Pathshala
पाठशाला
A Gateway to All Post Graduate Courses

MHRD
Govt. of India

An MHRD Project under its National Mission on Education throught ICT (NME-ICT)

Subject: Library and Information Science

Production of Courseware
e-Content for Post Graduate Courses

Paper No: 04 Information Sources, Systems and Services

Module : 02 Types of Information Sources: Documentary: Primary, Secondary, and Tertiary

Development Team

Principal Investigator & Subject Coordinator	Dr. Jagdish Arora, Director INFLIBNET Centre, Gandhinagar
Paper Coordinator	Mrs Renu Arora Former Head, Education and Training, NISCAIR
Content Writer	Dr Purnima Kaushik Head of Dept DLISc, University of Rajasthan
Content Reviewer	Mrs Renu Arora Former Head. Education and Training. NISCAIR

Module 2: Types of Information Sources: Documentary: Primary, Secondary and Tertiary

I. Objectives

After reading this Module, you will be able to:

- Know the characteristics of Information sources,
- Identify documentary and non-documentary sources,
- List various types of information sources,
- Know about the Primary, Secondary and Tertiary sources,
- Distinguish between Primary, Secondary and Tertiary sources of Information, and
- Give examples of documentary sources.

II. Learning Outcome

After studying this module, you will learn the need for various documentary information sources. Besides studying the various documentary sources of information, you will also learn their characteristics, categorization and use in different contexts. The documentary sources are categorized into the primary, secondary and tertiary sources. In primary sources, information appears first, secondary sources come out next and tertiary sources are the last to appear. We will learn their development and importance in study, research, recreation and personal development.

III. Module Structure

1. Introduction
2. Information Sources
3. Types of Information Sources
4. Documentary Sources
    4.1 Categorisation of Documentary Sources
        4.1.1 S. R. Ranganathan
        4.1.2 C. W. Hanson
        4.1.3 Denis Grogan
        4.1.4 Categorisation
5. Documentary Sources of Information
6. Primary Sources
    6.1 Characteristics of Primary Sources
    6.2 Problems of Primary Sources
    6.3 Examples of Primary Sources
        6.3.1 Periodicals
            6.3.1.1 Type of Periodicals
            6.3.1.2 Advantages of Periodicals
        6.3.2 Newspapers
            6.3.2.1 Advantages of Newspapers
            6.3.2.2 Disadvantages of Newspapers
        6.3.3 Technical Reports

1. Introduction

Information gets generated in various ways and is recorded in a variety of sources and is made available for use by users. On the other hand, every user requires information for various activities like study, research, problem solving, or entertainment. Kinds of information required by user defined as is current, background, statistical or research type. Useful information is that which is used and which creates value. Experience and research shows that good information has numerous qualities. This information is relevant for a purpose, should be timely, accurate, complete, reliable and targeted to the right person. It has to be communicated in time with right level of details and is communicated by an appropriate channel, i.e., one that is understandable to the user. For this sources of information are used to communicate information.

In this Module, we will study the various documentary sources of information, their characteristics and use in different contexts.The documentary sources are categorised into the primary, secondary and tertiary sources. We will learn their development and importance in

study, research, recreation and personal development. The non-documentary sources will be discussed in the next Module, i.e., Module 3.

2. Information Sources

A source is a place or person from which you can obtain something useful or valuable. A resource is something that can be used to perform some function. The sources from where we get information are called information sources and these comprise of documents, humans, institutions as well as mass media like radio and television. Information sources are significant for information organisations and information users. This is because the sources indicate the current development in all fields, avoid duplication in research, give answers for specific queries, help us to understand some unfamiliar terms, provide meaning for terms and indicate broadened view of a subject. Information sources also provide an in-depth treatment of a topic or aspect of a topic and can also provide a broad overview or historical view of a topic. This is so because these sources are prepared after browsing wide variety of knowledge and also examine past studies to predict future trends, etc.

