINE also covers life sciences vital to biomedical practitioners, researchers, and educators, including aspects of biology, environmental science, marine biology, plant and animal science as well as biophysics and chemistry. Increased coverage of life sciences began in 2000.

The majority of the publications covered in MEDLINE are scholarly journals; a small number of newspapers, magazines, and newsletters considered useful to particular segments of the NLM broad user community are also included.

MEDLINE is the primary component of PubMed (http://pubmed.gov). The result of a MEDLINE / PubMed search is a list of citations (including authors, title, source, and often an abstract) to journal articles and an indication of free electronic full-text availability. Searching is free of charge and does not require registration.

A growing number of MEDLINE citations contain a link to the free full text of the article archived in PubMed Central or to other sites. Linking can be made from many MEDLINE references to the Web site of the publisher or other full text provider to request or view the full article, depending upon the publisher's access requirements. For articles not freely available on the Web, the "Loansome Doc" feature in PubMed provides an easy way to place an electronic order through the National Network of Libraries of Medicine (NN/LM) for the full-text copy of an article cited in MEDLINE. Registration is required and local fees may apply for this service.

Services/products providing access to MEDLINE data are also developed and made available by organizations that lease the database from NLM. Access to various MEDLINE services is often available from medical libraries, many public libraries, and commercial sources.

3.5 MedlinePlus (http://medlineplus.gov/) It is the National Library of Medicine's web site for consumer health information. The site offers authoritative, up-to-date health information, without advertisements, and is available anytime, anywhere for free. A Spanish-language version, MedlinePlus en español (http://medlineplus.gov/spanish), is also available. A site for cell phones and other mobile devices is at http://m.medlineplus.gov. MedlinePlus is not an exhaustive list of every health web resource. It is a selective list of authoritative health information sources from NIH and other government and professional organizations in the U.S.

4. PubMED

PubMed is a free search engine accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics. The United States National Library of Medicine (NLM) at the National Institutes of Health maintains the database as part of the Entrez system of information retrieval. From 1971 to 1997, MEDLINE online access to the MEDLARS computerized database had been primarily through institutional facilities like medical libraries. PubMed, first released in January 1996, ushered in the era of private, free, and home-computerized MEDLINE searching. The PubMed system was offered free to the public in June 1997, when MEDLINE searches via the web were demonstrated.

PubMed comprises of more than 26 (in 2016) million citations for biomedical literature from MEDLINE, life science journals and online books. Citations include links to full-text content from PubMed Central and publisher web sites. PubMed citations and abstracts include the fields of biomedicine and health, covering portions of the life sciences, behavioral sciences, chemical sciences, and bioengineering. PubMed also provides access to additional relevant web sites and links to the other NCBI molecular biology resources. PubMed is a free resource that is developed and maintained by the National Center for Biotechnology Information (NCBI), at the U.S. National Library of Medicine (NLM), located at the National Institutes of Health (NIH). Publishers of journals can submit their citations to NCBI and then provide access to the full-text of articles at journal web sites using LinkOut.

5. PubMED Central

PubMed Central (PMC) is a free archive of biomedical and life sciences journal literature at the U.S. National Institute of Health's National Library of Medicine (NIH/NLM). In keeping with NLM’s legislative mandate to collect and preserve the biomedical literature, PMC serves

as a digital counterpart to NLM's extensive print journal collection. Launched in February 2000, PMC was developed and is managed by NLM's National Center for Biotechnology Information (NCBI). As an archive, PMC is designed to provide permanent access to all of its content, even as technology evolves and current digital literature formats potentially become obsolete. NLM believes that the best way to ensure the accessibility and viability of digital material over time is through consistent and active use of the archive. For this reason, free access to all of its journal literature is a core principle of PMC.

PMC is a repository for journal literature deposited by participating publishers, as well as for author manuscripts that have been submitted in compliance with the Public Access Policy mandated by NIH and similar policies of other research funding agencies. PMC is not a publisher and does not publish journal articles itself. PMC offers publishers a number of ways in which to participate and deposit their content in the archive. Although free access is a requirement, publishers can delay the release of their material in PMC for a reasonable period after publication. Publishers may also obtain a copy of their deposit material at any time, at no cost.

In addition to its role as an archive, the value of PMC lies in its capacity to store and crossreference data from diverse sources using a common format within a single repository. With PMC, a user can quickly search the entire collection of full-text articles and locate all relevant material. PMC also allows for the integration of its literature with a variety of other information resources that can enhance the research and knowledge fields of scientists, clinicians and others. NLM is collaborating internationally with other agencies that share the goals of PMC. Maintaining copies of PMC's literature in other reliable international archives that operate on the same principles provides greater protection against damage or loss of the material. At the same time, the diversity of sites allows for the possibility of more and even greater innovation, ensuring the permanence of PMC over the long-term.

6. Difference between MEDLINE, PubMED, and PMC (PUBMED Central)

As per the fact sheet MEDLINE is the National Library of Medicine (NLM) journal citation database. Started in the 1960s, it now provides over 22 (in 2016) million references to biomedical and life sciences journal articles back to 1946. MEDLINE includes citations from over 5,600 scholarly journals published around the world. Publishers submit journals to an NIH-chartered advisory committee, the Literature Selection Technical Review Committee (LSTRC), which reviews and recommends journals for MEDLINE. The LSTRC considers the

quality of the scientific content of a journal, including originality and the importance of the content for the MEDLINE global audience, using the guidelines found on the NLM Fact Sheet MEDLINE Journal Selection. The MEDLINE database is directly searchable from NLM as a subset of the PubMed database as well as through other numerous search services that license the data. In addition to the comprehensive journal selection process, what sets MEDLINE apart from the rest of PubMed is the added value of using the NLM controlled vocabulary, Medical Subject Headings (MeSH), to index citations.

PubMed has been available since 1996. Its over 25 (in 2016) million references include the MEDLINE database plus the following types of citations:

• In-process citations, which provide records for articles before those records go through quality control and are indexed with MeSH or converted to out-of-scope status.

• Citations to articles that are out-of-scope (e.g., covering plate tectonics or astrophysics) from certain MEDLINE journals, primarily general science and general chemistry journals, for which only the life sciences articles are indexed with MeSH.

• "Ahead of Print" citations that precede the article's final publication in a MEDLINE indexed journal.

• Citations that precede the date that a journal was selected for MEDLINE indexing (when supplied electronically by the publisher).

• Pre-1966 citations that have not yet been updated with current MeSH and converted to MEDLINE status.

• Citations to some additional life sciences journals that submit full text to PMC (PubMed Central) and receive a qualitative review by NLM.

• Citations to author manuscripts of articles published by NIH-funded researchers.

• Citations for the majority of books available on the NCBI Bookshelf (a citation for the book and in some cases each chapter of the book).

PubMed citations often include links to the full-text article on the publishers' Web sites and/or in PMC and the Bookshelf. MEDLINE is the largest subset of PubMed. You may limit your PubMed search retrieval to MEDLINE citations by restricting your search to the MeSH controlled vocabulary or by using the Journal Categories filter called MEDLINE.

PMC (PubMed Central) launched in 2000 as a free archive for full-text biomedical and life sciences journal articles. PMC serves as a digital counterpart to the NLM extensive print journal collection; it is a repository for journal literature deposited by participating publishers, as well as for author manuscripts that have been submitted in compliance with the NIH Public Access Policy and similar policies of other research funding agencies. Some PMC journals are also MEDLINE journals. For publishers, there are a number of ways to participate and deposit their content in this archive, explained on the NLM Web pages Add a Journal to PMC and PMC Policies. Journals must be in scope according to the NLM Collection Development Manual. Although free access is a requirement for PMC deposit, publishers and individual authors may continue to hold copyright on the material in PMC and publishers can delay the release of their material in PMC for a short period after publication. There are reciprocal links between the full text in PMC and corresponding citations in PubMed. PubMed citations are created for content not already in the MEDLINE database. Some PMC content, such as book reviews, is not cited in PubMed.

7. Unified Medical Language System (UMLS)

The UMLS integrates and distributes key terminology, classification and coding standards, and associated resources to promote creation of more effective and interoperable biomedical information systems and services, including electronic health records.

The purpose of the National Library of Medicine Unified Medical Language System (UMLS) is to facilitate the development of computer systems that behave as if they "understand" the meaning of the language of biomedicine and health. The UMLS provides data for system developers as well as search and report functions for less technical users.

There are three UMLS Knowledge Sources:

• The Metathesaurus, which contains over one million biomedical concepts from over 100 source vocabularies, • The Semantic Network, which defines 133 broad categories and fifty-four relationships between categories for labelling the biomedical domain, and • The SPECIALIST Lexicon & Lexical Tools, which provide lexical information and programs for language processing.

They are distributed with flexible lexical tools and MetamorphoSys, the UMLS install and customization program.

8. ICMR-NIC Centre for Biomedical Information

ICMR-NIC Centre for Biomedical Information also referred to as Indian MEDLARS Centre (IMC) was set up in 1986 to cater to information needs of biomedical professionals in India.

The main aim of setting up Indian MEDLARS Centre was to provide access to relevant biomedical information, in the shortest possible time, to the medical professionals. It provides information from NLM's databases plus from other internet resources and CD databases. Support services like training, full-text of journal articles and Union Catalogue of Biomedical Periodicals are also available. The information needs in this subject are taken care of two major resources from the centre as below.

8.1 IndMED Database

IMC has designed and developed a bibliographic database of peer reviewed Indian medical journals referred to as IndMED, a database developed to cover non-Medline journals. The database includes journals from 1985 to date. There are simple and advanced search mode available for searching the database. The IndMED database is a bibliographic database developed on the lines of the MEDLINE database using the concepts of both keywords as well free-text searching. A user-friendly search engine has been designed enabling the users to access the database using "Simple" or "Advanced" search modes.

8.2 MedIND

MedIND provides online access to full-text of Indian biomedical periodicals to the users in and outside India. IndMED indexes Indian Biomedical journals. It is accessible from (http://indmed.nic.in) to the medical professionals, free of cost. The database aims at covering peer-reviewed journals from 1985 onwards. To supplement IndMED with full text of articles, this resource was developed to host full-text of indexed Indian biomedical journals. This medIND portal is accessible free of cost to the medical community in India as well those outside the country. Journals indexed in IndMED database are included in this database. At present there are no charges for hosting the journals contents on the site. Editors of journals covered in Index Medicus (MEDLINE) are welcome to have their journals included in this full-text database.

9. Summary

In this module, we have discussed MEDLINE and its related databases. MEDLINE is a huge database of over 20 million references to articles published in approximately 5,600 current biomedical journals from the United States and over 80 foreign countries. It is a database

you can search free using the NLM PubMed system at http://pubmed.gov. It is used for finding references on specific medical topics using either keywords or Medical Subject Headings (MeSH) for references to articles published in the 1940's - to the present as converted from Current List of Medical Literature (CLML). Medline Plus) is the National Library of Medicine's web site for consumer health information.

In conclusion, PubMed citations come from firstly MEDLINE indexed journals, secondly from journals/manuscripts deposited in PMC, and lastly from NCBI Bookshelf. Both MEDLINE and other PubMed citations may have links to full-text articles or manuscripts in PMC, NCBI Bookshelf, and publishers' Web sites. If we limit the PubMed search to MeSH controlled vocabulary or the MEDLINE subset, we will see only MEDLINE citations in our results.

ASTINFO

ASTINFO stands for Regional Network for Exchange of Information and Experience in Science and Technology in Asia and Pacific. It aims to promote the exchange of information and experience in science and technology among countries in the Asia/Pacific region. It was established in 1983 as an outcome of the Second Conference of the Science Ministers and Economic Planning Bodies in the Asia/Pacific region (CASTASIA II), held in March 1982 in Manilla (Philippines).

ASTINFO has co-ordinating units in 18 Member States; and some 82 national/ regional institutions now hold the status of ASTINFO Associated Centres and Networks. A quarterly Newsletter is also being published.

The aims and benefits of ASTINFO include the following:

‘‘Computerisation of library and information management services;

Pilot projects on Specialised information systems and services;

Development of National Information Policies and Standards;

Innovative approaches to education and training of library and information personnel;

Establishment of document delivery systems and services; and

Serving as a forum for communication and information exchange.’’

ASTINFO helps Member States in acquiring/developing the necessary policies, methodologies, guidance, and expert advice to generate, store, process, retrieve, exchange, use and share information in the area of Science and Technology.

In the year 1986 UNESCO launched another network, called Asia-Pacific Information Network in Social Science (APINESS) with the collaboration of Association of Asian Social Research Councils.

Since the year 2000, UNESCO had revised its various activities and programmes and included ASTINFO and APINESS Programmes in the APIN (Asia Pacific Information Network). APIN is a network formed by a merger of the Regional Network for the Exchange of Information and Experiences (ASTINFO), the Regional Informatics Network for Southeast Asia and the Pacific (RINSEAP) and the Regional Informatics Network for South and Central Asia (RINSCA).

APIN Programme of UNESCO is linked with UNESCO's Information for All Programme (IFAP) and promotes ICT literacy and application, information and knowledge networking, sharing of information resources, and use of international standards and best practices in communication, information and informatics.

ASTINFO has a number of activities to achieve its objectives, including:

- Networking: ASTINFO facilitates the exchange of information and experience between national focal points through a variety of channels, such as workshops, conferences, and online platforms.
- Capacity building: ASTINFO provides training and support to national focal points to help them collect, organize, and disseminate information on science and technology.
- Advocacy: ASTINFO raises awareness of the importance of science and technology for sustainable development through publications, events, and other outreach activities.

ASTINFO is a valuable resource for countries in the Asia-Pacific region to access information and experience on science and technology. It is also a forum for countries to share their experiences and work together to promote the development and use of science and technology for sustainable development.

Institute for Scientific Information (ISI)

Introduction

Eugene Garfield and his Institute for Scientific Information (ISI)™ pioneered new methods for indexing and disseminating the world's scientific and scholarly research literature in the second half of the 20th century.

Today, as the research arm of Clarivate™, ISI continues Garfield's commitment to provide researchers with high-quality data, advanced tools and key insights to accelerate discovery and innovation.

Building a foundation for information science

Garfield introduced the concept of citation indexing for the sciences in 1955 and ISI produced the first Science Citation Index (SCI)™ in 1964. Citation indexing revolutionized information retrieval. By recording and linking the cited references that authors attached to their papers, the SCI represented an "association of ideas index."

It was an idea before its time, proving Garfield a visionary as well as an innovator. By organizing information through a network of citation connections, Garfield anticipated web hyperlinking and the Google Search algorithm by three decades.

From its foundation in 1960, ISI introduced a range of current awareness and information retrieval products and services covering the literature of the sciences, social sciences and humanities.

A Social Sciences Citation Index (SSCI)™ was introduced in 1973 and an Arts & Humanities Citation Index (AHCI)™ in 1978. Several products focused on the chemical sciences, such as Index Chemicus, the ISI's first offering in 1960.

The Journal Citation Reports™, introduced in 1976, collated journal-to-journal citations to help librarians and publishers understand the communication system of the science and social sciences literature, as well as the influence and prestige of specific titles. Among other indicators in the product, the most popular was the Journal Impact Factor™.

Other ISI products were designed to keep researchers up to date on new publications in their fields, such as Current Contents, a weekly bulletin presenting the content pages of journals, eventually issued in seven field-specific editions.

SCI data also served as a foundation for quantitative studies in the history and sociology of science and eventually gave birth to the field of scientometrics.

Timeline of key events:

- **1960:** Eugene Garfield establishes the Institute for Scientific Information (ISI) in Philadelphia, Pennsylvania
- **1964:** ISI publishes the first Science Citation Index (SCI), fulfilling Garfield's 1955 proposal for citation indexing of the scientific literature

- **1973:** The U.S. National Science Foundation incorporates SCI publication and citation data in the first Science Indicators report on national performance in research
- **1973 / 1978:** ISI expands coverage of the scholarly literature with the introduction of the Social Sciences Citation Index (SSCI) and the Arts & Humanities Citation Index (AHCI), respectively
- **1976:** ISI publishes the first Journal Citation Reports, including Journal Impact Factors and other descriptive statistics
- **1979:** Garfield publishes Citation Indexing – Its Theory and Application in Science, Technology, and Humanities
- **1981:** The ISI Atlas of Science is published, based on research by ISI's Chief Scientist Henry Small and using co-citation to map research topics
- **1988:** ISI introduces the Science Citation Index on CD-ROM
- **1992:** The Thomson Corporation acquires ISI
- **1997:** The Web of Science first launches online, bringing together the SCI, SSCI and AHCI
- **2001:** Essential Science Indicators is introduced – a web-based analytic tool providing data on the output and impact of researchers, institutions, nations and journals, as well as highly cited papers and research fronts
- **2009:** InCites, a platform for in-depth analysis of research performance integrated with complete Web of Science data, is launched
- **2016:** Clarivate acquires the ISI product range from Thomson Reuters Corporation
- **2017:** The life of Eugene Garfield (1925-2017) is commemorated and celebrated September 15-16 in Philadelphia, Pennsylvania
- **2018:** ISI formally re-established within Clarivate, continuing Garfield's original business and intellectual legacy

The ISI was set up in 1960. It has been servicing the scientific, academic and business communities as an information provider. It provides direct and easy access to the bibliographic data, cited references and abstracts contained in the world's most important scientific, technical and scholarly publications.

ISI has been taken over by Thompson Scientific, a segment of Thomson Corporation is now referred to as Thompson ISI. The goal of ISI is to ''increase the impact of research by providing researchers integrated information solutions delivered by the most innovative technologies''.

A recent development of ISI is the ISI Web of Knowledge which is the single window from which researchers can access, analyse, and manage information. ISI Web of Knowledge enables users to locate high quality information with help from evaluation tools and bibliographic management products. It also provides innovative search tools for cross-content and web document searching. It is equipped with a sophisticated linking gateway as the ISI Web of Knowledge content is multidisciplinary, and supports research conducted at academic, corporate, government, and not-for profit organizations world over.

We all know that ISI has been the only source for cited reference searching and this facility has been enhanced by the Web of Science , the main component of Web of Knowledge. Web of Science is a multidisciplinary collection of bibliographic information from over 8,600 evaluated scholarly journals. The information taken from each article includes the article's cited reference list (bibliography), allowing users to search for articles that cite a known author or work. Cited reference searching is unique to ISI, providing effortless navigation backward, forward, and through literature regardless of publication dates, country of origin, or disciplines.

ISI is also well known for the term 'Impact Factor'. Based upon citation analysis and quantifiable statistical data, it provides a systematic, objective way to determine the relative importance of journals within their subject categories. The impact factor can determine which are the best journals, what journals have the highest impact and what journals are most frequently used or cited.

Users of ISI include librarians, academic researchers, administrators scientists, researchers and analysts working in all kinds of organisations.

The following facilities are available from ISI:

— Simultaneous cross-content searching.

— Accessing full-text web content.

— Accessing over 100 years of backfile records and cited references.

— Searching "pre-published" journal articles.

— Conducting cited reference searching.

— Refining and mining useful information from search results.

— Linking directly to the full-text of primary literature, additional databases, and any library's holdings.

— Accessing freely available external collections.

— Alerting, including Personal Citation Alerts.

Citation Indexes

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Carrying the torch of Garfield's intellectual legacy

In 1992, the Thomson Corporation acquired ISI. Thomson merged with Reuters in 2008 to form Thomson Reuters. In 2016, the scientific and scholarly information business of Thomson Reuters, including the products and services of the former ISI, was spun out to private ownership and rebranded as Clarivate.

ISI was revived as a research division within Clarivate in 2018 to conduct scientometric research, to advise the company on the content and features of its products, and to offer guidance to the research community on best practices in the use of quantitative indicators in the evaluation of research. It also maintains the foundational knowledge and editorial rigor upon which the Web of Science index and its related products and services are built.

ISI's reports and publications and participation in events and conferences play a crucial role in extending and improving the knowledge base that is essential to our colleagues, partners and all those who deal with research in academia, government organizations, corporations, as well as funders and publishers.

Information Policy

QP-2020: Give an account on inforrnation policies and programmes.

1. INTRODUCTION

1.1 Need for a National Information Policy

The awareness of the value of information in socioeconomic development has been maturing over the last few years. The last decade has been particularly noteworthy for the enlightened approach of the Government to develop an infrastructure of information to support all nation building activities. It is now appropriate to think in terms of a national information policy. Many of the countries, both developed and developing, are now in the information policy-making stage. In fact, information policy-making has become an important activity in documentation and information management in many countries.

1.2 Lack of Policy in the Past

For the most part, information agencies have not developed or used policies. They are guided by rules of thumb or were following trial and error method. Scientific management brought in the concept of polices, planning, implementation, evaluation, etc.

1.3 Basic Policy Questions

Polices can be formulated at different levels, say, at local, regional, state, national and international. At the local level, different institutions may have different policies. Thus, the policies of different institutions may differ. However, there will be some basic policy question's in general which even evolved separately may come out to be common.

1.4 Policy Statement

Policy statements provide the basis for orderly, smooth and thoughtful change. They further assist and enable longer range management planning. There can be policies to cover every decision or to meet every contingency. The following basic premises are likely to be useful: 1. Programmes and activities must operate within one framework and be directed towards a common set of objectives. 2. The establishment of performance goals and the determination of priorities is contingent upon a clear understanding of general polices. 3. Consistency and efficiency of operations are ultimately dependent upon the existence of a sound body of policies. 4. Clear policy statement reinforces and protects the information service in matters where its position is questioned or challenged.

1.5 Value of Polices

Polices are of value in a number of ways. To name a few:

(i) They standardize activities.

(ii) Facilitate decision making.

(iii) Minimize confusion.

(iv) Coordinate activities of various units, and

(v) Conserve time in training personnel.

1.6 Policy Questions for Information Organizations

Information organizations must address themselves to the following basic policy questions:

1. What is the major role of the information service?

2. What are the components of the information system? And how are they related?

3. What information services are provided? And how?

4. What are the different categories of users served?

5. Which levels of services are to be provided?

6. What role is to be played by the information Unit in relation to the services available from outside agencies?

7. What are the roles, responsibilities and relationship of the users vis-a-vis the information services, administration and staff?

8. What are the lines of authority and process of decision making?

i) Issues for a Policy Statement

As mentioned earlier, policy statements are to be formulated at the international level, regional, state, national and international level. Whatever may be the level at which the policy has to be formulated, it should comprehend a set of basic issues. Some of these are illustrated below:

ii) Infrastructure Development

1. Identification of the objective and thrust areas of the institution,

2. Requirement of users.

3. Existing infrastructure and new infrastructure to be developed.

4. Manpower, material and monetary requirements.

iii) Information Services Development

5. Increased control of locally generated information.

6. Access to databases and databanks.

7. Information dissemination methods.

8. Information analysis and consolidation.

9. User studies and identification of user needs.

iv) Utilization of New Technologies

10. Improving access to new technologies.

11. Guidance for utilization of the new technologies.

12. New services with new technology.

13. Sharing of resources and services.

v) Manpower Development

14. Increasing training of manpower.

15. Initiation into new technological developments.

16. Organizing continuing education Programmes.

17. Training in user training.

18. Training of trainers.

vi) Other General Recommendations

19. Guidelines for policy formulation.

20. Study and evaluation of systems and services.

21. Reviewing of the policy and its effectiveness.

22. Preparation of policy manual.

23. Cooperation and coordination with organizations at different levels and in different fields.

2. NATIONAL INFORMATION POLICY

It has increasingly been realized that information is vital for national development as like energy and manpower. Most of the nations started evolving national policies for information generation, organization and dissemination. Inspite of restrictions trans-border data flow has become imperative and common.

By and large nations have realized that the progress of a nation depends upon the information it generates, disseminate to the users, and put it to work. Lack of information is going to adversely effect the development. Secondly the cost of information is directly related to its use or application. Generation of new information needs lot of inputs by way of research, gathering, processing and storage. Information dissemination is governed by the factor of recovery of investments in research, gathering, processing and storage costs. The cost of information makes it imperative to share the information in a planned manner and coordination of information activities within a nation. The evolution of public policy, however, has not kept pace with the vast technological change. Setting public policy in this area poses daunting challenge, even for information professionals. There currently exist a vast number of laws, regulations, directives, statements, policies and judicial interpretations concerning information. Given this complexity, how does an information professional balance all the competing needs? How can we organize our thinking about information policy? In almost all countries national governments are the major investors and

disseminators of information. As such, each country should evolve a national policy of its own taking into consideration the developments at national and international level.

2.1 Guidelines for the National Information Policy

A national information policy should comprehend the following:

1. Identification of the information needs of different socio-professional groups.

2. Establish priorities in regard to these needs.

3. Visualize a 'National Information System' with various sub-systems, sectorel system, etc.

4. Services to be offered and methods to provide the services.

5. Keep a watch on the capacity of the national information infrastructure (manpower, material, money, etc.)

6. Decide the measures needed to enable the national information system to perform its role and ensure compatibility among the various information systems in the country.

7. Decide as to how the national information system should be further developed.

8. Development and improvement of primary publications and ensure generally of the availability of information and data.

9. Strengthening the collections and improve the accessibility.

10. Policy regarding access to foreign collections of documents and databases.

11. Development of translation services, databases, networks, preservation, dissemination and conservation of documents.

12. Bibliographical control of documents generated in the country.

13. Coordination between various information units and subsystems.

14. Establishment of standards for information processing and communication of information. 15. Manpower planning.

16. Financing of information systems and pricing of the services.

17. Enacting appropriate legislation for regulation of information activities.

18. Promotion of user education and services.

19. Encouragement of education and research in library and information science.

20. Cooperation with other national and international organizations and institutions.

3. NATIONAL POLICY INITIATIVE IN INDIA

3.1 Chottopadhyaya Committee (1985)

The Department of Culture, Government of India set-up a Committee on National Policy on Library and Information Systems on 7 October 1985 under the Chairmanship of Prof. D.P. Chattopadhyaya, Chairman RRRLF. During the period between December 1985 and February 1986, the Committee toured different parts of the country and discussed with cross sections of the people. Suggestions were also received from several individuals and institutions. An interim report was submitted in March and the final Report on 30 May 1986.

3.1.1 Salient Features of the Report

1. The most important task before the Government is to establish, maintain and strengthen the free public libraries in the country and enable them to work as a system.

2. The main thrust in this area should go to the rural public library. A village or a village cluster with an adequate population should have a community library which will also serve as an information centre.

Resources of different agencies engaged in the work of public health, adult education, local selfgovernment and such others may be pooled to build up this composite centre.

3. An important link should be established between the community library of the village and the village primary school. If the school does not have a library of its own, the community library should provide the children with an adequate book-corner.

4. The community library should also importantly cater for adult education and make adequate audiovisual aids available to attract the illiterate villagers.

5. The district library should serve as an apex library for each district with public libraries at city, town and village levels constituting important components in the district library system. In addition to the usual services to be rendered by it, it should also provide for learning facilities and recreation for the handicapped, wherever possible, district libraries and comparable city public libraries should provide literature in Braille. The district library and branch libraries serve within its area wherever it is necessary and feasible. Special services should be rendered to hospitals, prisons and the infirm in their homes.

6. Libraries for special groups should be built in areas of tribal concentration or of minority communities to develop their distinctive cultures. Government will provide all encouragement for such communities to develop their own libraries through voluntary effort.

7. Each public library should have a section for children and, in addition, separate libraries for children with attractive books and audio-visual supporting material should be established wherever possible.

8. The district library will take the leadership in establishing linkages between all other public libraries of the district and work towards resource-sharing within the area.

9. The key role of public libraries as chief sustaining agencies of distance education should be recognized and they should be adequately equipped with the relevant resources for this purpose.

10. All the libraries within a state should form part of a network extending from the community library of the village through intermediary levels to the district and to the State Central Library. This state network should eventually be connected with the national level network.

11. The role of the State Central Library is crucial in networking and the establishment of uniform library procedures within the State. The State Central Library or Directorate of Public Libraries has to perform as the coordinating agency for public libraries in the state.

12. To bring about the development of the public libraries in a state it is vital that each state enacts its own library legislation. The Central Government should revise the Model Public Library Bill, which it has already prepared, in the light of experience gained in recent years and urge upon the states the importance of enacting such legislation. Finances for library development should be funded by each state either from its general revenue or from local taxation. 13. The Central Government should assist the state in the development of public libraries in a larger way than it has done so far. The Raja Rammohun Roy Library Foundation as the national agency for coordinating and assisting the development of public libraries be suitably strengthened enabling it to discharge its responsibilities effectively.

3.2 Empowered Committee

The Department of Culture, GOI appointed an Empowered Committee in November 1986 again under the Chairmanship of Prof. D.P. Chattopadhyaya to lay down the programme of action for the implementation of the recommendations made in the policy statement. The Empowered Committee submitted its Report in April 1988.

3.3 Working Group

On examination of the Empowered Committee's decisions, the Department of Culture felt that certain decision would be difficult to implement in the form envisaged by the Empowered Committee. It was accordingly decided to constitute a Working Group to go through carefully each decision of the Empowered Committee and indicate how best to implement them. This Working Group was chaired by Ms.KomalAnand (Jt. Secretary to the Govt., of the Department of Culture). The President, ILA was a Member of the Group.

The Working Group discussed the whole matter in four sittings between July-September 1992 and submitted its suggestions in December 1992. These have since been accepted by the Government for implementation.

Salient features of the Empowered Committee Report as accepted by the Working Group are given below:

1. Declaring Director, National Library as the Head of the Central Reference Library.

2. Initiating action for creation of National Commission on Library, Documentation and Informatics within the Government set-up.

3. Establish, maintain and strengthen public libraries in the Country and enable them to work as a system.

4. Making rural library service available in each village under the “Minimum Needs Programme” by 2001 A.D. By Central and State Government agencies.

5. Every rural public library shall have a children’s section.

6. Community Centre Libraries should have AV material and equipment. Such libraries should have an important role in Adult Education Programme.

7. District Libraries should provide more facilities for the handicapped and under-privileged classes. 8. Public libraries should act as chief sustaining agencies for distance education and should be adequately equipped.

9. State Central Library should play an important role in networking, establishment of uniform library procedures and standards within the state.

10. RRRLF may establish 100 model rural libraries in collaboration with state agencies.

11. The Central Government may revise Model Public Library Bill in the light of the experience gained in the recent years.

12. The Central Government in collaboration with State Governments may establish at least one multilingual library in each state.

13. Every school and college must have a library and a qualified librarian.

14. Association of Indian Universities may take up a project evolving academic library norms on priority basis.

15. To begin with, a few select University Library Science Departments may be provided with adequate resources as part of manpower development programme.

16. The National Library, INSDOC, DST, and ICSSR may take suitable steps to create national databases.

17. There should be National Library System (NLS) consisting of the National Library, National Depository Libraries in Delhi, Bombay and Madras, National subject libraries and other libraries of national importance.

18. There is a strong need of having a national R and D Centre of Library and Information Science. National Commission on Libraries once established may consider this proposal.

19. A national ‘Grid’ of public libraries be developed linking village community centre library with national grid.

20. The Department of Culture may take suitable steps in preparing the Draft Bill on National Commission on Libraries (NCL) giving the detailed provision under powers and function of the NCL, Bodies of NCL; Finances of NCL, etc.

21. Department of Culture has been requested to constitute a “Library Unit” which will be entrusted with the implementation of Empowered Committee’s decisions.

Most of the recommendations of the Empowered Committee are of general nature. It seems no action has been initiated either in creating the envisaged “Library Unit” or in the establishment of NCL. The Department of Culture was vested with the responsibility of preparing the Draft Bill on NCL. The Department of Culture should appoint a ‘Committee of Experts’ to draft the Bill.

The proposed NCL should have more of ex-officio members rather than ad-hoc nominations. Professional associations and senior professionals should have place in the NCL. In fact, the Department of Culture should appoint yet another committee to draft a National Library Plan giving long-term and short-term programmes, spelling out details of a ‘National Library System’ networking; norms for cooperation and coordination of services, etc.

3.4 Intellectual Property in relation to National Policy

Ownership of information, or intellectual property, is an increasingly important aspect of information policy. The government has a substantial interest in protecting free expression by guaranteeing that citizens can use ideas for their own benefit and benefit of others. At the same time, government has an interest in guaranteeing the people’s welfare by encouraging intellectual advancement that benefits society. In a capitalistic economy, this advancement is accomplished by allowing the ownership of expression. Limiting access to information by providing for ownership fulfils this public policy need.

All three components of intellectual property law combine to comprise a fairly strong system of protection. However, electronic information poses a significant challenge to the current law. Software programs fall in between copyright and patent protection. They are expressions of ideas, and yet hold great utility. Legislators have not yet been able to revise current law to adequately protect such intellectual property. The courts have had a difficult time sorting out the issues of ownership given the inadequate laws. This situation has left software producers in a difficult position. With the rapid change in technology, this type of intellectual property tends to have a short life span. Many software producers are moving towards trade secret law to ensure protection of their electronic intellectual property, which appears to afford them better protection in the short term.

4. GOVERNMENT INITIATIVES

4.1 Recent Scenario

In recent years, there has been a growing concern for ‘easy access’ and ‘proper organization’ of information for national development. In India, economic planning has necessitated the creation of a Development Information System (DIS), which largely functions within the

periphery of Statistical Information System (SIS). The government functions within a cluster of Formal organization known as departments and ministries. They generate all manners of information as byproducts of administrative/regulatory or developmental processes. A proper mechanism for organization, storage and dissemination of such information is necessary for an 'open' democracy. Fifth Pay Commission report says "In the context of government functioning in the present era of economic liberalization openness means giving everyone the right to have access to information about the various decisions taken by government and the reasoning behind them." Another significant factor in this realm is the creation of an information infrastructure in the country, which can facilitate free flow of information. This, in turn, can pave the way for better administration, Business negotiations and decision making at all levels.

4.1.1 Five Point Agenda of the Prime Minister

Mr.AtalBehari Vajpayee as Prime Minister of India addressing the delegates attending ASSOCHAM Summit on "India in the knowledge millennium" in 2001 suggested a five point agenda for leveraging of existing competencies in information technology, telecom, Bio-technology, drug design, financial services enterprise wide management to make India a knowledge super power. The Five Point Agenda Points to the following:

- Education for developing a learning society.
- Global networking.
- Vibrant Government-Industry-Academia interaction in policy-making and implementation.
- Leveraging of existing competencies in IT, Telecom, Bio-technology, Drug Design, Financial Services, and Enterprise wide Management.
- Economic and business strategic alliances built on capabilities and opportunities.

4.2 National Knowledge Commission

The Knowledge Commission is an idea that Sam Pitroda had mooted in the National Advisory Council. The Pitroda's draft for discussion, presented to the Prime Minister in December 2004, does not, however, seem path-finding. It rattles off India's knowledge heritage in "temple architecture, concept of zero, yoga and Ayurveda", while saying the "knowledge paradigm of the future will require integration of access for public benefits, concepts at universities, creations in labs, applications by industry and services by government".

4.2.1 The Commission

Mr. Sam Pitroda is the Chairman of this commission. PushpaBhargava is the Vice-chairman. Members include Infosys, Nanda Nilekani, former Delhi University vice-chancellor Deepak Nayyar, former chairman of Hindustan Lever Ltd Ashok Ganguly, sociologist Andre Beteitte, economist JayatiGhosh and political philosopher PratapBhanu Mehta-will be paid for their work.

Bhargava says there would be no duplication with existing committees such as the Central Advisory Board of Education Sub-Committee on Higher Education headed by scientific adviser C.N.R. Rao on creating two new national institutes of science even though many of the terms of reference are similar: promote creation of knowledge in science and technology labs and manage institutions engaged in intellectual property rights.

4.2.2 Working Group on Libraries

The Commission took it as one of its first initiatives to review library services, and to examine the present standards of public, private, institutional and specialized libraries and other information centres and resources, in order to formulate and create mechanisms and institutions that will serve the people. The Commission therefore set up a Working Group on Libraries to initiate objective review of current services and standards and to recommend the changes India needs. An honest review of how libraries now function has highlighted the need for changes in the mindsets of those who own, manage and operate libraries, starting with their perceptions of their responsibilities. The commission's first recommendations on libraries were forwarded to the Prime Minister in December 2006.

The development of libraries and their accessibility to those in search of knowledge also implies the translation of books and information into all major languages in use in India and their appropriate conversion into userfriendly versions for the varied ages, interests, needs and knowledge levels of present and potential clients of library and information services. The Commission's integrated approach to its mandate is already reflected in its initiation of working groups and consultative enquiry on language, translation, literacy, open education and information and knowledge networking – all of which can connect to the gateways that the opening up of libraries can yield. The Commission has already submitted recommendations on language and translation, to enrich and enhance the availability of knowledge.

Beginning its work in April 2006, the Working Group undertook an information search, review and examination of library standards, services and potential, through a range of consultations, visits and correspondence. It enlisted the attention of several experts, and set-up four special-focus committees. The Group submitted its first proposals for action to the Commission on 28th August 2006, and the Commission has recommended key actions to the Prime Minister. Highlighted in the Commission's 2006 Report to the Nation, these are presented in detail below:

Recommendations

In order to reach the goal of creating a knowledge society, the majority of the people of India must be helped to overcome 'information poverty'. The knowledge deprived have to be given access to relevant and timely information and knowledge to address the roles they should play in the developmental process. It is critical that the Library and Information Services sector is given the necessary fillip to ensure that people from all walks of life and all parts of India have easy access to knowledge relevant to their needs and aspirations.

In this new situation, libraries in India need to make a paradigm shift from their present strategy of collection or acquisition of knowledge to a strategy of knowledge access. Libraries and librarians have to recognize their functions and their critical role in creating a knowledge society. The library and information sector is committed to support the creation of a knowledge society by providing equitable, high quality, cost-effective access to information and knowledge resources and services to meet the informational, educational, recreational and cultural needs of the community through a range of national, institutional and public libraries. Keeping in mind the fact that the stakeholders of all the focus areas of the NKC mandate will need wellorganized and systematic library and information services to support all their activities, it was felt that the existing institutions and services are ready for significant change. The Commission has therefore made the following recommendations to ensure sustained attention to development of libraries:

1. Set up a National Commission on Libraries: There is need of a permanent, independent and financially autonomous statutory body to address all the library-related concerns and measures that require attention, if the information and learning needs of the citizens of India are to be met. To launch the process in a mission mode, the Central Government should set up a National Mission on Libraries immediately, for a period of three years. This Mission should subsequently be converted into a permanent National Commission. (Annexure 1 provides details on the roles recommended for the proposed National Mission on Libraries.)

2. Prepare a National Census of all Libraries: A national census of all libraries should be prepared by undertaking a nation-wide survey. Collection of census data on libraries would provide baseline data for planning. The Task Force that has been set up by the Department of Culture for this purpose should be given financial and administrative support to implement this activity and complete the survey on a priority basis (within one year). Survey of user needs and reading habits should be periodic at the national level as a part of the National Sample Survey.

3. Revamp Library and Information Science Education, Training and Research Facilities: The proposed Mission on Libraries must assess as soon as possible the manpower requirements of the country in the area of Library and Information Science management, and take necessary steps to meet the country's requirement through Library and Information Science education and training. To keep the sector abreast of latest developments, necessary encouragement should be given to research after evaluating the research status in this field. Establishing a well equipped institute for advanced training and research in library and information science and services would provide the necessary impetus to this task.

4. Re-assess Staffing of Libraries: In the changed context, it is necessary to assess the manpower requirements for different types of libraries and departments of library and information science, keeping in mind job descriptions, qualifications, designations, pay scales, career advancement, and service conditions.