Information sources are different from reference sources. An information source is one which provides us the required information. Whereas, reference sources are to obtain specific types of information which is compiled specifically and designed to provide information in a most convenient form.An information source thus is the source from where we get information. It deals with documents and non-documents. Information sources are also different from information resources. An information resource is not the same as a resource and is defined as a resource which can convey or describe (essential) characteristics of a resource in some way,

3. Types of Information Sources

While conducting user-requirements analysis, it is important to identify the sources of information. For this, we need to select different sources of information in order to gather complete and accurate information. Information sources are usually organized according to their information contents, type, media or form to cater to the different needs of the users. The sources of information are broadly classified into:

- Documentary Sources
- Non-Documentary Sources

All recorded sources of information irrespective of their contents and form come under documentary sources. These may be published or unpublished, in print or in electronic form. Documentary sources can be categorized as primary, secondary and tertiary sources on the basis of appearance of information. In primary sources, information appears first, secondary sources come out next and tertiary sources are the last to appear. The non-documentary sources of information can be defined as those sources and resources of information that are not contained in any document. The non-documentary sources comprise of formal and informal sources.

4. Documentary Sources

All recorded sources of information irrespective of their contents and form come under documentary sources. These may be published or unpublished, in print or in electronic form. These may be books, periodicals, magazines, or reference books and others.

Documentary sources may be defined loosely as records relating to individuals or groups of individuals that have been generated in the course of their daily lives. This is not to say that documentary sources do not require a structured approach; on the contrary, the use of letters, diaries and the like need a careful methodology in order to extract their relevance for the understanding of society.

Documentary Sources can further be categorized based on their information contents and physical form as follows:

- Documentary Sources (By Contents)
- Documentary Sources (By Form)

4.1 Categorisation of Documentary Sources

Several library and information science experts have categorised the documentary sources of information. Some experts have categorised as below:

4.1.1 S. R. Ranganathan

Dr. S R Ranganathan, the father of Library Science has classified the documentary sources of information into four categories. These categories reflect the chronological order of their development and are based on the physical characteristics of documents.

a. Conventional - Books, periodicals, maps and atlases

b. Neo-Conventional - Standards, specifications, patents, data

c. Non-Conventional - Audios, visuals, audio- visuals, microforms

d. Meta Document - Direct created documents without any human intervention

4.1.2 C. W. Hanson

C. W. Hanson, former editor of Journal of Documentation in an article entitled 'Introduction to Science Information Work' published in 1971 by ASLIB divided the documentary sources of information into two categories, namely, primary and secondary.

a.   **Primary Sources**

Hanson was of the view that the primary documents exist of their own and usually contain original information based on the first formulation of any new observation, experiment, ideas, etc. Thus, Hanson explained that - a monograph, an article in a journal, text book, and encyclopaedia are all primary documents. He opined that although an article in encyclopaedia or text book may not contain any new information on the subject but it presents the information in the particular form for the first time. These articles concerned are not condensations or rewriting in any way of any existing document but have been specially written for the text book or the encyclopaedia. Thus these are also primary sources. The sources like books, periodicals, dissertations, reports, patents, standards, trade literature, conference proceedings, etc. are to be included in this category.

b.   Secondary Sources

The secondary publications were identified by Hanson as those that present the contents of the primary documents in a condensed form or listed them in a helpful way. This is to enable the existence of a primary document so that it can be known and access to it can be made. In this category, the sources to be included are Catalogues, Bibliographies, Indexes, abstracts, Indexing and abstracting journals, etc.

Besides the above two categories, Hanson also gave a third category which he called as:

c.   Primary/Secondary Sources of Information

Some publications like the monographs, conference proceedings, theses and dissertations, etc. have the characteristics of both primary and secondary sources of information. In case of these publications, the documents that represent new facts can be regarded as primary publications and those that have the characteristics of reviews, etc.are to regarded as secondary publications. As a result of such mixing of primary and secondary sources of information, some library and information science experts do not consider this category to be much practical utility.

4.1.3 Denis Grogan

Denis Grogan, the famous British Information Scientist and Educator, on the basis of level of reorganization, classified the documents into three categories,viz. primary, secondary and tertiary.

i. Primary Sources

Grogan identifies the primary publications as those in which the author, for the first time, supplies evidence, describes a discovery, makes or drives a new proposition or brings forward new evidence about previous proposition. It was created at or near the time being studied, often by the people being studied. It is a fundamental, authoritative document related to a subject of inquiry, used in the preparation of a later derivative work. Thus, the primary sources of information are basic sources of new information which have not passed through any filtering mechanism like condensation, interpretation or evaluation and are the original work of the author.

Primary sources may include periodicals, patents, standards, research reports, dissertations and theses, reprints, trade literature, classic books, letters, diaries, and other personal papers, photographs, interviews and transcripts, government and historical records, newspaper clippings, and other original sources.