5. Set up a Central Library Fund: A specified percentage of the Central and State education budgets must be earmarked for libraries. In addition, a Central Library Fund should be instituted for upgrading existing libraries over a period of three to five years. Initial funding

from the government sector may be Rs. 1,000 crores, which may be matched by the private sector through corporate philanthropy. This fund should be administered by the National Mission on Libraries.

6. Modernize Library management: Libraries should be so organized and the staff so trained that they become relevant to user communities (including special groups) in every respect. Also, to optimize resources, efforts should be made to synergize the strengths of different types of libraries through innovative collaboration. A proposed outline for this modernization includes a model Library Charter, a list of services to be performed by libraries, and proposals for a library network and a National Repository for Bibliographic Records.

7. Encourage Greater Community Participation in Library Management: It is necessary to involve different stakeholders and user groups in the managerial decision-making process of libraries. Public libraries must be run by local self-government through committees representing users of the library. These committees should ensure local community involvement and should be autonomous enough to take independent decisions to conduct cultural and educational community based programmes. Libraries should integrate with all other knowledge-based activities in a local area to develop a community-based information system. In rural areas, the responsibility for village libraries and community knowledge centres must lie with the Panchayats. These should be set up in school premises or close to them.

8. Promote Information Communication Technology (ICT) Applications in all Libraries: The catalogues of all libraries should be put on local, state and national websites, with necessary linkages. This will enable networking of different types of libraries and setting up of a National Repository of Bibliographic Records and centralized collaborative virtual enquiry handling system using the latest ICT. To enable equitable and universal access to knowledge resources, libraries should be encouraged to create more digital resources by digitizing relevant reading material in different languages; this can be shared at all level. Peer-reviewed research papers resulting from publicly funded research should also be made available through open access channels, subject to copyright regulations. The use of open standards and free and open-source software is recommended for this.

9. Facilitate Donation and Maintenance of Private Collection: There are numerous rich, private and personal collections in India which need to be identified, documented and preserved for posterity. While there is a need to create a decentralized model for identification of personal collection, it is also necessary to sensitize organizations to receive and preserve donations of personal collections through a simplified process. The proposed National Mission may set up a Committee on Private and personal Collections under the chairpersonship of an eminent scholar. (Annexure 5 provides details of terms of reference of the Committee). Since special facilities for maintaining private or personal collection are not easily available, it is suggested that ten Regional Centres with specific mandates be set up in different parts of the country for this purpose.

10. Encourage Public - Private Partnership in Development of Library and Information Services: Philanthropic organizations, industrial houses and other private agencies should be

encouraged through fiscal incentives to support existing libraries or set up new libraries. Also, the ingenuity of civil society can be utilized for preparing necessary infrastructure to meet the special ICT needs of libraries and information services.

4.3 National Mission on Libraries

The Ministry of Culture, Government of India has set-up the National Mission on Libraries on 5 April 2012. The high level Committee with Prof. Deepak Pental as Chairman is composed of:

(i) Shri B. S. Baswan, Member

(ii) Dr.SanjivMisra, Member

(iii) Dr. H.K. Kaul, Member

(iv) Prof. A.R.D. Prasad, Member

(v) Prof. SubbiahArunachalam, Member

(vi) Mrs.SudhaMurty, Member

(vii) One of the Trustees of Sir Ratan Tata Trust, Member

(viii) Secretary, Department of Higher Education, Min. of HRD, Member (Ex-Officio)

(ix) Secretary, Ministry of Culture, Member – Convener

4.3.1 The Terms of Reference The following are the terms of reference for the proposed National Mission on Libraries:

a) Advising the Government of India on all library and information sector matters of national importance.

b) Preparing long-term plan and strategies for development of the library sector, including conceptualization and approval of projects and preparation of a “National Policy on Library and Information Systems for India”.

c) Interacting with State Governments on all library matters, especially on public library matters. d) Setting standards, including quality standards, for library collections, services, technical work and infrastructure, and devising in-built mechanisms to ensure compliance for all types of libraries.

e) Encouraging and promoting partnership with corporate sector, philanthropic organizations, as well as bilateral and international agencies in the development of the library and information sector.

f) Reviewing and assessing current status of library and information service education and in-service training facilities, and working with agencies such as the UGC and universities to address the identified issues.

g) Coordinating with stakeholder Ministries such as the Ministry of Culture, Ministry of Human Resource Development, Ministry of Information Technology, Department of Panchayati Raj etc., to ensure effective implementation of the NKC recommendations and management of the post-implementation scenario.

h) Coordination with other national stakeholders of the library and information sector, such as the University Grants Commission (UGC), the All India Council for Technical Education (AICTE), Raja Rammohun Roy Library Foundation (RRRLF), Council for Scientific and Industrial Research (CSIR), Indian Council for Agricultural Research (ICAR), Indian Council for Medical Research (ICMR), Indian Council for Social Science Research (ICSSR) and so on, to ensure effective implementation of the recommendations and management of the post-implementation scenario.

i) Collaborating with counterpart agencies in other countries to explore areas for cooperation which will lead to strengthening of India's library and information sector.

j) Securing public support through advocacy and media by providing evidence of delivery, usage, outcomes and impact.

k) Helping State Governments (that do not yet have library legislation) in formulating State Library Acts.

4.3.2 Co-opt Experts

The Mission would be free to co-opt experts to associate with it in the management of its tasks.

4.3.3 Tenure of the Mission The tenure of the National Mission on Libraries will be three years.

4.3.4 Method of Operation The Mission will address its Terms of Reference through Working Groups to be constituted for the purpose of formulating elaborate plans of action.

4.3.5 Management Support

Raja Rammohun Roy Library Foundation, an autonomous body under the Ministry of Culture will be the nodal agency for the National Mission on Libraries for administrative, logistic, planning and budgeting purposes.

5. SUMMARY

Need for National Information policy was being felt for quite some time in India. Needless to emphasize that lack of information adversely effects development programmes in any field. Libraries are no exception. Settingup of a Committee on National Information Policy on Library and information Systems on 7th October 1985 under the Chairmanship of Prof. D P

Chattopadhyaya, the then Chairman of Raja Rammohun Roy Library Foundation, by the Department of Culture, Government of India has been an epoch making event in the world of Library and Information Science in India. The recommendations of this Committee have resulted in the formation of National Knowledge Commission, Working Group on Libraries, National Mission on Libraries, etc.

UNIT - 4

Information Services, Concept, Needs

I. Objectives

The module aims to

• Introduce the concepts of reference, documentation and information services

• Discuss the practice of information services in digital / virtual environment

• Illustrate the various types of information services

II. Learning outcome

After completion of the module the student will

• Distinguish the different types of information services

• Understand the growth and changing practices of information services

• Know the information services and products suitable for digital environment

1. Introduction

Information is the basis of all communication. The intrinsic value of information lies in its transmission and utilization. However information is complex in nature as it is hidden in various forms and formats. The communication of information from the generation point to use point is a multistage process. The users would like to access information that should be relevant to the context, accurate for the purpose, complete for the problem and reliable. Therefore libraries are acting as channels to bridge the gap between the static information and dynamic user and facilitate continuous flow of relevant information to the users. While studying the information communication you might have studied about the barriers to communication like exponential growth, time, space, culture, language etc. To overcome each barrier different types of information services have been introduced from time to time by libraries.

Suseela Kumar observed that “A reader may need a specific type of information for a specific purpose. The number of documents are produced is very large, so large that it is impossible for the reader to keep track of its information” Hence the library’s / librarians’ main function is to provide the ‘connecting link’ between the reader and the book and set the ideas, information and knowledge in motion. For this purpose the LIS professionals have developed the various services with information retrieval as motto. The definition given by A. L. A. Glossary of Library Terms will enable you to understand the concept more clearly. According to it, service means “An agency which supplies information especially current data, in easily available form, not readily available otherwise”. So the libraries are the agencies that provide services for its members. The ‘service’ component develops high degree of rapport between library staff and users. The information services as you observe in libraries today were redesigned and reoriented from time to time suitable to user demands. Indeed the concept of information services has a long history that can be traced back from 19th century reference service to the present digital services. In the following paragraphs you can have an overview of the trends in the development of information services.

2. Evolution of concept of information service

The concept of information service has its roots in the ‘personal assistance’ offered in the public libraries of U.S.A. Later various services have emerged under the umbrella term ‘information services. The growth of the concept is presented under reference, documentation, information and online services.

2.1. Reference service

In the earliest period the function of the libraries was to collect and preserve reading material. The scholar knows most of the books and the authors in his subject as the publications are limited hence no expectation for assistance from the librarian for information gathering or access. After inventing the printing press there was gradual growth

in publication activity and the libraries collections were increased significantly. It was no longer possible for the scholars to locate the book and or information without assistance from the librarians. The initial stages of personal assistance were rudimentary and quite peripheral to the library's main function of acquisition, arrangement and supply until the emergence of reference service in the last quarter of 19th century. According to 'World Encyclopaedia of Library and Information Science (1980)

"Reference service had its beginning in the last quarter of 19th century. By the time of World War II, most of its basic forms and techniques had been developed. Most historians of reference service find it convenient to begin with Samuel Swett Green's 1876 paper, "Personal relations between Librarians and Readers" at aconference in Philadelphia. Until that time, the predominant view of the function of library service emphasized the acquisition and organization of library materials, and the library clientele were expected to use the material independently. Green, on the other hand, pointed that library users were unskilled in using the catalogue to find materials and lacked knowledge necessary to select the material appropriate to their needs. Personal assistance to such users would benefit them and would result in their taking a more positive view of the library."

Green's observations and suggestions were made with reference to public libraries. The idea got momentum with acceptance by eminent personalities like Melvil Dewey who advocated the concept of reference service. Thus the concepts of 'aid to reader' and 'assistance to reader' were initiated and by 1890 the terms were replaced by 'reference work'. Early part of 20th century witnessed the establishment of separate reference departments in libraries with trained staff for the purpose. Public libraries in USA have drawn the attention of the government and the public, introducing noteworthy services like 'special publics', 'bibliotherapy' etc.

2.2. Documentation

The emergence of primary research findings in the form of journals and research reports and their phenomenal growth in 20th century lead the libraries to devise the new types of services It was the Second World War that necessitated speedy dissemination of information in education and scientific research. Consequently, the provision of assistance to the user was accepted as a central activity of the library. Listing of articles published in journals in narrow subject areas became a necessity to provide access to current information. Thus the concept of 'Documentation' was emerged. Its focus is on latest information published in primary information sources. Documentation is a process of collecting and subject classifying all the records of new observations and making them available at need to the discoverer and inventor (S.C. Bradford). According to S.R.Ranganathan it is promotion and practice of bringing into use nascent micro thought by a specialist, which is pin pointed, exhaustive and expeditious. However this service was confined in general to special libraries.

2.3. Information service

The growth of special libraries to disseminate scientific and technical information to scientists and researchers lead to the development of 'information service', an umbrella term that includes reference, alert, review, analysis and consolidation types of services. According to D.J.Foskett "It is mainly in scientific and industrial research that the "information service" or "information library" has developed most strikingly into its present characteristic form." "While the major features of information services were developed by the mid-20th century, their particular concerns and activities are continually changing as user needs and information resources change." (World Enc., 1980).

• The services are provided in anticipation of an expressed need or in response to identified needs. • The services may range from directional, actual search for information, extraction and synthesis of information to delivery of information.

• They gained significance as all other activities of library like selection, acquisition, technical processing and shelf arrangement are considered as means to make the services possible.

In a parallel development public libraries of the West began in 1970s Information and Referral services using unconventional resources like experts from the community, information relating to basic needs like food, health, housing, employment etc. (Enc. of LIS 25:222).

2.4. Online services

The application of computer to the problems of information storage, processing and retrieval had brought in revolutionary changes in the nature of information services especially in special and higher educational institution libraries. From 1960s the secondary sources like indexes and abstracts are made available as databases following MARC format. Selective Dissemination of Information (SDI), the personalized service was introduced by H.P.Luhn of IBM in 1959. Similar service called as Current Awareness to offer alerts at regular intervals in a subject had been developed.

At present a variety of services are being offered online like virtual reference desk, bulletin board, e-mail, RSS, wikis, semantic web and ontology etc. "Online services provide an infrastructure in which subscribers can communicate with one another, either by exchanging e-mail messages or by participating in online conferences(forums). In addition, the service can connect users with an almost unlimited number of third-party information providers." (Webopedia http://www.webopedia.com/TERM/O/online_service.html)

2.5. Growth of Information Services in India

In India the concept of 'service' to reader was late compared to the western world of libraries. S.R.Ranganathan started reference service in Madras University in 1926 and in 1937 the post of reference librarian was created at Madras University. In order to meet the changing information requirements, especially the scientists, documentation service was introduced after Second World War. This was a phenomenon of special libraries /

information centres and other types of libraries continued with traditional reference services. The establishment of National Documentation Centres like INSDOC, NASSDOC, SENDOC, DESIDOC etc.; NISSAT; and U.G.C. National Information Centres like NCSI, Bangalore; NIC for Humanities and LIS at SNDT, Mumbai; NIC for Social Sciences at M.S.University, Baroda (Ceased their existence after INFLIBNET) facilitated implementation of variety of information services to users of specialized subject areas working in Higher Educational Institutions (HEIs), Research and Development Units of research and industrial organizations. At present INFLIBNET (1990) caters to the information requirements of HEIs while the networks like CSIRNET, DELNET, DRONA meets the user needs of specific subjects.

3. Changing practices of Information services

The provision of information services depends on two important factors:

• The nature of information sources that keeps on changing from clay tablets, to digital tablets.

• The nature of user information in terms of their approach, need, demand and seeking behavior that keeps on changing in relation to the work on hand.

Therefore the essential objective of information service is identifying the user's need, selecting information resources to meet that need and assisting the user in finding and using those resources. Though there is no change in the objective of service the process of serving users underwent significant changes.

The following paragraphs explain briefly the changing patterns of information services.

Basically the reference service has a gradual growth as reader's advisory (1920s), instruction / guidance and information search and retrieval.

• Reader's advisory to assist the readers in selecting the 'best' books;

• Instruction services to improve reading habits and search capabilities among the users especially in public and academic libraries;

• Provision of information / answer to reference query (short range reference) with reference interview as a tool to assess the need; literature search and retrieval (long range reference) depending on the nature of question (1930s)

• Compilation of subject bibliographies as an extension of long range reference

• Alerting services, in anticipation of user requirements, through bulletins, lists, routing of documents (1960s)

• Delivery of information through borrowing, reprography and translation.

The pattern was initiated in public and academic libraries and in fact even today it is visible in majority of these libraries.

However remarkable changes are evident in special libraries that centered on current literature in specific subject areas. They have adopted different mechanisms to offer services to target groups after assessing their information requirements. S.Seetharama has listed some of the basic mechanisms and the corresponding services provided by an information centre of a research / scientific / industrial organizations as follows:

No.	Mechanism	Service
1	Reference/ Referral	Reference service
2	Announcement	Current Awareness Services
3	Evaluation	State-of-the-art report,/Trend Report, Critical Compilation and Reviews etc
4	Accretion	Indexing and abstracting services
5	Documentation access	Reprographic and translation services
6	Promotion / Liaison	Liaison services; Technical enquiry.

According to Seetharama the first four mechanisms generate information services while the last two mechanism lead to support services. Thus in the traditional library structure there has been paradigm shift in the services offered from basic advisory to that of critical compilations. There is also wide variation regarding the service practices depending on the nature of users and their information requirements. In India special libraries are the privileged lot which has been implementing variety of documentation and information services from 1960s onwards.

3.1. Information services – Types

Over a period of time the LIS profession has devised a variety of services depending on the changing needs of user information requirements. They are basically

• Reactive – in response to user request e.g. reference service, literature search, bibliography compilation, document delivery

• Proactive – in anticipation of user request e.g. current awareness bulletins, SDI, indexing, abstracting, reports, review services (Information analysis and repackaging)

3.1.1. Reference service

“Ask Library Anything” (ALA) was the phrase coined by Melvil Dewey to explain the nature of reference service. The reference service involves the following activities

• Providing information using reference books like Encyclopaedias, Directories etc. (Ready reference) • This involves providing brief, factual answers to questions, such as addresses,

statistics, phone numbers, etc. that can be quickly located. E.g. What is the length of River Ganges? Who is the President of Sri Lanka?

• **User education**: User assistance, orientation and education are generally used interchangeably. But the distinction between the concepts has been explained by A. Neelameghan.

• **User Studies** – it includes development of motivation in seeking and using information, creating awareness of availability of information n sources and different tools like indexes, abstracts etc. and developing ability to extract, synthesize and package information for individual information needs.

• E.g. Motivating a researcher in Chemistry with available resources, introducing Chemical Abstracts and how to use it, how to prepare bibliographies and abstracts for the selected information.

• **User orientation** – it involves instructing the user to understand specific library / information system, location of information sources, using of tools like classification, catalogue, computers and networks to access information and developing familiarity with the services and previleges of the system.

• E.g. How to use OPAC? How the entries of an indexing periodical are arranged?

• **User assistance** – it includes helping the user in understanding the subject coverage and limitations of specific information source, help in interpreting the data elements in a catalogue entry, assistance in repackaging work of retrieved information.

• **Literature search**: Providing information after literature search for periodical articles for relevant information which may take more time than the ready reference. (Long range reference) E.g. A user seeks literature on 'Variations in the DNA sequence among people' 'Therapeutic value of yogic practices'

• **Referral:** Giving referral service for enquiries which the information centre cannot answer. E.g.Providing the user with addresses of plastic surgeons.

Thus reference service includes reference, reader's guidance and literature search and referral.

3.1.2. Current awareness services

Current awareness services are meant for the speedy announcement of newly acquired information or documents. Timeliness is the essence of this service, so it is called as alerting / announcement mechanism.

BimalenduGuha noted that this service is aimed at satisfying the current approach of users. The types of services include

• **Title announcement service** E.g. Current contents is a rapid alerting service database that is published online and in several different printed subject sections from the Institute for

Scientific Information, now part of Thomson Reuters,. It reproduces the title pages from several hundred major peer-reviewed scientific journals, and was published weekly, with the issues containing title pages from journal issues only a few weeks previously. Still published in print, it is presently available as one of the databases included in Thomson's ISI Web of Knowledge with daily updates, and also through other database aggregators.

Current Contents Connect® is a current awareness database that provides easy Web access to complete tables of contents, abstracts, bibliographic information, and abstracts from the most recently published issues of leading scholarly journals, as well as from more than 7,000 relevant, evaluated websites.

• **Selective Dissemination of Information (SDI)** is a current awareness system which alerts the user with latest publications in specific field of interest. The service is made possible by maintaining user profile and matching it with documents as soon as they enter the system.

• **Announcement of research in progress in a particular subject field or group of institutions**. E.g. ShodhGangotri : Repository of Indian Research in Progress details (Synopses / Research proposals for PhD programme)

• **Notifications for forthcoming conferences**. E.g. Conference Alerts: Academic Conferences World Wide (http://www.conferencealerts.com/)

• **Newspaper clippings** – these are the excerpts / articles cut from newspaper or magazine of issues of current interest or for future reference. E.g. Medical Newspaper Clippings 19011906

3.1.3. Information analysis and condensation services

The original information is analyzed and condensed or surrogated using data elements that represent the documents. These provide as much literature as possible on a subject i.e. exhaustiveliterature. Therefore they are prepared to meet the exhaustive approach of users. These are broadly classified as condensation and evaluative type

Condensation services are one of earliest services as bibliographies have a long history. The literature gathered is exhaustive in its coverage and analysis as well. It is difficult even for a big library to acquire all documents, more specifically all journals in a given subject. It is equally inconvenient for the user to browse all literature available in his field of interest. Therefore condensation type products are a necessity in libraries. The objective of these services is to be exhaustive in coverage of literature, describing every element of the document representation with an ultimate aim of guiding the user to the primary source. The condensed type services are categorized further as

Location type – e.g. Indexes, Subject bibliographies, Catalogues

Accretion type – Abstract services, Extracts, Technical digests.