There are certain primary sources of information, which remain unpublished. Very often these may be consulted for historical interest. Such materials include laboratory note books, memoranda, diaries, letters to and from a particular individual, company, etc. The libraries many times try to procure such type of material if it comes within its scope of area or is relevant to its purpose.

ii. Secondary Sources

The secondary sources have been identified by Grogan as documents concerning a particular subject of inquiry which is derived from or based on the study and analysis of the primary sources of information. In the secondary source of information, the original information is selected, modified and arranged in a suitable format for the purpose of easy location by the user. The secondary sources of information thus provide digested information and also serve as bibliographical key to primary sources of information. Secondary publications include text books, monographs, reference books, indexing and abstracting journals, reviews of progress/literature, etc.

iii. Tertiary Sources

Grogan called those sources the tertiary sources of information which are last to appear and mostly do not contain subject knowledge. These sources are designed to provide information about information and so acts as a guide to the primary and secondary sources of information. The main function of tertiary sources is to aid the users in using or accessing primary and secondary sources of information. The tertiary sources of information are bibliographies of bibliographies, yearbooks, directories, guides to literature, guides to organisations, lists of accession, lists of research in progress, etc.

4.1.4 Categorisation

The above sections indicate the categorisation of documentary sources by various experts. It is clear that eventually there is no rigid line of demarcation between primary, secondary and tertiary sources of information. However, the categorisation of documentary sources as given by Denis Grogan has been found to be most acceptable and is universally prevalent. He has given a detailed account of these categories, with suitable examples of each of these categories in his book entitled 'Science and Technology: an introduction to the literature'.

In this Module, the categorisation of documentary sources as proposed by Grogan has been followed.

5. Documentary Sources of Information

All recorded sources of information such as books, periodicals, articles, dictionaries, newspapers, dissertations, guidebooks, directories etc. are organized into quite basic and fundamental categories based on their information contents.

Depending upon their contents and organizational level, these can be grouped into:

- Primary
- Secondary, and
- Tertiary sources of information

The libraries and information organizations receive different types of questions. Each type of question requires different sources of information. This can be best illustrated with the help of an example. Suppose a researcher is beginning research on a wholly unknown topic. The first step is usually to consult encyclopaedias on the topic. These are examples of 'Tertiary' sources as they provide overview or general explanation in a condensed form on the topic for all kinds of users. The encyclopaedias also have reference for further reading. Other tertiary

sources can also be used, for example, subject dictionaries give full definitions and meanings of the subject's terminology.

After the general concept of the subject is clear, the next step is to consult various secondary sources to know what has already been written on the topic, at different times and from different points of view, by others on the topic. 'Secondary' sources are thus sources on the topic in question by other researchers, whose work has been based on Primary sources after consultation with the Secondary sources on the topic which had existed at the time.

In view of what existing Secondary sources make available 'Primary sources' are then consulted for further views of the topic under consideration. Here, some may be same as others have already consulted; some may be new not covered by others. This new research then usually identifies new aspects of the topic that have emerged which the others have not consulted or was not of interest to them.

In the above example concerning use of various sources, it can be seen that research is based initially on the analysis of primary sources, guided by the perspectives on the topic which already existed via secondary source and the Tertiary sources only provide only a general overview on the topic.

6. Primary Sources

Primary means 'earliest', 'original' and any such source is a primary source of information. UNESCO (1968) defines a primary publication as 'an original scientific paper describing new research, techniques or apparatus.' Primary does not mean superior. It refers to the creation by the primary players, and is distinguished from a secondary source, which is a historical work, like a scholarly book or article, built up from primary sources.

Primary sources are those sources which contain original information. Primary sources include new raw data, new interpretation of previously known facts or idea, any new observation or experiment, etc. Primary sources are those sources which contain original information that has been published, reported or recorded for the first time. Primary sources include raw data, new interpretation of previously known facts or idea, any new observation or experiment, etc. Information tends to be latest and comes out in the form of an article in a periodical, monograph, research report, patent, dissertations, reprint of an article or some other work. By its very nature, the primary sources of information are widely scattered and it is difficult to locate the information contained in them.