Subject bibliographies are lists of materials that relate to a particular discipline or subject scope. They give an overview of the discipline. According to Ranganathan, “A subject

bibliography is a document bibliography confined to a specific subject field only, instead of covering the entire universe of subjects." E.g. Asian Social Science bibliography, 1966 - , Delhi, Vikas, 1970 – (Publisher varies)

Union catalogues: It is a catalogue listing the holdings of libraries with a scope that may be local, regional, national or international. The primary purpose of union catalogues is location of documents so that the user can access the same through inter library loan. E.g. NISCAIR - National Union Catalogue of Scientific Serials in India (NUCSSI) 1982 – Ranganathan, S.R.,Compiler. Union Catalogue of Learned Periodical Publications in South Asia, Delhi, ILA, 1953

Indexes indicate the data or information through descriptors and describe the bibliographical details of the document through indicators. Every aspect of the document that is acquired by the information system/ library has to be identified, approach anticipate, and correctly indexed. Thus indexing service provides ease of approach in a subject field with exhaustive coverage. Abstracts and extracts involve the process of assigning descriptors to each document to identify the data or information i.e. citation of the document and summarization of the content in an abstract form. It summarizes the essential points of the document thereby providing access to important content of the document and avoiding unnecessary duplication of research in the same field. Thus abstracts are comprehensive but highly condensed presentation of information. Initiated in 1965 the abstracting services are most patronized services by scientific community and now almost all subjects in the universe of knowledge have abstracting services.

Evaluative services: The condensation type services provide information on bibliographical details of the document that facilitates identification and location of the document. Abstracts summarizes the subject content but are highly condensed. Therefore to provide the user with salient findings in articles by reviewing the same evaluative type services have evolved. They distill the intellectual content of the literature in a specific field and repackage the information. Thus, information consolidation and repackaging requires evaluation of the content. Such services involve evaluation, compaction, and simplification. The stages of repackaging activity are selective extraction, correlation and evaluation of information that are relevant to the needs of a specific group of users. The resultant products are state-of-the-art reports, trend reports, critical compilation of data, reviews etc. Reviews have a significant role in consolidating the totality of current information and providing an overview of the subject.

State-of-the art reports emphasize recency and up-to-dateness. In order to achieve this currency, state-of-the-art reports are often published as informal reports, prepared on demand, oriented to a restricted audience. E.g. IFLA. Information literacy state-of-the art report (2012). The series published from Columbia, France, Germany, Italy, Poland, Russia, and United Kingdom.
http://www.ifla.org/publications/information-literacy-state-of-the-art-reports

Digests - The management of organizations needs special type of evaluative services that helps them in planning, research and development etc. Some of the services are digests, market information services, critical compilation on technology transfer information etc. Digests are tools for the management and executives to locate cases on specific issues. E.g. US Supreme Court. United States Supreme Court Digest (1974- date) E.g. Index Medicus, Monthly. Washington, National Library of Medicine, 1960- . It indexes about 5051 periodicals by author and subject giving a citation under each entry. It is cumulated annually. The subjects covered include veterinary medicine, sociology, zoology, biology, chemistry, psychology besides medicine and health. In the subject section, references are grouped according to the language of the articles, with English articles getting preference, followed by articles in other languages, all arranged alphabetically by language. Titles in foreign language are translated into English.

The Cumulated Index Medicus was brought out by American Medical Association since 1960- to 2000 and was stopped after 41 volumes due to lack of demand. MEDLINE (1965) is made available through OCLC (the online vendor) and now as PubMed. http://www.ncbi.nlm.nih.gov/pubmed/

Biological Abstracts provides the latest information in every life science discipline, and contains more than 13.2 million archival records from as far back as 1969, with more than 370,000 citations added each year. Most of the records include informative abstracts written by the author. This database is produced by Thomson Scientific, Inc. Now Biological abstracts is accessible through Thomson Reuters Web of knowledge platform Source: http://thomsonreuters.com/web-ofknowledge/

3.1.4 Translation services

The translation and reprography are support services for document access. It is estimated that the nonEnglish publications by scientists and technologists approximately amounts to 50% of the world literary output. Therefore provision of translation service became imperative. For translation there are translation pools or banks at international and national levels. The pools maintain indexes to serve as a tool to notify and create awareness of available translated works so that other organizations to obtain copies of translations.

E.g. UNESCO: World Bibliography of translations. The Index Translationum is a list of books translated in the world, i.e. an international bibliography of translations. The Index Translationum was created in 1932.

In India NISCAIR provides translation of S&T documents from 20 foreign languages into English. The languages include Chinese, Czech, Danish, Dutch, French, German, Hungarian, Italian, Japanese, Norwegian, Polish, Portuguese, Rumanian, Russian, Serbo-Croatian, Spanish, Swedish, etc. The clients include National Laboratories, S&T institutes, R&D organisations, Corporate and Public Sector Undertakings, Universities, Research Scholars etc. NISCAIR provides reverse translation (English into foreign language) also. With application of technologies now the indexes are available as online databases. Further the automatic

translation services are also available though the library / information systems yet to adopt them.

4. Current trends in information services

The Information services have undergone a shift in role from 1990s with the introduction of information and communication technologies. The trend is towards access management rather than information acquisition and distribution. Wide variety of computer based bibliographic and full text databases, and the means for searching the databases at any time in an interactive mode has brought metamorphic changes in the library environment and the information services. The functional changes in libraries can be represented pictographically as follows:

User: The users in contemporary digital environment do not need a mediator or librarian to search information on their behalf; instead they can access information, as end users, in an interactive mode. Now first search for information is not in the library but on the internet. Users are making use of search engine to locate information rather than seeking help from the librarian.

Collections: In a traditional library the librarians had clear idea about the type of collection to be maintained but in the digital environment it is not so. The increasing penetration of the Internet in information storage and handling is significantly changing reading patterns and reading behavior. More and more e-resources are being made available than ever before in different forms or types. They include: E-Books; E-Journals; E-Zine; E-Thesis and dissertation (ETD); E-News Papers; EReference books; CD-ROMs; Data bases. The noteworthy point here is majority of them are accessible to users without any mediation of the library / librarian.

Information services: The benefits of information services lie in that they can help users to get the right information and thereby enhance their understanding and application. Libraries in India generally offer the conventional information services such as loan, reference, user orientation, current awareness and photocopying. The services are primarily on demand and occasionally alert type and based on print collections. Traditionally, library information services were limited to the materials that a library owned. Now electronic means of communication are changing the mechanism of information services. According to Drotner (2005) “The challenge facing the physical libraries is intensified by the fact that many traditional services performed there are taken over by users of the virtual libraries. When the majority of mundane services leave the physical library – and the librarian’s desk – then librarians in the physical library can downplay their functions in favour of virtual services; or they can redefine their role from access and individual service provision to users and facilitator of more sustained collective learning processes.”

The academic libraries are witnessing the advantage of library 2.0 and moving into library 3.0 arena. The library 1.0 is computer based and 2.0 offers use of dynamic contents, blogs, social networks, tagging, wikis, podcasts and mashup technologies on web. However the

information is scattered and unorganized all over the web. Now, Web 3.0 is prominently based up on organizing this scattered or unorganized information. The application of semantic technologies and ontology will be the key aspects in this third generation of web.

Now the information services are a blend of traditional and electronic. The libraries are continuing the traditional services like keeping bibliographic track of the status of all accessions either in print or e- format; reference; current awareness and retrospective searches; specialized bibliographic consultation and support; Indexing and abstracting databases; delivery of full-text (print / electronic). In addition they are able to offer a new series of services to their traditional service base for the following reasons:

• The digital environment supports the libraries to integrate its services and bridge gap between electronic resources and netizens

• Now the user as well as the library professionals can use bibliographic tools like web OPACs, search engines, subject directories, subject gateways that permit easy searching and browsing

• The traditional services can be modified into embedded information literacy training modules to assist in information seeking; open access institutional repositories; webliographies, value added aggregator services.

• A variety of new products and services like Library 2.0 and Library 3.0 based services can be promoted.

Consequence to these developments the existing services are either modified or replaced with modern services.

Traditional	**Digital environment**
User education	Information literacy
Subject bibliographies	Webliographies
Reference service	Virtual / Digital reference
Indexing and abstracting	Aggregator services
Advanced search	Digital repositories, archives

4.1 Information literacy

Information literacy is not a new concept to LIS, rather an extension of deep-rooted user education / orientation service. Information literacy is the ability to recognize information needed and then locate, evaluate, and effectively use needed information. As it forms the basic skill to access information, the librarians need to constitute a new paradigm for libraries. The technologies offer an opportunity to the users to have self-accessed to information without intermediaries. To make use of technology based e-resources, the user has to be trained in technological skills to recognize, locate, compare, organize and synthesize information on the web.

The information literacy instruction can be taken in phased manner to impart basic skills of information handling. The contents may include:

• skills to interact with internet and use various net based services;

• information search tools and strategies;

• use of the available consortia, databases etc.

• use of digital collections – open access publications, digital repositories, digital archives;

• e-publishing through wikis and web writing.

The training methods vary depending on the course structure and the level of users. There are a number of models available for imparting information literacy.

The more popular strategies are the

🗣 introductory course

🗣 stand-alone course

🗣 integrated with curriculum and

🗣 online tutorials

4.2 Webliography

Librarians are familiar with the compilation of bibliographies for the bibliographical control of print documents. Now, similar control mechanism is developed for electronic documents named as webliography by Dr. James Frankel, 2000. The webliography presents a wide range of electronic resources related to a specific subject that are freely available on the Internet. Webliography denotes an enumerative list of hypertext links surrounding a common subject or theme following standard citation guidelines.

However limited user time to access the internet, lack of search skills, difficult to find pertinent information from the huge i.e. finding a needle from hay stack. This situation has necessitated Webliographies. The bibliographical control of Web resources helps the user to

identify and locate information, to save time and to have optimum access and use of information

DariushAlimohammadi suggested following phases of webliography:

• Selecting the topic

• Search the web; navigation of web with one of the popular search tools like google, google scholar, subject gateways like Intute etc.

• Browsing and selecting the best among the retrieved hits following the criteria for web site evaluation

• Creating a web page; some software like Microsoft FrontPage, Netscape Composer and Dream weaver can be manipulated.

• Writing an introduction; preparing a table of content to help user to navigate the subject gateway easier.

E.g. Human Rights Watch. Human Rights Watch, 2008.Web. 1 June 2009. (www.hrw.org)

4.3. Digital /Virtual reference service

Traditionally reference services were limited to the materials that a library owned. Now electronic means of communication are changing the way research can be done. The Internet is also expanding traditional library collections and improving location and access to reference resources(e.g., ready reference materials and pathfinders through Websites, access to catalogs and electronic reference sources through telnet). Digital reference service allows users to get information from a library at any time - either access the library's website, or use the late-night reference services - such as "Ask a Librarian" or "IM a Librarian," where patrons can send an instant message to librarians. Users need not have to be local or even come to the library itself. It is popular with students who like the idea of not having to physically come to the library for information and/or instruction.

Digital reference and AskA services are Internet-based question-and-answer services. In addition to answering questions, experts may also provide users with referrals to other online and print sources of information. The question/answer process in digital reference services is modeled after the methods practiced by reference librarians in traditional library settings. As in a face-to-face interview, experts determine the amount of information appropriate for the user, the applicability of that information, and the level of information required. User queries must occasionally be clarified, and an online reference interview may be conducted to help define the user's information needs.

One of the first services to go online was the Electronic Access to Reference Service (EARS), launched by the University of Maryland Health Services Library in Baltimore in 1984. Although initial e-mail-based digital reference efforts received little attention from patrons, digital reference services proliferated over time and became increasingly popular, eventually

spawning such internationally-known services as AskERIC in 1992 and the Internet Public Library in 1995.

Although there are slight variations among services, all digital reference and AskA services function in a similar manner. Human intermediaries evaluate incoming questions via e-mail or Web interface, and then decide on an appropriate course of action. New questions may be checked against an archive of previously answered questions for an appropriate answer, and if no suitable answer is found, passed along to an expert for answering. The expert supplies the necessary information, which may consist of an actual answer (factual information), pointers to additional resources (information referral), or some combination. Responses are sent to the user's e-mail address or posted to a Web site for the user to access at a later date. In some smaller AskA services, the experts themselves may also monitor the incoming questions. Social network services like Face Book, My Space, Blogs can also be used to communicate with the user and provide him ready reference information.

4.4. Aggregator services

In spite of the availability of millions of data as free access on the web, majority of the users in our country are not able to make optimum utilization. Probable reasons may be lack of awareness, non-availability of net access for long hours and lack of time. Hence the librarian has to play the role of an aggregator. Aggregator collects the freely available information on the web, categorize, organize and index and disseminate to the relevant individuals or groups. There are number of directories and websites that lead to the open access books, journals, reference sources, conference proceedings etc. There are a number of open access journals, e-books and e-reference sources. To cite a few,

Open Access Journals • Directory of Open Access Journals (www.doaj.org) • Open J-Gate of Informatics India (http://www.openj-gate.org/index.asp)

Free e-books: • World eBook Fair (http://worldebookfair.com/) • Free Books (http://www.e-book.com.au)

E-reference sources: • Internet Public Library-Reference: (http://www.ipl.org/div/subject/browse/ref00.00.00) •

Internet Library For Librarians (http://www.itcompany.com/inforetriever/),D-LibReadyReference: (http://www.dlib.org/reference.html),

However they are under utilized as the user finds it difficult to precisely locate the relevant information. The procedure is similar to preparing a documentation list or a trend report but additionally providing full text access.

• The librarians can download articles on specific themes from the free web resources.

• Aggregate them as per theme / topic and maintain folders.

• Make them available for users or forward them to concerned faculty, researchers / scientists as e-mail attachment.

Such value added services will facilitate the higher order user satisfaction, the ultimate aim of any library. Further such value added services enhance the image of the professional as 'reactive and creative'. E.g. EBSCO Information Services, headquartered in Ipswich, Massachusetts, is an aggregator of full-text content.

Informatics India, Bangalore is one of the world's largest aggregators - indexing millions of research and technical papers from more than 28,500+ journals and hosting them for access on internally developed technology platform.

4.5. Digital repositories

An Institutional Repository is an online locus for collecting and preserving -- in digital form -- the intellectual output of an institution, particularly a research institution or university. It is organizing institutionally generated information accessible online for on campus and global users. Improved 'visibility' to the intellectual out put of institutions and the results of investment.. Interoperable repository supports the researcher's ability to search seamlessly; facilitate interdisciplinary research and discovery. The heterogeneous data of repositories can be mined for new thoughts with a global platform. The digital repositories contribute for a sound protection and preservation of institutions' intellectual property. It enhances access by removing access barriers, which in turn improves research capacity including the collaborative research. Brings together the intellectual output and the organization which otherwise get separated in conventional publishing system.

E.g. Institutional Repository of National Institute of Technology, Rourkela e-theses;

Vidyanidhi Digital Library, University of Mysore.

5. Summary

Libraries have an inherent obligation to provide information services to satisfy the academic, research, and general information needs of users. Therefore the libraries set a goal to offer different information services suitable to information sought by users. In this process they have developed variety of information services. Information services underwent significant changes from the status of 'personal assistance to reader' to the present web-based information services. Both traditional and Web based services are important to satisfy user information requirements. Therefore the present information services are blend of conventional and digital services.

This unit has dealt with the origins of information services as reference and how hey transformed as documentation and information services over a period of time. It also discussed four types of information services namely reference, current awareness,

information analysis and consolidation and support services like translation. It has been observed that advances in computers and telecommunication technologies are exerting great impact on information services and brought in changing pattern of traditional services as information literacy, Webliography, Virtual / Digital reference, aggregator services and digital repositories and archives for advance search. The current trend facilitates linking information retrieval of full text electronic resources at local as well as global level with real time access.

Reference service

Reference Service: concept, need, types, theories, trends

QP-2019: What is reference service? Explain its nature and scope.

QP-2022: Explain various types of reference services with suitable examples

1. Introduction

The literature reveals that the reference service, as a distinct function of the library, began in the late nineteenth century, largely in response to the growing prevalence of publicly funded libraries seeking to serve relatively inexperienced and unskilled readers, researchers, scholars and users of the libraries. While the Father of Librarianship in India Dr. S. R. Ranganathan stated that the reference is establishing contact between reader and book or source by personal service. He recognised the four categories among readers as the freshman, the general reader, the ordinary or generalist enquirer, and the specialist reader. These four categories are provided the reference services as per their requirements like initiation is given to the freshman, general help to general reader, ready reference service to the ordinary or generalist enquirer, and long range reference service is provide to the specialist as well as generalist reader. Initiation and general help will involve a practical knowledge of the psychology of readers. Ready reference service will require a good knowledge of reference books and sources. The reference librarian needs to have the good bibliographical mastery and familiarity with the developments in the universe of knowledge and has to be updated with the new technological and trends in the world. So, the modern e-reference librarian need to offers users with the opportunities to extend access to their services and enrich the quality of their provision. The modern reference librarian is well aware of the vastness of the world of knowledge and the varieties of intricacies of the information required by the reader at different level, so it has been very important in the present world (Ranganathan, 1961).

2. History of Reference Service in Libraries

The beginning of reference service is generally attributed to Samuel Swett Green, who in 1876 published the first article on helping patrons use the library. In the literature it is not clear that Samuel invented the idea of reference service for library users or he elaborated the concept in writing. But today he is better known as the father of Reference Services. He was the first to pay the stress on the need for librarians actively to assist members of their communities in using library resources. Samuel Swett laid down four functions for Reference Librarian as instructing the patrons how to use the library; answering patron queries; aiding the patron in selecting resources, and promoting the library within the community. This function were relevant in the era of 1870s and is relevant even today and will remain relevant in near times to come.

3. Reference Service and Definitions

The chronological view of Reference Service can be traced from 1876. The first definition which is available is given by S. S. Green. Green identifies four components of Reference Services. The first component is to instruct the reader in the ways of the library; second is assisting the readers/users in solving their inquires. The third component is to aid the reader in solving their inquires and the fourth is to promote the library within the community (Green, 1876). American Library Association, Committee of Library Terminology in 1943 gave the definition of Reference Work as that phase of library work which is directly concerned with assistance to readers in securing information and in using the resources of the library in study and research (ALA, 1943).

A. G. Rugh defined the Reference Service as direct aid to library users who need a particular book or books, or who need some information embodied in any books. It indirectly aids to the library users in the form of reference collection building and maintenance. He also defined the direct reference service as personal assistance provided to library patrons and instructional reference aimed to help the user select and use the proper materials. While indirect reference service is defined by him as providing the services to the users indirectly by evaluating and selecting materials for the collection and maintaining the collection in a form useful to the community served (Rugh,1975).

Ranganathan defines Reference Service as ‘Personal Service to each reader in helping him to find the documents answering his interest at the moment pointedly, exhaustively and

expeditiously'. Reference Service is establishing the contact between reader and book by personal service (Ranganathan, 1961).

B. M. Robinson deliberated that every question received by a librarian is mediated whether it is answered or not. He said that reference service includes Question handling, developing specialised resources like union lists, bibliographies. It also includes collection development, education and training of library staff and quality control of library services.(Robinson, 1989).

J. James enumerated the new types of reference services as e-mails, web-forms, instant messaging, chat, video-conferencing, MOO/MUD (James, 2002).

4. Objectives of Reference Service

The reference service is an opportunity for librarians to ignite a users/patron's sense of wonder about the endless paths of learning found within library resources. The major objectives of providing reference services to its users are:

- To protect and arrange the collection.
- To present the collection before the readers.
- To have trained and professional librarian.
- To encourage coordination between employees and readers.
- To save the time of the reader.
- To conduct the fact finding research.
- To develop the library.
- To maximise use of reference services.

5. Theories of Reference Services

James Wyer has described three different philosophies of Reference Service which are labelled as "Conservative", "Moderate" and "Liberal". These only are known as Minimum, Middling, and Maximum by Samuel Rothstein.

5.1 Conservative or Minimum

Conservative Reference Services approach provides occasional personal assistance to the inexperienced and dazed reader. It limits the help to pointing the way only and so it is

traditional in nature. The reference librarian helps the users in finding resources but does not read or interpret those sources for the user.

5.2 Moderate or Middling

The moderate reference service goes beyond providing mere instruction to actually helping the reader in using the book or finding the document and facts, etc. The reference librarian searches exhaustively to find answers for research and factual questions.

5.3 Liberal or Maximum

It includes the provision of providing the complete and reliable information to the readers. In this case reference librarians takes the user question and conduct the research, finds appropriate material and presents it to the user. The reference librarian if needed also writes the summary or analysis of the information found. Generally this kind of reference service is given in special libraries.

The first conservative approach emphasises over instruction over answers; the liberal approach emphasises answers over instructions and the moderate approach comprises equal part of each (Bopp and Smith, 2011).

6. Functions of Reference Services

American Library Association in 1942 categorized functions of Reference Services as a series of library job analysis. ALA has stated the following six functions of Reference Service:

6.1 Supervisory Function

This function consists of the proper organization of facilities, reference section, selection of reference materials, direction and guidance of personnel and staff, and study of the library clientele. It all includes management of reference sources and preparatory function.

6.2 Instructional Function

The Reference librarian should instruct the readers about the working of the library, the location of the material, the use of the online catalogues, the reference sources online and in physical format. An initiation or orientation programme should be arranged to acquaint the readers with the library practices and procedures. The readers can be made aware with the self arrangement, library website, collection of the library and reference sources available.

6.3 Informatory Function

There should be a Reference and Information Desk with modern facilities like computer and mobile devices where enquiries and information requirement are received and routed to proper section. The reference librarians should be prepared to answer all types of questions, and should be able to produce the & sources that would answer the questions immediately. The reference librarian needs to use social media tools to answer the queries of users.

6.4 Guidance Function

Reference Librarian's responsibility is to provide necessary guidance for the maximum use of the library and collection. The Reference librarian should be able to recommend a good reference source for the respective fields. They should be able to give guidance to the readers regarding the subject area, career related information or profession or vocation. Reference Librarian also guides its users with the location of the document, in the choice of material and other reading and learning materials.

6.5 Bibliographic Function

Reference section or department prepares bibliographies for the easy search of the documents. Reference librarian is always in contact with researchers and other readers and makes them aware of latest literature and provides bibliography if required by the readers. The bibliographies need to be prepared in interest to the readers so that they are able to know about the books, various sources and other reading materials acquired by the library and which are required for their respective subjects.

6.6 Appraisal Function

Reference librarian conducts evaluation programme of the effectiveness and quality of the reference work, reference services and reference staff. Appraisal is applied to know the use of collection and the service. Reference librarian and reference staff should evaluate their own services also. The libraries should possess the right kind of information sources and reference collections and the staff should be able to get the most out of it. The scales with which Reference Librarian can evaluate the effectiveness of Reference Services include:

- Whether the query of the reader is properly analysed?
- Whether proper procedure or process is followed?

• Whether the reader is provided information with full satisfaction?

• Whether library has sufficient reference sources?

If all the reference questions are satisfactorily answered than it is assumed that service is effective and efficient.

7. Ranganthan's Classification of Reference Services

Reference service is a process in which readers receive their information through personal contact of the Reference Librarian. There are queries of many types, varieties and are time bound. Reference section or reference department of the library makes the efforts to remove the difficulties of the readers to fulfil their requirements. Therefore all such information which is provided to readers immediately are called Ready Reference Service, and reference service which indicates long time is called as Long Range Reference Service. American Library Association called it as Direct Reference Service and Indirect Reference Service respectively. S. R. Ranganathan defined the following facets of reference work:

7.1 Ready Reference Service

Ranganathan defined Ready Reference Service as reference service finished or replied in a very short time, in a minute if possible. These include such reference services which direct the readers to reference sources immediately and information is gathered within short time. Generally the ready reference services are of the nature of fact finding that can be finished or answered in a very short time – in a short moment if possible. The reference librarian uses sources like reference book, online searches or offline/ online catalogue search for providing such kind of services. In the present context the need of ready reference services arises from the fact of the complex and vast nature of a data, information and knowledge, its artificiality, and arrangement of information. The distinguished person, fellows, foreign delegates, dignitaries, scholarly users generally approach for such type of services. Sometimes some customary and regular patrons/users also need the fact finding reference service because of shortage of time to locate and search there queries.

Ready Reference Service includes the following queries:

• Which are demanded direct

• Which are demanded by sharp medias

• Which are simple

• Which are answered on the table of Reference Librarian

• Which involve short answers

• Which are responded within short time, or within 5 minutes, or less

The Reference Sources which can be used for Ready Reference Queries are sources which are Fact Finding Sources. These include:

• Dictionaries

• Directories/Handbooks

• Census Reports

• Year Books/ Annuals

• Biographies

• Gazetteer

• Atlas

• Encyclopaedias

• Publications and websites of the specific organizations

• Authentic Online Web Based Sources

• Online Publishers Sources including Online Databases

7.1.1 Need of Ready Reference Service

It is generally seen that readers have knowledge of books and other sources which are concerned with the studies but sometimes the readers need such information which are not known to them and their queries are not related to the concerned books and regular sources. Reference Sources are such books and literature which are referred and consulted as when the information is needed. So generally the users are not aware of these resources as these are arranged differently which is not familiar to the users. This makes the need for the ready reference service. In the present context also the patrons or users including

students, researchers email or use social media to contact the reference librarian to ask the short questions relating to the ready reference and get the answers immediately.

7.2 Long Range Reference Service

Ranganthan stressed that Long Range Reference Service is more used by the public and special libraries. This service indicates taking long time in providing reference service. It is given to the special readers demanding special information. Normally it takes more than 5 minutes to provide the service with the help of reference sources. It is based on referencing every possible source of information to arrive at the required solution; as such, it is not possible to deliver this type of service immediately. The search in the long range reference service starts with the reference books, literature and online reference sources in present context and then goes to the books, reports, monographs, articles in periodicals in physical and online format. If the information is not available in the library sources whether physical or online then the search can even go to other local libraries and even to the other libraries in the country. The long range reference service provided today can become the ready reference service tomorrow, as by this time the reference librarian will be able to locate the material speedily from his past experience and developed skills. The scope of long range reference service has now even expanded to bibliographical service, referral service, translation service which is considered as long range reference services.

7.2.1 Need of Long Range Reference

a. **It Save the Time of the Reader and the Experts**

The time is precious for a reader and research scholar. As the researcher spends more time in literature search so the reference librarian can help its user with the reference sources and the procedures to search the required information.

b. **Knowledge Explosion**

Due to knowledge explosion vast literature is produced and the researcher/ user can not study the universe of knowledge in physical and online format. Libraries procure a variety ofresources of literature and reader is always eager to know the details and the whereabouts of the literature received in the library or published anywhere in the country or the world. Reference librarian is well versed and trained in the search techniques of literature. He can help the readers to trace his/her documents. Reference librarian can serve the reader with the help of reference tools and sources.

c. **Complexity of Information Sources**

Information sources are many and full of complexities. Every information source has different arrangement, style of presentation, language barrier, which is not known to readers. Reference Librarian with his abilities provides all information to the readers.

d. **Information Sources of other libraries**

No Libraries complete in itself and requires the help of other libraries for using and sharing the information sources. Similarly, due to the limited funds and huge information sources the libraries need to depend, each other. Therefore Reference librarian can help its users in providing the resources from other libraries.

8. Levels of Reference Service

8.1 Ready Reference

• Less than 5 minutes

• Use a designated reference collection to provide the answer

• Done while its patrons wait

• The result is always an answer

• Simple questions with generally simple answers

• Involves looking up factual information

• Requires quick access for ready reference materials

8.2 Long Range Reference Service

• From 5-30 minutes

• May take more than one day

• The result is usually an answer or a referral

• Simple question/ simple answer

• Requires more sophisticated resources

• Involves looking up information - not analysis

8.3 Research

• Labour intensive - consuming anywhere from a day to a week

• Library staff conducting secondary research

• The result is an explanation of research findings rather a clear cut answer

• Also may be called extended reference

• Complex question / complex answer

• Requires many sources

• Involves analysis

8.4 Referral

a. Question Referral

• One librarian referring a question to another librarian

• The referral is between librarian and libraries

• The referring librarian remains in control of the question

b. Client Referral

• Referring the client to another librarian or to an alternate source of information

• Once the referral is made, the referring librarian is out of the loop

• Providing a lead or making a contact (Robinson, 1989)

9. Five Laws of Library Science and Reference Services

S. R. Ranganathan provided the laws of library science and his interpretation further formed the groundwork for the reference service. The reference service satisfies the Five Laws of Library Science by the ways of personal contact, understanding the queries of the readers, making the reference sources available to the users and by saving the time of the users. The laws are enumerating with explanation on how the reference service abides to Five Laws of Library Science.

9.1 The First Law Books are for Use

According to Ranganathan, the First law is to put the book to its maximum use and it is best to employ reference service to help the readers to help themselves. Reference librarian stimulates the users and attracts them to the resources of the user choice. Similarly explaining the law in reference to readers Reference librarian establishes personal relations with the readers by his sweet behaviour, liberal attitude, knowledge and personality. In other words, Reference librarian is a friend, thinker and guide. So his role is to provide maximum service to the reader.

9.2 The Second Law Every Reader his Book

According to Ranganathan, reference service is required to aid the reader to get along with the document search. Similarly, the reader should also shoulder his responsibilities to understand the library sources and facilities.

9.3 The Third Law Every Book its Reader

To Ranganathan, the book cannot travel to the reader on its own, but will require reference service to interpret the collection to the potential user or match the reader's query with the document. The reference librarian needs to keep personal contact with the readers and encourages them to use various resources of the library. Book exhibitions, new arrivals display, web based promotions, social media contacts, traditional services like translation, indexing, and abstracting, bibliographical compilations also helps in keeping the library resources in contact with the users.

9.4 The Fourth Law save the Time of the Reader

According to Ranganathan, reference service comes to the aid of the researcher and scientist whose time cannot be wasted. Efficient and speedy reference service will definitely help in saving the time of the users.

9.5 The Fifth Law Library is a Growing Organism

According to Ranganathan, the collection, the readers, and time increase to meet altered situations; the kind of reference service will have to be altered to take advantage of technological advances. Similarly, the efficient and good reference service increases the number of the readers and thus it further helps in the growth of the library collection, staff and the infrastructure. It thus satisfies the fifth law.

10. Evaluation of Reference Service

The criteria for evaluation of Reference Service are as follows:

• Access

• Equity

• Response Time

• Impact

• Accessibility/ Convenience

• Value

• Usefulness

• Efficiency

• Effectiveness in meeting needs

• Effectiveness in anticipating needs

• Approachability

• Reliability

• Empathy

• Interest

• Listening /Enquiring

• Follow ups

• Service Quality

• Tangibles

• Assurance

• Accuracy of Answer

• User Satisfaction with service

• Rate of repeat users

• Costing per transaction

• Completion Time

• Role of Technology

11. E-Reference Services and Digital Reference Services

The present world has moved to electronic reference, e-reference, services with Internetbased question and answer which easily connects the patrons and users with library professionals who have expertise in the information sources through web forms, e-mail orsocial networking platforms. They have transformed the reference service from physical to virtual by establishing various information formats, packages, tools and delivery channels and further by reducing physical constraints of time and boundary. Libraries are now able to provide reference services on campus and off campus 24 X7 through web portals and web pages.

According to Janes, Carter and Memmott (1999), ‘‘Digital Reference Service is a mechanism by which people can submit their questions and have them answered by a library staff member through some electronic means (email, chat, web forms, etc.), not in person.’’ Digital Reference Service is communicating and interacting with users in virtual environments by utilizing computer and Internet technology. The asynchronous system of Digital Reference

Service include emailing, using social media tools and web based forms where patrons/ users can submit their questions/ queries and receive answers, usually within 24 hours while synchronous digital reference service support real time communication with reference librarian through chatting and instant messaging. The modern reference can be provided traditionally and non- traditionally. These different avenues of reference services can meet the diverse needs of a community and can be explained in three models:

11.1 Roving Reference

The reference librarian meets the patron where they are, be mobile within the library space or moving among the stacks, they are available as required by the users.

11.2 Outreach reference

Reference Librarian being visible in the community and connecting with user and patrons face to face. Participating in community events and providing program is an opportunity to teach the public about library services and resources.

11.3 Virtual reference

Available through phone, text, chat. Mobile Technology allowing for the immobile, distance or tech-savvy users to use library reference services.

12. Human Resource Policy for E-Reference

Some of the major things which need to be considered while deputing the Human Resource for the E-Reference Services include:

• Contractual Human Resources for e-reference service to be avoided

• Scheduling of reference librarian hours for e-reference service 24 X7- includes operations, workloads, shift lengths

• Priority for e-reference in comparison to other work and services of the Library

• Staffing levels, obligation to staff training and professional development (Johnson, Peter and Newton, 2011)

13. Summary

Reference service is the intensive and exhaustive kind of personal service, which try to bring together the user and information. The reference service manager who understands its users and their needs best supports the needs and services of its users. Models that work well in one library will not necessarily be relevant to other that serves a different type of community library, so the reference service needs to be personalised as per the requirements. Each reference interaction between a librarian and patron is an opportunity for mutual learning within a shared space. The user communicates their information needs while the reference librarian, using probing queries, seeks to provide the appropriate resource. So, the patron and librarian work together toward lifelong learning and exploration.

Documentation service

While according to Ralph R. Shaw, Documentation is any process connected with, identification, recording, organization, storage, recall, conversion into more useful forms, synthesis and dissemination of intellectual content of print or any other recorded materials.1

The most authoritative definition of the word is that adopted by ASL1B in 1945 for the Journal of Documentation namely, "Recording, organization, storage, recall, conversion into more useful forms, synthesis and dissemination.

DOCUMENTATION SERVICE

- The documentation service includes:
- 1. Supply of documentation lists known as Current Awareness service.
- 2. **Reprographical work** i.e. reproduction of reading material needed by a scholar by way of preparing a photographic copy of procuring it in micro form like micro-fiches, micro-cards, or micro-prints, etc.
- 3. **Translation work, i.e.** the important articles are translated from different foreign languages into one which is readable by the scholars of the particular country.
- 4. Preparation of adhoc bibliographies on demand.
- 5. Abstracting and indexing of articles of the subject fields where other already existing abstracting and indexing service fail.
- 6. Preparation of catalogues of unpublished manuscripts in different fields of subjects of indology.

- 7. Information service.

SALIENT FEATURES OF DOCUMENTATION

1. The act of collecting, classifying and making reading acceptable in records of all kinds of intellectual activity

2. The recording of knowledge and the resources of knowledge organizing such records systematically so that they may be found quickly and disseminating by various means both knowledge and sources of knowledge

3. The recording, organization and dissemination of specialized Knowledge

4. The science of collecting, storing and organizing recorded information material or documents for optimum access.

5. The selection, classification and dissemination of information.

CURRENT AWARENESS SERVICES (CAS)

- CAS has been defined by D.A kemp as: system for reviewing newly available documents, selecting items relevant to the needs of an individual or group, and recording them so that notifications may be sent to those individuals or groups to whose need they are related.[1]
- In a nutshell, CAS is a technique for communicating information in such a manner as to keep each researcher, teacher, scientist informed of latest publications appearing in their restricted fields of research of the periodical intervals.
- It is achieved by preparing document profile/list for the users.
- CAS can be given in following ways i.e.

(a) Announcement of research in progress;

(b) Notifications of forthcoming seminars / conferences

(c) Routing of periodicals; and

(d) Library bulletins i.e. displaying of new arrivals of books and periodicals.

REPROGRAPHICAL SERVICES

- Reprography thus meant copying and preparation of one or more copies of a document can be reproduced rapidly and economically through reprographic methods.

- It is thus applied widely in processing the information be making copies of published, unpublished material, rare documents, manuscripts, pages of periodicals, books, Newspapers, graphic material etc.

BIBLIOGRAPHIC SERVICES

- The Oxford English Dictionary defines Bibliography, as "A list of books of a particular author, Publisher or country, or of those dealing with any particular theme; the literature of a subject.

- In other words a bibliography is, " A list of written, printed or otherwise produced records of civilization., which may include books, serials, pictures, maps, films, recordings, museum objects, manuscripts and any other media of the communication.(Shores).

ABSTRACTING SERVICES

- Abstract acts as retrieval media and current awareness tool.

- According to Allen Kent "An abstract is a summary of a publication or an article accompanied by an adequate bibliographical description to enable the publication or article to be traced.

INDEXING SERVICES

- The word index is derived from the Latin word ‘indicate’ which means to indicate or point out. ’ An index is a tool by means of which a person who needs information has it indicated or pointed out him.

- Allen Kent defined index "As a device that serves as a pointer or indicator, most often alphabetic lists that includes subjects and name of people or places that are considered to be special pertinence in a graphic records.[1]

Information service

- Information is Power; it is a great National and International resource, it is embedded in a variety of documents such as books, periodical, articles, monographs, conference proceedings, diaries, abstracts, indexes, magnetic tapes, compact discs and so on.
- The problem of communicating right information to the right user, at the right time, in the right amount and in the right forms is the duty of the special libraries.
- Information service is the new name for documents services.[1]
- Katz employs the term reference service as a synonym for reference work and information service.

Current Awareness Services (CAS)

QP-2018: Differentiate between CAS and SDI. Explain the flow of SDI service in modern Libraries.

I. Objectives

• To keep the information seeker up-to-date in his/her field of interest or specialization; save the time and financial resources on subscription and storage of primary information sources.

1. Introduction

All types of libraries/information centres are organized to provide some basic services which are rendered either in anticipation or on demand from the users. For example, a typical library brings to the notice of its users new documents accessioned and new issues of journals received to attract its potential users. It also helps to find a specific document, or a part of the same. The information services provided in anticipation are termed as alerting services as this alert the users about the new information of their interest. Broadly speaking, the same is also termed as current awareness service though there are some more services falling under the scope of alerting services. It may be noted that the term 'alerting services', besides containing general names of the information services, may also assume some specific names like company profiles, notification of contracts, product information bulletins, etc. in the context of a business or industrial library/information centre.

Alerting services usually referred to as Current Awareness Services have been important means for keeping the users up to date in their areas of interest. A current awareness service may be as simple as copy of table of contents or a bulletin containing bibliographic records,

of articles selected from the current issues of journals and other material, and usually organized by subjects. These services satisfy the current approach of the users and have several characteristics. These characteristics have been described in this module.

In this module, we will learn the various current awareness services offered by modern library and information organisations. The various CAS covered include both the manual and computerised CAS. The computer based solution offers better services, with more flexibility and easier maintenance of the resources along with lower costs.

2. Current Awareness Services (CAS)

Alerting Services are also termed as Alert Services or Current Awareness Services or CAS. These services assist the library users in keeping up-to-date with current research in specific areas of interest. In this context, current awareness refers to a way to stay up-to-date on the latest information from journals in a field, to receive automatic alerts about new information/articles in a specific research area and using modern technology that helps a user to organize and mediate the information that is required to conduct research.

According to Encyclopedia Britannica, 'the purpose of a current-awareness service is to inform the users about new acquisitions in their libraries. Public libraries in particular have used display boards and shelves to draw attention to recent additions, and many libraries produce complete or selective lists for circulation to patrons. Some libraries have adopted a practice of selective dissemination of information…….'

The CAS is in-house services offered by information organisations. A successful CAS involves knowledge of subjects or topics to be covered, which users require what information, knowing the sources for obtaining the latest information and making available required information timely, regularly and reliably. The major benefits of CAS include providing the users latest information on desired topics, saving time and leading to creation of new ideas.