Primary sources are original material son which other research is based. They are from the time period involved and have not been filtered through interpretation or evaluation. They are usually the first formal appearance of results in physical, print or electronic format and present original thinking, report a discovery, or share new information. Primary sources allow researchers to get as close as possible to original ideas, events, and empirical research as possible. Such sources may include creative works, first hand or contemporary accounts of events, and the publication of the results of empirical observations or research. Primary Sources are original materials from the time period involved, and have not been filtered, influenced or analysed through interpretation. They bring us as close to the original eventor thought as possible.

6.1 Characteristics of Primary Sources

Characteristics of primary sources are:

- Primary sources can either be first-hand observation/analysis, or accounts contemporary with the events described.
- Primary sources document events, people, and viewpoint of the particular time.
- When research is more periods- based, rather than based on sequence of events, scope of possible primary sources broadens considerably.
- Primary sources represent a researcher's perspective which has to be used with secondary or tertiary sources to broaden the views through which the researcher is looking at an event, era, or phenomenon.
- It is important while using any documentary source as a primary source that the user/researcher has knowledge of or is aware and sensitive to the bias of the person/expert/researcher who created the primary source, and also to the broader cultural biases of the time (period) in which the primary source was created.
- The researcher's perspective, or the arguments or points for which a researcher plans to use a primary source as evidence, is significant in determining what sources will be primary.
- Reproductions of primary sources remain primary for many research purposes.
- Some attributes are based more on the perspective represented in the source and context in which the source is being used by researcher.

6.2 Problems of Primary Sources

Primary sources are widely scattered and are available in such a large number that it is extremely difficult to keep track of all that is published even in a single discipline. To solve this problem, bibliographic control of these sources is required and it is always not possible for every kind of primary source. The widely scattered information in primary sources is constantly being compressed, organized and rearranged according to some definite plan and communicated through another set of publications called secondary sources of information.

When conducting research, researchers usually use both primary and secondary sources. However, while primary source documents are useful, every researcher should be aware of possible problems with them. Some major possible problems while using primary sources include bias and objectivity. Every document is biased, whether deliberately or unconsciously, by the point of view of the person who wrote it.

Another major problem with using primary sources is that they do not cover everything that a user might need to cover for a particular assignment. This is so because the user does not always get the entire context as it may have one person's point of view, or the reigning viewpoint of the time.

The problems that are mentioned above with regard to primary sources are that of perspective. That's why secondary sources are so important. We do not have to be the expert when using these sources; we simply have to be able to understand the interpretations that experts have deciphered. Then we have to form an opinion of those.

6.3 Examples of Primary Sources

As discussed above, primary sources are those sources which contain original information that has been published, reported or recorded for the first time. Primary sources are of varied type, large in number and are widely scattered. Some typical examples of primary sources of information are primary periodicals, newspapers, technical reports, dissertations, conference papers, patents, standards, etc.

6.3.1 Periodicals

A periodical is a publication with a distinctive title which appears at stated or regular intervals, without prior decision as to when the last issue shall appear. It contains articles, editorials, features, columns, stories or other writings, by several contributors. The periodicals are important sources for current information on any subject. UNESCO has defined a periodical as "a publication that constitutes one issue in a continuous series under the same title, published at regular or irregular intervals, over an indefinite period, individual issues in the series being numbered consecutively or each issue being dated."

The important aspect about the subject material of periodicals is that the latest or current information is provided to the readers through them. This library material upon receiving in the library is displayed prominently to the readers and is replaced by the subsequent new issues received by the library.

Periodicals are also referred to as serials or journals. Besides these, magazines are the most typical type of periodicals. Magazines are also like journals with each issue starting at page one but they are not academic or professional publications. These are not peer-reviewed.

6.3.1.1 Type of Periodicals

Periodicals are distinguished either on the basis of literary content contained in them or by their sponsoring institutions. The different types of periodicals are:

a.   Scholarly periodicals

This category of periodicals report original research or experimentation, often in specific academic disciplines. These are meant to increase knowledge in a field, give information concerning research findings, present new   ideas and to invite discussion. The targeted users are the scholarly researchers, faculty and students. It has articles written by experts in the field, and are signed. Most scholarly journals subject their articles to the peer review process prior to publication. Journals that employ the peer review process are also referred to as "refereed journals." The scholarly periodicals areusually published by professional or scholarly associations, research and academic institutions.

Examples: Indian Journal of History of Science, INSA; Journal of Organic Chemistry, ACS; International Journal of Research in Social Sciences, IJMRA

b.   Trade journals

The trade journals discuss practical information and concerns in a particular industry. They contain business news, product information, advertising, trends in technology, and law and are targeted at the professionals in that industry, or students researching that industry. Their purpose is to increase practical knowledge/information in an industry/profession, provide industry news, contacts and updates concerning the industry. The articles in trade journals are written by experts in a particular field for other experts in the same field and often include

colourful illustrations and advertisements. These publications do not involve a peer review process. Trade journals are published by trade or professional associations/organizations and corporate or commercial organizations.

Examples: Foreign Trade Review, Indian Trade Journal, Publishers Weekly, PC World, Auto India

c.   Popular and general interest periodicals

These   cover news, current events, hobbies, or special interests and   are targeted at the general public, and available to a broad audience. The articles or features are usually written by a member of the editorial staff or a free- lance writer.The language of the articles is mostly written for any educated audience, and does not assume familiarity with the subject matter. These periodicals contain advertisements; include many illustrations, often with large, glossy photographs and graphics for an aesthetically pleasing appearance. This category does not involve a peer review process.These are usually brought out by commercial organizations or specific interest groups.

Examples: Readers Digest, Newsweek, Time, Scientific American

As discussed above, periodicals published in three categories, are many in number and cover almost the whole of the universe of knowledge. They are published at various intervals. The frequency of a periodical may be daily, biweekly, fortnightly, monthly, bimonthly, quarterly, half-yearly, annual or irregular. Besides periodicity, a periodical publication also has a distinguishing number for each successive volume. This is known as its volume number and each individual issue carries an issue number.

The main feature of scholarly periodicals is that, the page numbers are consecutive throughout the volume. On the other hand, in other categories of periodicals, each issue begins with page one. The learned periodicals generally issue title page, contents and index when each volume is complete. These are supplied either with the last number of a volume or with the first number of the next volume. Some, but not all journals, are available on the Internet. Some electronic journals (or e-journals) just give you access to the table of contents (TOCs) and abstracts, whereas others give you access to the full text of the articles. Access depends on what the institution has paid for.

6.3.1.2 Advantages of Periodicals

- As these are published frequently, periodicals are the best sources for current information.
- Periodicals often contain information on the latest trends, products, research and theories.
- Current events are usually discussed in periodicals long before they become the subject of a book.
- Periodicals are the best source for ephemeral or very specialized information.
- They are portable and easy to handle physically.
- Periodicals exist for every field and every area of interest, providing access to a variety of hard-to find information.
- Due to the shorter length of periodical articles, more topics may be covered within one volume of a periodical than in one book.

6.3.2 Newspapers

A newspaper is not only a source of information; it's a storehouse of information.It is a scheduled publication containing news of current events, informative articles, diverse features, editorials, and advertising. It usually is printed on relatively inexpensive, low-grade papers known as the newsprint. It is a publication issued periodically, usually daily or weekly containing most recent news. Newspapers, thus, provide an excellent means of keeping well informed on current events. They also play a vital role in shaping of the public opinion.

Different library and information science expertsthink differently about newspapers being primary sources of information. In fact it depends to a great extent on the contents of the newspaper articles. Some newspaper articles are clearly primary sources. For example, a reporter's account of an event that he/ she witnessed first-hand (e.g., a natural phenomenon like an eclipse) is a primary source. Similarly, an opinion piece or a letter to the editor in a newspaper is primary source.However, some newspaper articles could be secondary sources. Most newspaper stories are written by reporters or special correspondents who have gathered information from witnesses or participants in a newsworthy event, so the story's content is second-hand news and thus a secondary source. If someone who actually took part in the event and wrote the story, that would be a first- hand resource. For example, if a climber who personally climbed Mt. Everest wrote an account about the climb and the new equipment used in the process that would be first hand news concerning the climb and the evaluation of the equipment. This is a primary source of information.

Newspapers usually meet the following four criteria:

- Accessibility: Its contents are reasonably accessible to the public.
- Periodicity: It is published at regular intervals.
- Currency: Its information is up to date.
- Universality: It covers a range of topics.