The CAS has several advantages over other information services, which are:

• Keeping users better informed

• Providing access to needed information/documents

• Supporting academic, professional and managerial tasks

• Automating the process of searching for retrieving relevant information

• Providing information in a preferred format

2.1 Definition

There are several definitions for CAS and it has been defined by several prominent library and information science professionals. Some of these are mentioned below:

Ranganathan defined CAS as ‘documentation periodical, listing the documents appearing during the period covered, and without being, selected to suit the requirements of a particular reader or of a specific topic under investigation. This is of the nature of a general appetizer. It endeavors to keep the clientele informed promptly of all the nascent thought created in their fields of work and related fields.’

Guha defines it as ‘a device of the information system through which the users of information can be informed promptly, as soon as possible after publication but before absorption into the comprehensive secondary sources of current literature on a broad subject field or on an area in which a group of persons are interested, and presented in a manner, a volume, and rhythmintended to facilitate or cultivate current approach to information. In the context of a library, the time limit should be after the receipt of the publications but well before the receipt of the secondary publications contains them.’ According to him, CAS is ‘a system of informing the users as soon as possible after publication.’

Lucille J, Strauss and others have defined it as "the establishment of a system for reviewing publications immediately upon receipt, selecting information pertinent to the programme of the organisation served, and recording individual items to be brought to the attention of those persons whose work they are related. It involves a combination of processes including the selection of pertinent information from periodicals, books pamphlets, patents and reports, in fact, anything of serious content that is received.

Alasdair Kemp defines CAS as ‘a system for reviewing newly available documents, selecting items relevant so the needs of an individual or group, and recording them, so that notifications may be sent to those individuals or group to whose needs they are related.’ According to him, CAS is "a system of informing the users as soon as possible after publication.’

From the above definitions, it can be seen that CAS is the process of reviewing selected items according to the information needs of the users, selecting the relevant items according to the information needs of the users' recording the items systematically, and sending the notifications to the users who need it.

2.2 Factors influencing on Current Awareness Service

CAS is influenced by the following factors:

• Current Approach: It is necessary for every information professional to keep abreast with the current literature or the latest development of subject. He/she must know all the important areas of research in a subject as soon as published or generated.

• Continuous need: CAS is very much required where there is continuous need of current affairs and developments by the users. More the continuous need, more Current Awareness service.

• Direct demand: For many specific research areas the user may not be immediately interested but some of the references may be demanded by them later onurgent basis. For such needs, some of the references are recorded in diaries or personal file kept with the library or information professionals, so that when need arises they may be supplied with latest developments.

2.3 Steps in Current Awareness Service

The steps in the provision of CAS are given bellow:

a. Review or scan documents immediately upon receipt.

b. Select information and record individual documents pertinent to the information requirements of the individual users or groups being served. This may be done by comparing the documents/information with the needs of users being served.

c. Send notification to the users about items or information of interest to them.

3. Need for Current Awareness Services

Current awareness process is basically the opposite of the retrospective search. The retrospective search begins with a need to locate information on a specific topic for a specific

purpose. The goal of current awareness on the other hand is less specific. It is the need to understand current developments in order to do one's work more effectively. In view of this, following needs for alerting services can be identified.

3.1 Growth of literature

The published scientific and technical information has grown rapidly on account of large expenditures on research and developments (R&D)by the government. The enormous growth of scientific information has caused serious problems of accessibility, storage, retrieval and dissemination for the researchers, scientists, etc. This results in many problems in accessing the information and keeping the researchers up-to-date in their areas of interest. CAS enables the researchers, scientists, etc. to keep themselves up-to-date and well informed in their field of specialization. Thus, CAS aims to serve the current information needs of the users.

3.2 Interdisciplinary nature of research

The interdisciplinary nature of research, nowadays, results in the scattering of information in different sources. Same type of information is available in different journals. Further, the information relevant to a given discipline may also be found in journals of other related disciplines. For example, information relevant to the Biochemistry may appear in the Journal of Scientific and Industrial Research, or Indian Journal of Chemistry, etc. It is very difficult for user to find relevant information and hence there is a need of CAS.

3.3 Types and forms of documents

Although the journals are the main source of current information, useful information for researchers may appear in various types of documents such as journals, reports, seminar papers, etc. Documentation and information centers are providing a variety of information services in order to solve this problem. Providing CAS service is one of the important services which alerts the users about the current developments in their area of interest.

3.4 Users' help

A user himself may not be able to scan literature as widely, timely and regularly as could be done by CAS, because its coverage may be wider. Also, there may be some users who do not possess the ability or willingness to do scanning of sources. In this case, CAS will help the users to keep them abreast with the latest documents on the subject of their interest. It also helps to bridge the time interval between the publication of an article and the inclusion of an abstract. Ultimately, the function of CAS is to reduce the time taken by the specialists to scan the documents in periodicals.

4. Characteristics

Characteristics of CAS are as follows:

4.1 Approach not in response to specific query

For any active user, it is necessary to be up-to-date with his/her field of work and interest. Further, as no field of study can progress in isolation, one has to keep abreast of the developments in a broader field also. So far as one's specific field of work is concerned, one has to be very thorough regarding any important work as and when published or generated. As the current approach is not meant for any specific information, it implies that a user may not have a specific search formulation while approaching the information system.

4.2 Continuous need

Another characteristics of current approach is the continuous need irrespective of the stage of research work in hand, its findings, etc.

4.3 Retrieval not the only intention

This is an important characteristic which emphasizes that it is not always necessary to go to the original document as retrieval is not always the intention. In most of the cases, the user is satisfied to know that a particular piece of work has appeared in print or somebody is working on a particular problem or the results of a particular work is expected to be published in the near future and so on. Further, for most of the times, the user may get the information from abstracts only. For many of the items the users may not be immediately interested but some of the references may be noted by him/her in a diary or a personal file so that when the need arises the same may be retrieved.

4.4 Diverse requirements

CAS keeps the users well-informed and up-to-date about the current developments which take place in their areas of interest. This is a continuous service provided to the information seekers irrespective of the stage and progress of their research. There are some of the diverse requirements and prerequisites of CAS as described below:

• CAS is an announcement mechanism and not a pin pointed information; or a tailormade or customized information service.

• CAS is provided to meet the current information requirements of the users.

• CAS is usually provided to a group of users (researchers, scientists, etc. having homogeneous information requirements), and not to the individuals.

• It may be available in a printed, electronic or any other appropriate form acceptable to the user. • It is to be provided within a time frame (deadline) much before the information is published in secondary sources such as indexing and abstracting sources.

• It should be brought to the notice before the notification in secondary sources of information, e.g., abstracting and indexing services,

• Getting feedback is not a prerequisite in CAS.

• Speed, currency and ease to use are three factors to determine the efficiency and effectiveness of CAS in any organization.

5. Categories and types of CAS

5.1 Categories of CAS

There are generally two kinds of Current Awareness Services that may be recognized.

5.1.1 CAS for all the users

Services which may be provided to all the users to keep them up-to-date. These services include a list of recent additions in the libraries, compilation of bibliographies, indexing and abstracting services, table of contents of journal received in the library, etc. This may be provided in the following forms:

• Contents pages of journals

• Library bulletin

• List of new additions or accession list

• Newspaper clippings

• Routing of periodicals

5.1.2 CAS for homogeneous group of users

These are provided to a homogeneous group of users, i.e.,users having samesubject interest. These may include communication of information to individuals or group through various means such as by telephone, conversation, email, routing of journals, etc. These may also include circulation of materials in anticipation to individuals, keeping in view their information needs.

Those services, which are directed towards all users of theorganisation include accession lists (a list of recent acquisitions), bibliographies, indexing and abstracting services, bibliographic surveys, literature surveys, table of contents of periodicals received in the library, Current Awareness bulletin, etc.

5.2 Types of Current Awareness Services

Different kinds of current awareness services are offered depending upon the requirements of individual users. Listed below are main types of current awareness services offered by most of the libraries.

• Title announcement services

• Announcement of research in progress

• Notification of forthcoming conferences

• Selective Dissemination of Information (SDI)

• Newspaper clipping service

• Current awareness bulletin

SDI Service

QP-2019: Give an account on SDI service.

QP-2022: What is SDI? How do you plane in a university library.

Selective dissemination of information (SDI)

SDI is a type of CAS which keeps the users in touch with the latest developments in the field of users' interest. In other words, it is a personalized service meant for the individuals or a group of users having identical information needs.

The characteristics of SDI service are:

• It is concerned with the published information.

• The source of current information may be available both within and outside the organization.

• It is a computerized assisted service.

There is urgent need for selective dissemination of information service for technology enabled academic, research and other special libraries as:

• The literature output at present is multiplying at a fast pace.

• The volumes of record information are growing exponentially.

• The users do not have time for reading the available voluminous literature in their respective fields.

• Modern technologies can help to satisfy the researchers' information requirements and their needs.

6.1 Objectives of Selective dissemination of information

• To provide current information on a particular subject, To receive, scan and provide the literature to right users,

• To notify the latest information about the particular subject clearly, To delegate the computer base technique for relating current profile of information to the interest of users,

• To achieve current requirements through the scan of journals, current awareness bulletins, and other important resources, and Expeditious service/time saving.

6.2 Components of SDI

6.2.1 User profile

It contains a file describing the subject field of the researcher by indicating proper indexing terms as keywords. The process of its creation includes the users' identification, as individual or a homogeneous group. The objective is to define the information needs properly. The requirement of information is collected by using questionnaire which is converted in to machine readable form (user profile).

6.2.2 Document profile/database

It is a bibliographical record of the documents related to user's information needs and areas of interest. It may be in-house or a commercial database. Both the systems have relative advantages and disadvantages. For example, coverage and scope of commercial database may be more than the in-house created one. On the other hand, in-house database despite beingvery time-consuming as compared to commercial database, may ensure pin-pointed and better customization of information requirements

6.2.3 Matching user profile with document profile

It consists of matching the user's profile (UP) with the document profile (DP), i.e., contents of the DP with those of UP with the help of a computer. It is advisable to use computer rather than manual work if users are more than 100 or so. The task of the librarian/information professional is to translate the information requirements of user in to descriptors taken from the controlled vocabulary or thesaurus as it helps in perfect searching of documents/information stored in the database.

6.2.4 Notification

It is based on the match between the user's interest profile and the document profile. At the first instance, the individual user receives notifications from the system.If any loose match is observed between his/her profile and any document in the database, the same may be taken care of. Further, the user may indicate the usefulness of the documents/information disseminated to him/her. The notification may be sent by taking printouts along with the covering letter and feedback form. The same may be sent by e-mail or by using Bulletin board service, if the request from users is common.

6.2.5 Feedback

The user is expected to provide feedback to the SDI providers in a prescribed feedback form indicating whether the documents/information notified is most relevant, relevant but not needed, or not relevant at all. In case most of the items of information are found useful, then it can be concluded that the user profile has been properly prepared. On the other hand, if most of the information is not found useful, then it can be said that user profile does not match with the user's interest areas and hence must be modified.

6.2.6 Modification In case, the user indicates through the feedback form that the output is not useful, the SDI provider takes action to modify the profile on the basis of the results provided by the user. The reasons for disseminating information that is not useful are analysed which may result in revision or modification of the user's profile. In some cases, the users' interest may also change due to the change in research projects or so. In such cases, the modification of user's profile itself is required. An active interest and personal contact between the user and the researcher is of great importance to ensure modification of the profiles.

6.3 Benefits of SDI

In SDI, an accurate representation of a user's interests is crucial to the performance of personalized search as this leads to a perfect match of user's information requirements and the information/document provided to the user.

The following are benefits of SDI service.

• In view of users interest, it encourages the research scholars to utilize current literature.

• Satisfies the researchers requirements and their information needs.

• Enables access to latest and particular subject information very quickly.

• Motivates research mindset and knowledge skills.

• Provides quality and current awareness literature.

7. Methods and Techniques of Providing CAS

Current awareness services alert scholars, researchers, and other users to recently published literature in their fields of specialization. Librarians who provide these services use various methods to keep current with academic and professional literature. Traditional methods include routing print journals, distributing photocopied journal tables of contents, and simply

browsing professional publications. Newer methods include conducting saved searches in preferred databases and creating email table of contents alerts.CAS can be provided by the following methods:

7.1 Current Awareness Bulletin/List

This is one of the most popularform of current awareness service provided by libraries. In this type of service, the library or documentation center scans primary journals and other sources of current information received in the library. It may be provided in the form of library bulletin. It consists of a list of recent additions or a list of periodicals or indexing periodical (a list of articles from periodicals).The typical bulletin may contain all or some of the items which are given below:

• Library publicity and announcements in general

• News items (selected from news in the form of clippings)

• Announcements of forthcoming conferences/seminars and meetings

• List of current acquisitions (such as books, periodicals)

• Details of contents of recent periodicals

• Publication details from the secondary sources in original or as the reproduced one

The objective of CAS is to keep the R&D activities of the organisation and other interested organisations abreast with the current developments in their respective field of interest. For example, Chemical Titles of the Chemical Abstract Service produced by American Chemical Society, a professional body. The simplest form of a library bulletin is a list of recent additions. A list of contents based on journals is a quick and cheap method. Sometimes, it is used as an alternative to routing of periodicals in many of the areas, especially in science and technology. There are excellent international indexing and abstracting services, but there is very often time lag in receiving these. Therefore, local indexing and abstracting services (another name of documentation list) may have to be brought out. Very often, these services may be found more useful because these are tailor-made or customized. The scope of the bulletin depends upon the needs of the organisation and the resources made available to the library.

7.2 Routing of Journals

Routing or circulating the journals is an important means of dissemination of information. Generally in special libraries/information centers, the bound volumes of journals are circulated, but the current issues are also routed. Before the current issues of periodicals areissued, the library/information professional can scan these current issues and mark certain articles to draw the attention of individuals. In this method the library sends the current issues to the first person on the list, who passes it on to the next name in the list, ultimately the last person returns it to the library.

7.3 Display

Display is considered as an important method of offering CAS.It is a general practice of a library to display either all or selective items of recent acquisitions as part of their publicity programme. The item may be a book or periodical. It may be the jacket of a new book. This enables users to be aware of recent developments in their field of interest or related areas.

7.4 Research in Progress Bulletin

It is an alerting service which alerts the users about the new research projects and the progress made in the projects already in progress. This type of service generally requires joint efforts of more than one organisation or institution working in similar or closely related research areas. A parent body which funds or controls a group of research organisations could also bring out research-in-progress bulletin. For example, Council of Scientific and Industrial Research (CSIR), Indian Council of Agricultural Research (ICAR), etc. bring out such bulletins in India.

Research in progress contains information about the organization/laboratory at which the project is being carried out, name of the researchers, sources of funds, duration of the project, etc. It also includes information about the status of the research in terms of the progress achieved and thereby keeps the interested researcher up-to-date.

7.5 Contents by Journal Service

This service can be provided in-house or by commercial publishers. In this service, the library or documentation centers or commercial publishers distribute a publication which consists of content pages of the journals in various subject areas. For Example, in humanities, social sciences, etc. In this service, photocopies of the content page of the selected journals

can be circulated to the users. There are some agencies such as Institute for Scientific Information (ISI), Philadelphia (now Thomson Reuters) which publish the content pages of journals entitled Current Contents which is a rapid alerting service database.

The main idea behind publishing the content pages of journals is that journals are important medium for communicating new information. If the users can be regularly informed of articles appearing in current journals in broader or narrow areas, they would come to know of recent developments that are taking place in their fields of interest. The simplest way is the duplication of the content pages of the journals and sending to the users. Another reason of providing this type of service is that this service enables the users to quickly know the titles of the articles which they value very high. Once they identify useful papers relating to their field of interest, they can then go to the library and read the papers.

Alternatively, they can also write to the author of the paper and can get copies of that paper. In this way, the user can build up good personal collection of articles of his area of interest. For example, Current Contents published by the Institute of Scientific Information (ISI) in theUSA. The Current Contents—Physical Science, published weekly reproduces the contents pages of over 700 journals.

Nowadays, creation and maintenance of research in progress databases in computer readable form is available. Such databases can be used both for retrospective search before a new project is formulated and for CAS too. This will be further discussed in section on Computer-based services.

7.6 Newspaper Clipping Service

Newspapers are considered as a valuable source of current information as these are the current awareness media. They publish news of recent happenings in various fields such as in politics, health, sports, business, etc. Newspapers carry useful information for everyone from housewives to top management. They are of various kinds such as regional, national or international. Some newspapers specialize in particular subjects such as in Economics and allied fields, for example, Economic Times, Financial Express. They contain an in-depth knowledge of industry, trade, banking, etc. Important information available in the newspapers may be useful to the users. Newspaper clipping covers the clippings of daily newspapers, weeklies, current magazines, etc. Clippings may pertain to different languages.

Various libraries and documentation centers provide information services based on these newspaper clippings, known as the newspaper clipping service. For providing newspaper clippings, libraries/documentation centers subscribe to several newspapers, which may be daily or weekly newspapers. Each of these newspapers is scanned and any items of interest to the user groups are clipped, i.e., cut and pasted on a sheet of good quality paper. One or more clippings are then assigned sub-headings or class numbers or some code. At periodic intervals, i.e., daily or, weekly, the clippings are arranged by subject headings or some code and disseminated to the users. In smaller organisations, batches of clippings in one or more groups may be circulated to users. In large organisations or where the circulation is wide, a bulletin containing news items with or without an annotation may be circulated. The clippings themselves are filled in verified or in file folders for use at later date.

Abstracting Service

QP-2018: What is an abstract? Explain the importance and type of abstract

QP-2021: Write a detailed note on Abstracting service

Introduction

- The word abstract comes from the Latin abstractum, which means a condensed form of a longer piece of writing.
- An abstract is a brief statement of the essential content of the original document or an indication of the characteristics of the original document.
- It aims to draw attention to the information contained in the original and provide a sufficient basis for the reader to judge whether or not he wants to consult the original.
- Abstract = Abbreviation + structure (Information)λ

Meaning:

An Abstract is the terse presentation in (as for as possible) the author's own language of all the points made in the same order as in the original piece of primary documentary information that can be a book, a research report, a periodical article, a speech, the proceedings of a conference, an interview etc.

Definition:

"An abbreviated, accurate representation of aλ work, usually without added interpretation or criticism, accompanied by a bibliographical reference to the original work when appearing separately from it."

Need:

- Language barrier
- Fourth Law of Library Sc.
- Alternative of original document
- Size control
- Helps to Indexer and Bibliographers
- Information explosion

Types of Abstracts

1. Titular Abstract

2. Annotation

3. Indicative or Descriptive Abstract

4. Informative, Informational or Comprehensive Abstract

5. Structured Abstract

6. Slanted Abstract

7. Author Abstract

8. Subject-specialist-prepared Abstract

1. Titular Abstract

- It is also known as title-only abstract
- Applicable in case of many articles where titles are selfexplanatory
- usually states subject and not findings

Example Tamson, Rita. "Bibliography on medicinal plants and related subjects." Bibliography on medicinal plants and related subjects. 171 (1974).

2. Annotation

- A clause or a sentence is added to amplify the title of an article ◦
- Annotated and indicative abstracts differ only in length

Example Bethel University. (2013). Creating APA style annotated bibliographies, 6th edition. Retrieved from https://www.bethel.edu/library/research/apa-annobibsixth.pdf This is an excellent resource for creating annotated bibliographies in APA format, 6 th edition and offers guidelines for writing annotations and a sample annotated bibliography.

3. **Indicative or Descriptive Abstract**
    - Short abstracts which describe the broad concepts covered in an entity in general terms are called indicative abstracts
    - generally longer than an annotation
    - Indicative abstracts only indicate what is covered in the entity - what is done, what is discussed, what is analysed, what is compared, and so on
    - Indicative abstracts are presented in a single paragraph only
    - Useful for state-of-art-report reviews, literary criticism, descriptive works etc.
4. **Informative, Informational or Comprehensive Abstract**
    - Acts as a substitute for the document
    - It is a miniature version of document including the purpose, numerical data, methodologies, formula, conclusions and recommendations
    - It is used most often for experimental work and for specific research report (Pao,1989)
    - bigger than an indicative abstract
5. **Structured Abstract**

- Structured abstracts have the same requirements as informative abstracts, but the content is written in separate paragraphs and under different headings
- They also guide authors in summarizing the content of their manuscripts precisely facilitate the peer-review process for manuscripts submitted for publication, and enhance computerized literature searching

6. **Slanted Abstract**
    - Information or description reported in a document is oriented to a specific discipline
    - An abstract written to represent a specific portion of a document, or a particular perspective on its content, usually for the benefit of a specialized audience
    - For example, an abstract of a research paper on the Global economic impact of Covid-19, written for the benefit of Industrial Economy”
7. **Author Abstract**

- An author abstract is prepared by the author herself/ himself
- Journals like Annals of Library and Information Studies, IASLIC Bulletin, etc. are providing author abstracts with all original articles

8. **Subject-Specialist-Prepared Abstract**
    - These abstracts are prepared by subject experts
    - Abstracting services have a panel of abstractors who specialize in various subjects ◦ According to their specialization they are assigned articles for abstracting

Abstracting Sources

- Biological Abstracts: It provides the latest information in life science discipline, and contains more than 13.2 million archival records most of the records include informative abstracts written by the author ◦
- This database is produced by Thomson Scientific, Inc. Now Biological abstracts is accessible through Thomson Reuters Web of knowledge platform Source: http://thomsonreuters.com/web-of-knowledge
- Chemical Abstracts Service (CAS): A division of the American Chemical Society, is the world's authority for chemical information
- CAS delivers the most current, complete, secure and interlinked digital information environment for scientific discovery

Purposes of Abstract

The main purposes of an abstract are:

1. Provide a brief summary: The primary purpose of an abstract is to provide a quick overview of the publication. This helps readers quickly understand the main points, findings, and conclusions of the work, without having to read the full text.

2. Identify relevance: An abstract helps readers quickly evaluate the significance of the publication to their research interests. This is particularly important in academic and scientific fields, where researchers need to sift through a large volume of literature to find relevant materials.

3. Efficient retrieval: Abstracts help in the efficient retrieval of information by providing searchable summaries of publications, which allow researchers to quickly and easily find relevant materials on a given topic without having to read through the full text of every publication.

4. Promotion: An abstract also serves as a promotional tool for the publication, helping to attract readers and generate interest in the work.

5. Peer Review: In the peer-review process, abstracts help reviewers assess a publication's relevance and quality quickly and make an informed decision about whether to accept or reject the work.

Indexing Services

Introduction:

Indexes are indispensible tools for providing easy and quick access to information contained in a document or a collection of documents.

The term "Index" has been derived from the Latin word "indicare" which means to "indicate" or "to point out". Index is therefore, basically concerned with indicating an object or idea to one who does not know where that object or idea is located.

Definitions

Encyclopedia of Library and Information Science, defines an index as "an indicator, more often an alphabetic list that includes subjects and names of people and places that are considered to be a special significance in a graphic record".

The British Standard BS3700:1954 defines an index as "a systematic guide to the location of words, concepts or other items in books, periodicals, or other publications".

Chakrobartty and Chakrobarti define an index as, "a systemic guide to be the items of a collection or the concepts derived from it. It comprises entries arranged in a known or searchable order, with references to show where each items indexed is located".

What is indexing?

A record specifying an existent along with its address is an "entry". In the context of subject indexing, an entry always pertains to a source of information . Any set of methodically arranged entries is an "index". The process of preparing an index is " indexing"

"It is a process of analyzing the information content of records of knowledge and expressing the informational content into a indexing language."

Why Indexing:

- Basic purpose of indexing is to help maximum of recall or retrieval or relevant information with minimum of noise. In the absence of any need for recall there would be any need for indexing.
- Indexing thus serve as an operating tool. No store can be efficiently operated without an index of some kind or other.
- The indexing tool becomes necessary any store of information or document containing information is required to be organized for repetitive use by the user.

Types of Indexes

1. Book Indexes,
2. Indexes to collections,

3. Periodical indexes, and
4. Newspaper indexes.

We are very well aware with the book index, so we describe mention remains.

Indexes to collections: these index collections of poems, fiction, plays, songs, essays, stories, biographies etc.

Periodical indexes: Broadly speaking, these are of three types, namely:

1 General Indexes: it consists;

a. Citation Indexes

b. Subject Indexes

c. Indexing to individual Periodicals

2 Subject Indexes, and

3 Indexes to single periodicals.

Functions of an Index

Indexes guides users to documents and other things;

Author indexes guides user to names of people and lead searches to document related by subject because the author tends to specialize.

Index provide guide to material that the user may wish to recall or that he may not know exists, that is, indexes are used for question of recall or discovery.

Without indexes, the searcher would waste time by turning through documents page by page. indexes save the time and make practical searches that would otherwise be given up.

indexes provide highly compact, useful information about a person or a field.

The cross references in subject indexes guide uses to accepted facts of a field.

Nomenclature, terminology and spellings are often helpfully provided by indexes and their introduction.

The origination of a field of knowledge can be obtained through a classified index or from the cross-references in an alphabetic subject index.

The subject approach may be catered for by such indexes as subject indexes, keyword index or by a minute index for special approach.

Document Index: It is catered for by such index as Patent Index, Numerical Patent Index, Report Index, Conference index, Translation Index, Book Index, Bibliographic Index, etc. or by Contract Number Index, Accession Number Index, Registry Number Index.

Bibliographic Index: An index to the literature on a particular subject, mostly consisting of micro-documents is called a subject index or bibliographic index.

Conclusion :

It is difficult to know what new has been published even in a small area of specialization as literature is being published at a very fast alarming rate. These services have been found to be very helpful in deciding which articles is to access and used and which are not.

Alerting and Current Awareness Services

QP-2021: What is an alert service? Explain various alerting services provided in special libraries.

Services that keep you up-to-date with news, articles, journals, books and websites in your field of research

TOC alerts are available in numerous databases and from publishers. Follow the database's instructions to create a TOC alert. You may be asked to log in/register or create a profile to complete the alert process.

- JournalsTOCs is an alerting service where you can discover the latest articles directly from publishers, once have been published online. A free service for individual users, researchers, librarians, students and anyone who's looking for the latest or most current papers published in the scholarly literature with international coverage.

- TOC Premier is a database which provides access to the most up-to-date TOC information for over 16,500 journals, hosted by EBSCOhost. A title list of included journals and books is available.

- Wiley Online Library: e-Alerts allows you to receive the table of contents (e-TOC) for selected journals, published by Wiley, whenever a new issue is published, including receipt of Early View and Accepted Article alerts

Have a look at your favourite journal and see whether they offer this service.

Citation alerts notifiy you when a document or author has been cited.

Some online tutorials:

- **Scopus**: Creating alerts and using My Scopus settings. Citation alerts and author citation alerts are included. Use the one log in for Scopus, SciVal and ScienceDirect.

- **Web of Science**: Citation reports.

- How to: Google Scholar Citation video (Purdue University), or the Google Scholar Citations help page.

Most databases require you to register for free to create a profile in order and create an alert.

Look for the help section in each database. Follow the instructions to set up an alert on your saved search. Visit the list of databases at CQUniversity to select the ones relevant to your area of research.

Some online tutorials:

- Scopus: Creating alerts and using My Scopus settings. Use the one log in for Scopus, SciVal and ScienceDirect.

- Web of Science: Saving Your Search and Setting Alerts.

New publication alerts

Many online book sellers offer free recommendation and notification services when new items are added to their database. A similar service is offered by some publishing houses. By registering with them you will be emailed when new items in your area of interest are published.

Selected examples:

Cambridge E-Alerts: You can subscribe to receive email notifications of new book publications. Select one or more subject areas.

CSIRO Publishing: You can subscribe to receive email notifications of new publications. Select books by subject area. Select journals and magazines by individual title.

Harvard University Press mailing list: You can subscribe to receive email and/or print notifications of new book publications. Select one or more subject areas.

Springer New Book Alert: You can subscribe to receive email notifications of publications. Browse by subject for books. Browse by subject or individual titles for journals.

Wiley books (Researchers): You can subscribe to receive email alerts for publications. Select from a range of products, e.g. Cochrane Library or Online Books.

Web alerts

You can be notified of new or changed web pages just as you can for journal articles and books.

- Google alerts: Set up a Saved Search Alert using the keywords of your choice, and have the latest relevant Google results emailed to you.

- Google Scholar: Open the menu at the top left of the screen to go to Alerts to create an account. Once you have an account you can set up Saved Search Alerts. Look for the Create Alert button on the search results screen.

- Scout Report: This is a weekly report offering a selection of new and recently discovered Internet resources of interest to researchers and educators.

RSS feeds

What is RSS?

RSS (Really Simple Syndication) is a way to receive updates for various websites. You can subscribe to an RSS feed and have the updates are delivered via an RSS feed reader.

The following icons indicate that an RSS feed is available in databases, journals, news sites and webpages:

Feed reader software allows you to gather your RSS feeds together to read later. RSS feed readers are available for different platforms, data may be opened on PCs, MACs, and using apps on mobile devices.

- Feedly provides access to RSS feeds via a web browser, also apps for Apple and android devices.

- Top Windows RSS Feed Readers and News Aggregators

- Microsoft Outlook may be used as a RSS feed reader with updates delivered to the RSS Feeds, folder in your Outlook account.

How to use Outlook as your feed reader:

1. Right click on the RSS icon on the website.

2. Select the copy link / shortcut option available in your browser.

3. Right click on the RSS Subscriptions folder in Outlook. You'll find it below the Outbox and Quarantine folders.
4. Select Add a New RSS Feed ... from the menu. Paste the URL into the box that pops up.
5. Click Add, then click Yes to add the URL to the RSS Subscription folder.

Frequently Asked Questions (FAQ)

An FAQ is defined as a list of frequently asked questions and answers related to the specific topic. The FAQ is also known as Frequently Asked Questions or Questions and Answers [Q & A]. In other words, we can define FAQ is a set of questions and answers asked by the users about the specific service or a product. In the world of IT, the FAQs are usually created for online services, software programs, websites, and computer hardware. They act as a major benchmark for finding answers to a specific question. Nowadays, it has become a feature of the internet, and today, the World Wide Web has thousands of FAQs on it.

Modern Development of FAQs

The modern development of FAQs contains:

1. Non-Traditional FAQs
2. In Web Design

1. Non-Traditional FAQs: - There are some cases in which the informative documents are present in the traditional FAQ-style are also not described as FAQs, mainly the FAQs of a video game, which is basically a detailed explanation about the gameplay, beginning-to-end guidance, secrets, and tips regarding the game. The format of FAQs of video games is mostly in the format of question-and-answer, and it also contains a small portion of questions and answers.

2. In Web Design: - Nowadays, the FAQ has become an essential website's component, no matter whether it is a standalone page or a multi-page website section per query or subject. The embedded links to FAQ pages now become popular in website navigation bars, footers, or bodies. In web design, the FAQ page plays a vital role in achieving various goals related to customer service and SEO (Search Engine Optimization).

- It helps to improve site navigation.
- It reduces the workload of customer service workers.
- Integrating or linking within the pages of the product.
- Enhance the website's visibility by optimizing/matching for particular search terms.

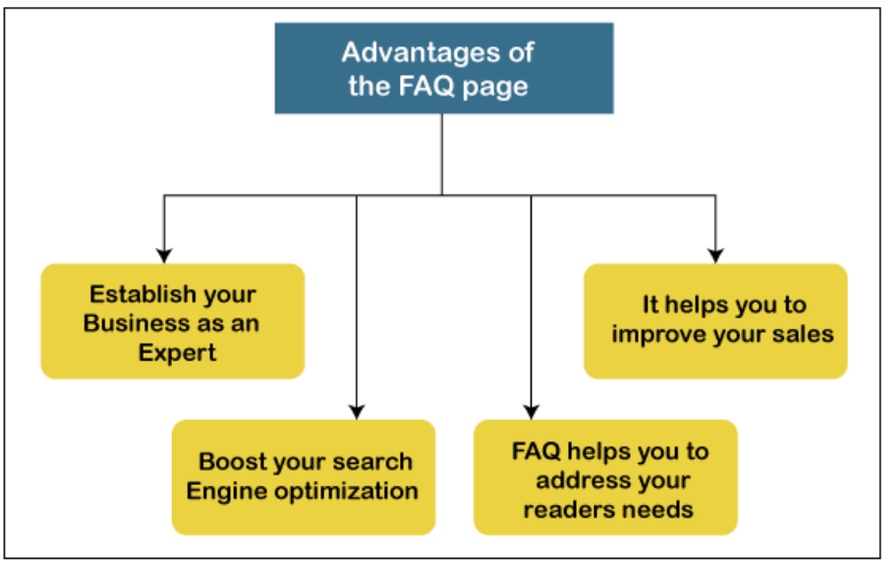
What is FAQ Page

FAQ is Frequently Asked Questions, and on a website, there is a page named FAQ, which is a structured list of useful details that customers may ask related to the goods and services. The FAQ page is a convenient way to structure the information that your clients often ask.

There are various benefits provided by the FAQ page:

- With the help of the FAQ page, a customer's experience can be improved.
- The FAQ page offers information quickly to assist clients in making a buying decision.
- It helps to enhance the online visibility on Google and other search engines.
- It also reduces the amount of time that your employee requires to answer the simple or an easy question.

Main advantages of the FAQ Page:



What to Include in a FAQ Page

A FAQ page requires constantly improvement and updation. If you want to keep the page meaningful, you can keep adding new questions and answers and updating old ones.

There are various things which you have to keep in your mind regarding what to include in a FAQ page that helps to create an effective FAQ page:

1. Use accordions
2. Common Questions
3. Keep it short
4. Categorize

1. Use Accordions: - By using the Accordion system, you should create a FAQ page and always avoide long webpage.

2. Common Questions: - A FAQ page is all about fundamental questions and answers, as the name suggests. You have to gather all the common questions to the customers and then add them to the FAQ page.

3. Keep it Short: - The question and answer include in the FAQ page must be short so that customers can read it easily.

4. Categorize: - All the questions and answers include in a FAQ page are arranged and organized category wised.

FAQ Page Design

There are various points which you have to consider while designing the FAQ page for your website:

1. Include a search bar
2. Link top questions
3. Write clear and concise pages
4. Stick to the basics
5. Organize questions by category
6. Regularly update each page

1. Include a Search Bar: - Although listing all the FAQ questions on one page and linking or connecting them from a landing page is helpful, this complex format can end up being boring for many customers. Sometimes with a single question in mind, clients come to a FAQ page and are forced to click through hundreds of other questions to answer their questions.

If the customers have access to the search bar, their query or related keywords can be easily searched to save time.

2. Link Top Questions: - If you have a category laid out in your FAQ section's landing page, then it is good. Although several questions are likely more popular than other questions. It is better if these such top questions must have their sector, and the link of the answer to these questions is placed at the top side of the FAQ page so that time of the customers can be saved. In this way, we can preserve our hierarchical organization by making the most frequently asked questions more available.

3. Write Concise and Clear Pages: - Another thing which you have to keep in your mind while creating a FAQ page is the FAQ page must be concise and precise because if the FAQ page contains a vast text, then it confuse the reader and due to this reader need to search for the responses they require. So, instead of writing a long paragraph, it is better to provide concise and straightforward answers.

4. Stick to the Basics: - You may want your FAQ pages to be lightened with the theme, colors, etc. It can be useful for the company and its branding, but it is not entertaining customers on your FAQ pages. The FAQ page format must be in a simple design so that reader can read this easily.

5. Organize Questions by Category: - If in the FAQ page section, you organize each question based on the category, then the customer gets a fast response to their question because if all the questions are arranged in a random order, then sometimes the customer might be frustrated.

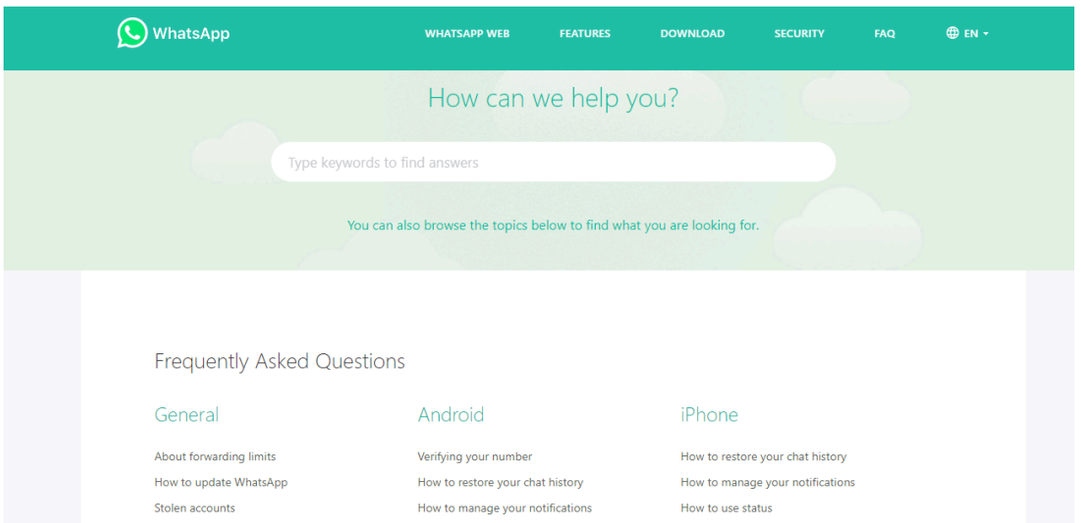
6. Regularly Update Each Page: - Each FAQ page which you have must be always correct. When your company faces product releases and updates, these changes must be reflected in your FAQ page. This means that the team needs to regularly review each page and update it as new features are introduced.

Best Examples of Effective FAQ Pages

There are various examples of effective FAQ pages:

1. WhatsApp
2. Microsoft
3. Bank of America
4. UCAS
5. Buffer
6. Dropbox
7. WorldFirst
8. Zappos
9. Adobe creative cloud
10. Wikipedia

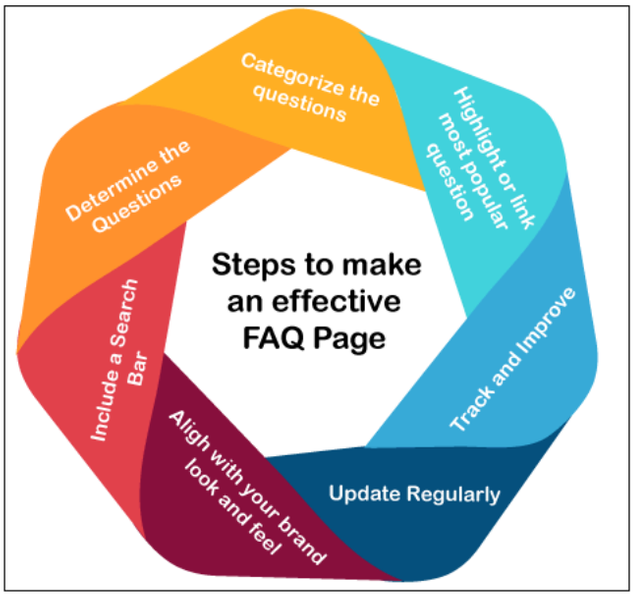
1. WhatsApp: - The FAQ page of WhatsApp has a calming, green color scheme that aligns well with its branding. The resource of FAQ for WhatsApp is easy to use, bright and effectively organized for quick mobile use or desktop. Beyond that, this basic FAQ page contains no frills. The WhatsApp FAQ page contains a search bar where we can type the keywords. Below is the FAQ section, there is a specific category of items and the links to three common questions. And by clicking on the appropriate link, we can view all the questions.