Newspapers are available in various categories as below:

a. Daily newspaper – issued every day.
    Examples: The Times of India, The Hindustan Times, The Hindu, The Economic Times.

b. Weekly or fortnightly – published once a week or fortnight.
    Example of Weekly: The Newage Reporter, Union Times Today, Sadbhavana Times
    Example of Fortnightly: Northeast Mail, NGO India

c. National – a newspaper that has national focus and circulates throughout the country.
    Examples: The New York Times, The Hindustan Times, The Times of India

d. International – a newspaper having international editions.
    Examples: The International New York Times, The Daily Telegraph, The International Herald Tribune, The Wall Street Journal Asia

e. Online – most printed newspapers these days have online editions too.
    Examples: Times of India, The Hindu, Business Standard, The New York Times

f. Some newspapers have only the web-based editions.
   Examples: The Yorkshire Times, Atlantic Highlands Herald, Southport Reporter
Most modern newspapers are in one of the three sizes:

- Broadsheets: 600mm X 380 mm (23 X 15 inches)
- Tabloids: half the size of broadsheets at 380 mm X 300 mm (15 X 11 ¾ inches)
- Berliner or Midi: 470 mm X 315 mm (18 ½ X 12 ¼ inches)

The newspapers contain the world, national, state and local news. They carry editorials, opinion columns, featured articles and entertainment items. Very often, the news items or the stories are also supported by illustrations and photographs. A lot of newspapers bring out glossy and coloured supplements too in order to attract more readers. Some, but not all journals, are available on the Internet. Some electronic journals (or e-journals) just give access to the table of contents (TOCs) and abstracts, whereas others give access to the full text of the articles. Access depends on what the subscribing institution has paid for.

6.3.2.1 Advantages of Newspapers

There are several benefits of newspapers as primary sources of information.

- Newspapers are less expensive than other primary information sources.
- In contrast to some Internet resources, most newspaper articles have been well-researched, written with reliable sources and edited for accuracy.
- Newspapers are also more widely available, most convenience, available in categories and easy to search for information.
- Many newspapers in large metropolitan cities have weekly supplements in specialised areas, with more opinion-based articles and lists of local events.

6.3.2.2 Disadvantages of Newspapers

For many users, there are some drawbacks too of newspapers as well. With newspapers, it's impossible to communicate events in real-time. As newspapers must go through the process of producing content, printing, and distributing the finished paper, articles/features that were written the previous night before may be out of date by the time they reach the readers the next morning. Some newspapers can be biased, depending on what kind of organisation(s) they are owned by. The process of producing newspapers is considered a waste of paper and energy resources as most of the papers also available online. Lastly, in today's fast world, the news is transmitted using many other faster mediums than newspapers like internet.

6.3.3 Technical Reports

A technical report is a formal report designed to convey technical information in a clear and easily accessible format. It is usually a document written on any field of knowledge by a researcher detailing the results of a project. It provides information on a technical topic but in such a way that is adapted for a particular audience that has specific needs for that information. It is divided into sections which allow different readers to access different levels of information. Technical reports are mostly required in the field of science and technology

as in these fields, the researchers usually need information that is current and at times not even published in journals.

The technical report provides background on a topic, for example, cloud computing, global warming, biodegradation, eating disorders, etc. However, the information on the topic is not just for anybody who might be interested in the topic, but for some individual or group that has specific needs for it and is even willing to pay for that information. For example, an entrepreneur needs to set up a fruit processing industry in a particular region. For this he needs to have general knowledge about available fruits in the region season-wise, available options, manpower availability and the technologies used to start it, but they do not want to go digging in a library to find it. What he need sis a technical background report on the subject.

Although technical reports are very heterogeneous, they possess the following characteristics:

- Technical reports may be published before the corresponding journal literature.
- Contents may be more detailed than the corresponding journal literature, although there may be less background information as most of the readers already know it.
- Technical reports are usually not peer reviewed unless the report is separately published as journal literature.
- Reports carrying classified contentsusually have limited access.
- Technical terminology and acronyms are frequently used.

Technical reports can be very useful sources of information about results or on the progress of research as they are published more quickly than journals and are often very detailed.

Examples:

Wood, Alan: Software Reliability Growth Models. Tandom Technical Report, HP Labs, 1996.

Bin Fan, Algorithmic Engineering Towards More Efficient Key-Value Systems. Computer Science Technical Reports 2013, School of Computer Science, Carnegie Mellon University, Pittsburgh.