How to Make an FAQ Page

There are various steps to make an effective FAQ page:

1. Determine the questions
2. Categorize the questions
3. Highlight or link most popular questions
4. Include a search bar
5. Align with your brand look and feel
6. Update regularly
7. Track and improve



Virtual Reference Service

Virtual Reference Service According to Machine Assisted Reference Section (MARS) of the Reference and User Services Association (RUSA) of the American Library Association, Virtual Reference Service is reference service initiated electronically, often in real-time, when users employ computers or other Internet technology to communicate with reference staff, without being present physically. Communication channel used frequently in virtual reference are chat, videoconferencing, Voice over IP, co-browsing, e-mail or instant messaging.

Virtual reference service is also referred as digital reference, e-reference, online reference and remote access reference. While telephonic reference service has long been accepted and practiced in the libraries to respond to remote users' requests, virtual reference service has been relatively a recent phenomenon.

The increasing availability of the Internet and electronic resources have been the major factors which lead to the implementation of virtual reference service that can be accessed electronically by remote users.

Present day libraries are making available variety of electronic sources like online catalogues, indexes, abstracts, digitised collections, e-journals and full-text databases, through their websites. The availability of the electronic sources via remote access requires that users should be assisted by the library to use these sources effectively. There has been a steady decline in the in-house use of library as more number of users

are using personal computers with the Internet access from home, workplace or cyber café. This has prompted librarians to explore alternative approaches for interacting with their users. They have started offering virtual reference service.

The virtual reference service, in general sense, can be defined as delivery of reference service via the Internet to library users who are outside the physical confines of the library. Current primary modes of delivery for virtual reference service are e-mail, electronic forums and real-time chat communication. E-mail reference has been the most heavily used type of virtual reference service. Here, user sends the library an e-mail reference query, supplying whatever information s/he feels is necessary. The librarian may reply by e-mail, phone, fax or letter, etc. E-mail reference service suffers from a number of drawbacks which are as follows:

• E-mail does not offer instantaneous response as the Internet users normally expect from the Web.

• It is difficult to conduct any kind of reference interview using e-mail. If question needs clarification, it may take three or more exchanges over a few days to find out what user really wants.

• E-mail reference places most of the burden of answering the question on the reference librarian whereas in in-house reference, the librarian works with the user to find the answer instead of doing all the work for her/him.

In real-time chat communication users and librarian send short written messages back and forth instantly. Chat software (like CompuServ' Instant Messenger) allows librarian to create a setting where interaction with the user is live (realtime) but limited to written exchange of information. Through a series of short messages librarian gets to know the user's requirement. Some chat programmes offer an open virtual reference room where one or more user can enter at a time and exchange messages with the librarian.

Advantages of using chat online reference are as follows:

- It is like live reference. Librarian can talk to user directly.
- Librarian can conduct a reference interview on the spot by exchanging series of short messages to get better idea of what the user wants.
- It eliminates the problem of mishearing what is said.
- It is helpful for those with hearing or speaking impairment.

- User can save text of chat session and refer to it later.

Disadvantages of chat software are as follows:

• In chat reference, librarian can write and explain to the user to go to a specific address on the Web to find information, but can't actually take her/him there or be with her/him through a database search whereas it is possible with in-house reference service.

• More time consuming than voice communication, because librarian has to type everything out. Spelling and typing errors also might creep in.

• User might not have that much patience as s/he expects everything to be instant, efficient and convenient.

If user logs off prematurely, it may not be immediately apparent to the librarian, specially if s/he is busy looking for required information in relevant sources. Some of the limitations of the general chat softwares have been solved by 'Virtual Reference Softwares'. These softwares are modification of 'Web-based Contact Centre Software' specifically designed to make online reference services easy, quick and cost effective. Currently more than 30 versions of virtual reference software are in use. The new softwares are constantly being introduced and existing products are being refined. Some of the commercial virtual reference softwares are QuestionPoint, Virtual Reference Toolkit, 24×7 Reference, Convey System, Docutek, etc.

These Virtual Reference Softwares, in addition to fully supported chat module offer many other facilities like:

• 24×7 technical support;

• Online training for librarians;

• Private and secure communication between users and librarians;

• Complete session transcripts, including URLs are e-mailed to both the user and librarians at the end of each session. A copy of the transcript is also stored in the system database for future reference and analysis;

• Queuing features which let users and librarians to know how many people are waiting to be helped;

• Push technologies allowing librarians to send web pages directly to users' desktops;

• Co-browsing facilities, allowing users and librarians to search through a database, catalogue or website simultaneously. This facility allows librarian to teach online more easily;

• Conference facilities allowing the librarian to conduct a group instruction;

• Customisation of software;

• Generating weekly statistical reports;

• Ability to transfer questions to the participating libraries in the network in real-time, for shared and collaborative virtual reference service; and

• Provide multilingual services e.g. QusetionPoint offers services in 20 languages.

Many libraries provide virtual reference service on stand alone basis. Some libraries provide this service on collaborative basis to ease the impact of software cost and staffing for extended hours. On an international level, Library of Congress and OCLC (Online Computer Library Center), Ohio launched collaborative virtual reference service using QuestionPoint software, as a pilot project in the year 2000. Presently, QuestionPoint service (formerly known as Collaborative Digital Reference Service), is one of the largest and most geographically distributed collaborative virtual reference service in the world. More than 260 libraries of all types in 21 countries are using QuestionPoint virtual reference service.

There are several benefits associated with collaboration. The first is the ability to offer virtual reference service on time share basis. For instance, an Australian/New Zealand – U.S. collaboration offers 24×7 service without staffing nights in either location. Because of 12 hours difference in the time zone, each location can cover the other's night hours. Second is automatic building of a database of all questions and answers, thus providing re-use possibilities, and options for self service by users. QuestionPoint cooperative virtual reference supports multilingual reference transaction. It has Question and Answer knowledge base that is carefully reviewed and maintained by cooperative contributors.

As collaborative virtual reference services continue to evolve, the need was felt for some guidelines and standards for operating these services. Official guidelines and policies for collaborative virtual reference service have started appearing. The prominent groups

involved in creating virtual reference guidelines are International Federation of Library Associations and Institutions (IFLA), Virtual Reference Desk (VRD), National Information Standards Organization (NISO), and Machine Assisted Reference Section (MARS) of Reference and User Services Association (RUSA) of American Library Association. In addition, the QuestionPoint service has issued member guidelines.

Virtual reference service offers users a convenient, high tech way to connect with library's information professionals. This service is well suited for getting quick facts, verifying references to published sources, finding how to search for needed information in a database or on the Web or getting advice for in-depth searching.

Limitations of Virtual Reference Service

• The cost of the software is high;

• Once purchased, the reference staff has to be trained to use the software. Few reference librarians have experience with chat, instant messaging, web collaboration or any other methods of working live online;

• More time required to answer the question than that in face-to-face reference service. The average chat question takes 10-15 minutes to answer; and

• The queries that rely on in-depth consultations from a variety of sources prove difficult for librarian to communicate effectively through virtual reference service.

Virtual Reference Desk (VRD)

QP-2020: State and explain the major VRD projects.

Virtual Reference Desk (VRD) This project is sponsored by the US Department of Education. It is dedicated to the advancement of digital reference and the successful creation and operation of humanmediated, Internet-based information service. The VRD project organizes and provides conferences on digital reference issues for information professionals in libraries and other contexts. The VRD does not actually answer questions, but provides resources and links to experts that offer these services. The basic idea of VRD is that when a user asks a question and that can not be answered by a participating library then it is forwarded to the VRD network for assistance. This service includes:

- Collaborative Ask A Service:A network of Ask A Services and volunteer information professionals that ensure users' questions are addressed by the most appropriate experts.
- The Learning Centre: A web site for the K-12 community with curriculum-related websites, frequently asked questions, and other previously asked questions.
- Ask A+ Locator: A searchable database of high quality K-12 Ask A Services.

The following are some of the Ask A Services, which are Internet based question and answer services that connect users with experts and subject expertise.

Ask a Hydrologist

Ask a Linguist

Ask a Parenting Expert

Ask a Question

Ask a Reporter

Ask a Scientist

Ask an Archaeologist

Ask Dr Math

Ask Mr Calculus

Ask the Dentist

Ask the Space Scientist

Virtual Libraries

Types of Libraries

- National Libraries
- Academic Libraries
- Public Libraries
- Special Libraries
- Digital Libraries

- Virtual Libraries
- Hybrid Libraries

From their historical beginnings as places to keep the business, legal, historical, and religious records of a civilisation, libraries have emerged since the middle of the 20th century as far reaching bodies of information resources and services that do not even require a building. Rapid developments in computers, telecommunications, and other technologies have made it possible to store and retrieve information in many different forms and from any place with a computer and telephone connection. The terms digital library and virtual library have begun to be used to refer to the vast collection of information to which people gain access over the internet.

This section provides a brief account of libraries with a focus on the later part of the 20th century, when both technological and political forces radically reshaped library development. It offers an overview of different types of libraries and explains their important functions.

Virtual Libraries

Much of the explanation surrounding the emerging 21st century library is based on the opportunities provided by enhanced access to information resources through the use of networked information technologies. Existing libraries are a product of an intersection and an interaction of people, resources, and procedures.

The delivery of services to patrons and other users, including library staff, is built upon the collective personnel, information, and technological resources that constitute the library. Library professionals (experts) are accepting the potential and practicality of virtual libraries to better serve users by providing access to a broader range of information than available locally and by supporting traditional resource sharing among libraries.

Definition of Virtual Library

"A Virtual Library is a selected organised collection of units (nodes) of documentary resources

• Spread everywhere (space);

• Accessible always (time);

Where individuals and groups as

• Authors (producers of documents);

• Publishers (editors of documents);

• Readers (users of documents)

Are linked across the global electronic network and related in different ways to documents that are:

• Fast and easily obtainable

• Available in their full version

In view of satisfying multiple cultural exigencies (information, learning and entertainment, etc.)."

But, according to Allan Powell "the virtual library can have many definitions, including: A library with little or no physical plant of books, periodicals, reading space, or support staff, but one that disseminates selective information directly to distributed library customers, usually electronically. A more traditional library that has transformed some significant portions of its information delivery channels into electronic format, so that many or most of its customers do not need to visit the library to obtain information. A library that operates as a nexus of selected information management activities within the organisation, some of them centralised, but most of which happen through the efforts of decentralised staff, resources, systems, and even outside suppliers, who are accessible and dispersed through out the organisation".

"The key characteristics of a true virtual library are:

• There is no corresponding physical collection,

• Documents will be available in electronic formats,

• Documents are not stored in any one location,

• Documents can be accessed from any workstation,

• Documents are retrieved and delivered as and when required, and

• Effective search and browse facilities are available" (Sherwell, 1997).

A)The realisation that convergence of communications and computing technologies offer opportunities for extending the reach and the range of the

traditional library is driving the acceptance of the virtual library concept. The Internet, the Web, and digital collections provide a context for making the idea of a virtual library real.

B) Virtual Library Design A pragmatic approach for designing virtual libraries is to focus on services rather than on technology. A service-based architecture for a virtual library is essential and provides the framework to accommodate both digital resources and the collections that will not be transformed into bits and bytes.

C) Service-Based Architecture Since the library, by its nature, is primarily a service institution, a service philosophy should guide the virtual library. A library collects books and other materials, and appoints qualified staff with a view to provide services to its users. The following components must be taken into consideration while building a virtual library:

It may be emphasised that user needs define and shape appropriate services, which are based on available resources, including staff and information. Technology, in the form of many different tools, supports the delivery of services. Of course, the management identifies and prioritises the services and formulates overall policy. Management also acquires and allocates the funding necessary for the infrastructure, services and the infrastructure needed for their delivery (resource and technology). Service-based architecture not only identifies components of the virtual library and indicates where funds to be allocated, it also allows the development of service quality benchmarks. For any service, we need to indicate the goals and objectives of the service, and then propose performance metrics by which to assess the utility of a service and ultimately, the value of the service to users.

Virtual Library: Services for Users Though demographic characteristics play an important role in deciding users of virtual library, the boundaries can be wider and more inclusive. Focussing on services allows us to think about the types and levels of services we are going to provide to a variety of user groups. Defining the services for any group directs us to the technologies appropriate to those groups. The types of services provided by a virtual library comprise the following:

• Resource discovery services,

• Access services,
• Reference services,
• Instruction service, and
• Patron account service.

Resource discovery service: This service provides users with a variety of tools and approaches for discovering the existence of appropriate resources. Typically, a user will search one or more repositories of metadata, full text, or images to identify and select resources. Three types of searches are possible: i) Single Database Searching, ii) Broadcast Searching, and iii) Integrative Searching.

Access service: Once the user has discovered the resources, the access service addresses getting the information to the user. It depends on the users' paying capacity.

Reference service: Both cost and quality of service are important considerations for establishing reference service. With the limited resources made available for reference service the library must consider priority of serving various user groups.

Instruction service: This service focuses on appropriate training and instruction activities to assist users. Users will need to know how to use the new and emerging technologies. But, more importantly they may need help in understanding what resources are available, their costs, and their authenticity.

Patron (user) account service: This service area addresses user activities including accessing account information through the network, use the service to order materials, or pay for the resources.
The above list of services is illustrative and not comprehensive. These five services are intended to provide a point of departure for discussing what the virtual library might provide.

Standards and Interoperability for Virtual Library
The virtual library is a focus for collaboration and collaborative services. In the network environment, there is an assumption that systems and organisations

interoperate. Definitions of interoperability reveal common themes: working together, exchanging information, interacting without special effort on the part of the user, or operating together effectively. Usually the content of the interoperability is focussed on technical interoperability between information systems. For example, a system-centric definition of interoperability might be the ability of two or more systems or components to exchange information and use the exchanged information without special effort on the part of either system. In service-based virtual library, a focus on users should inform the concept of interoperability so that the users may successfully search and retrieve information from two or more systems in a meaningful way with confidence.

The implementation of standards such as Z39.50 enables interoperability among systems. But, implementing such technologies and offering services based on interoperable systems require a clear understanding of the information access and use issues.

Collaboration among libraries has always been manifested in resource sharing programmes. Opportunities for resource sharing increase with a virtual library as the research of librarians and users extend to a broader and more comprehensive range of resources. Many different groups can benefit from a virtual library. The challenge is to ensure that the various groups have opportunities to participate in the design, development and governance of the virtual library. Indeed the virtual library offers a new context for taking traditional library collaboration forward.

About data mining for information

Data mining is a process of discovering patterns, trends, insights, and knowledge from large volumes of data. It involves various techniques and methodologies to extract valuable information and make data-driven decisions. Here's an overview of data mining for information:

1. **Data Collection**: The first step in data mining is collecting relevant data from various sources. This data can be structured (e.g., databases) or unstructured (e.g., text documents, social media posts).

2. **Data Cleaning and Preprocessing**: Raw data often contains errors, missing values, and inconsistencies. Data preprocessing involves cleaning and transforming the data to make it suitable for analysis. This may include handling missing data, removing duplicates, and standardizing formats.

3. **Data Exploration**: Before applying any specific data mining techniques, it's essential to understand the data. Data exploration involves generating summary statistics, visualizing data distributions, and identifying potential patterns or outliers.

4. **Data Mining Techniques**:

    - **Classification**: This technique is used to categorize data into predefined classes or labels. It's commonly used for tasks like spam email detection, sentiment analysis, and medical diagnosis.

    - **Regression**: Regression analysis predicts a continuous numeric value based on input variables. For instance, it can be used to predict sales revenue based on advertising expenditure.

    - **Clustering**: Clustering groups similar data points together based on their inherent characteristics. It's used for customer segmentation, anomaly detection, and recommendation systems.

    - **Association Rule Mining**: This technique discovers relationships between variables in data. It's often used in market basket analysis to identify products that are frequently purchased together.

    - **Time Series Analysis**: Time series data mining is used to analyze and forecast data that varies over time, such as stock prices, weather patterns, or sensor readings.

5. **Model Building**: Depending on the chosen data mining technique, models are built using algorithms that learn patterns and relationships within the data.

6. **Model Evaluation**: Models must be evaluated to determine their accuracy and effectiveness. This involves using metrics like accuracy, precision, recall, F1-score, or mean squared error, depending on the task.

7. **Interpretation and Visualization**: Once patterns and insights are extracted, they need to be interpreted and presented to stakeholders effectively. Data visualization techniques can be valuable for this purpose.

8. **Deployment**: Successful data mining models can be deployed in real-world applications to make predictions or automate decision-making processes.

9. **Continuous Improvement**: Data mining is an iterative process. Models should be updated and refined as new data becomes available to ensure they remain relevant and accurate.

10. **Ethical Considerations**: Data mining also raises ethical concerns, such as privacy, bias, and the responsible use of data. It's important to adhere to ethical guidelines and regulations when conducting data mining activities.

11. **Data Sources**: Data mining can be applied to a wide variety of data sources, including:

- **Transactional Data**: This includes data from sales, financial transactions, and online interactions. Analyzing transactional data can reveal customer behavior and purchasing patterns.

- **Text and Document Data**: Data mining can extract valuable insights from text documents, such as articles, reports, and social media posts. Techniques like text mining and natural language processing (NLP) are used for sentiment analysis, topic modeling, and information extraction.

- **Image and Video Data**: Data mining techniques are increasingly being applied to image and video data. This can involve tasks like image recognition, object detection, and video content analysis.

- **Sensor Data**: Internet of Things (IoT) devices generate vast amounts of sensor data. Data mining can be used to monitor and analyze sensor readings for various applications, including predictive maintenance and environmental monitoring.

- **Genomic and Biological Data**: In fields like bioinformatics, data mining is used to analyze genetic sequences, protein structures, and biological pathways to gain insights into diseases and drug discovery.

12. **Big Data and Data Warehousing**: With the advent of big data technologies and data warehousing solutions, organizations can store and analyze massive datasets efficiently. Data mining techniques are crucial for uncovering meaningful patterns within these extensive data repositories.

13. **Tools and Software**: There are numerous data mining tools and software available that facilitate the process. Some popular ones include:

- **R**: An open-source programming language and environment specifically designed for data analysis and statistics.

- **Python**: A versatile programming language with libraries like scikit-learn, pandas, and TensorFlow that support data mining tasks.

- **Weka**: A user-friendly, open-source data mining software package with a graphical user interface.

- **RapidMiner**: A commercial data science platform that offers a wide range of data mining and machine learning capabilities.

14. **Association Rules**: Association rule mining is commonly used in market basket analysis. It identifies relationships between items in a transaction dataset. For

example, it can discover that customers who buy bread and milk are likely to purchase eggs as well.

15. **Data Mining in Healthcare**: Data mining is widely used in the healthcare industry for tasks like disease prediction, patient outcome analysis, and fraud detection in medical insurance claims.

16. **Challenges and Limitations**: Data mining may face challenges such as overfitting (creating models that perform well on training data but poorly on new data), data quality issues, and interpretability of complex models. Additionally, privacy concerns and compliance with data protection regulations like GDPR are important considerations.

17. **Cross-Disciplinary Applications**: Data mining is not limited to a specific industry or field. It has applications in marketing, finance, manufacturing, social sciences, and many other domains.

18. **Machine Learning Integration**: Data mining often intersects with machine learning, where machine learning algorithms are applied to automate the discovery of patterns. Machine learning models can adapt and improve their predictions over time, making them valuable for data mining tasks.

19. **Prescriptive Analytics**: Beyond descriptive and predictive analytics, data mining can also lead to prescriptive analytics, where the insights obtained are used to recommend actions or decisions to optimize processes or outcomes.

20. **Real-Time Data Mining**: Some applications require real-time data mining to make immediate decisions or detect anomalies as they occur. Stream processing and real-time analytics technologies enable this.

Data mining is a powerful tool for turning data into actionable insights and knowledge. It continues to evolve with advances in technology and plays a crucial role in helping organizations make informed decisions, discover hidden patterns, and gain a competitive edge in various industries.