6.3.4 Dissertations and Theses

A dissertation or thesis is a document submitted in support of an academic degree presenting the author's research and findings. Its purpose is to inform and present scholarly information. This category of documents is usually collected by academic or special libraries as they contain results of original research. In present times, besides a printed copy, most of the dissertations are also submitted in electronic form.A thesis/dissertation can be new data on an important issue; an innovative data collection method; an analysis of existing data sets in new ways to answer new and important questions; or a derivation of new research methods and a demonstration of their usefulness.The objective is to help the student learn how to think through and investigate a research question. The thesis/dissertation should show competence in the development, implementation and reporting of a research project.

6.3.4.1 Difference between Dissertation and Thesis

People are often confused with the differences between a Thesis and a Dissertation.Some universities consider both thesis and dissertation as similar. Even the dictionaries would define them as somewhat similar. The standard dictionary defines Thesis and Dissertation as follows - "A dissertation is a long formal piece of writing on a particular subject, especially for a university degree," and "A thesis is a long piece of writing based on your own ideas and research that you do as part of a university degree, especially a higher degree such as a PhD." The Dictionary thus defines both thesis and dissertation to be likely similar to each other. But there are broad features that distinguish them apart. A thesis involves conducting original research. A dissertation is usually done with already existing research work which may require the researcher to add own thoughts to it.

Examples:

Murali D.: Studies on p53 and its role in cell proliferation, athesis submitted to the Centre for Cellular and Molecular Biology, Jawaharlal Nehru University, New Delhi for award of doctorate degree. 2014.

Khurana, Poonam: Role of ethics in personal, team and organisational effectiveness, a thesis submitted to Department of Management Studies, University of Delhi, Delhi for award of doctorate degree. 2013.

Chopra, Shika: SMART Materials and Structures: a survey of published literature, a dissertation submitted for award of Associateship in Information Science, INSDOC (NISCAIR).

6.3.5 Conference Papers

A conference is a meeting where people in specific subject fields get together and share information by having discussions, presenting papers, posters, etc. There are thousands of different conferences held every year all over the world. Reports/proceedings of a conference provide information about a conference and are also the published form of the papers that were presented at the conference. Conference papers and proceedings can provide very useful information. They usually contain the latest and newest research and findings by specialists in a particular field.

Papers from conferences organised by learned societies or associations (sometimes called symposia, workshops) are often published as 'Proceedings of ... conference'. They are usually published in book format, sometimes in a number of volumes depending on how many papers were presented or submitted. They are useful sources ofprimary information, as they present research at an early stage, before journal articles have been published.

Examples:

Proceedings of the National Academy of Sciences, India Section A: Physical Sciences. Springer India, New Delhi. 2014.

57th All India Library Conference Proceedings on "Knowledge Society : Innovations in Librarianship (ILAKSIL 2012), Edited by B. Ramesha,SanjeevDutt Sharma, O.N. Chaubey, N.S. Shokeen, B.K. Vishala, Anuradha Gupta.

Proceedings of 8th International Convention CALIBER-2011, Goa University, Goa, 2-4 March, 2011.

6.3.6 Patents

A patent is defined as 'a government authority or licence conferring a right or title for a set period, especially the sole right to exclude others from making, using, or selling an invention.' It is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. It is means to protect intellectual property rights. Patents are considered a unique source of information for scientific and technical information because a granted patent gives the patentee an exclusive right over his/her invention and he/she is able to try to stop anyone who uses it without permission. Although patent infringement is not a criminal offence, but patentee can enforce the patent rights by taking a legal action under civil law.

6.3.6.1 Advantages of Patents

According to World Intellectual Property Organization (WIPO), patent documents have following advantages as sources of information.

- They contain information which is often not divulged in any other form of literature.
- They have a relatively standardized format including abstract, bibliographic information, a description of, and in most cases also drawings illustrating the invention and full details on the applicant.
- They are classified according to technical fields.
- They provide examples of industrial applicability of an invention.
- They cover practically every field of technology.

Examples:

A K Singh, N K Pandy, A K Gupta: A composition of insulating fluid and process for the preparation thereof. Granted in India on 15/06/2012.

A K Singh, O N Anand, A K Gupta: A process for medial working fluid from heavy alkylate. Granted in Canada on 11/10/2011.

6.3.7 Standards

A standard is a document that provides rules or guidelines to achieve order in a given context. We use standards in our daily life for most of the chores and activities, for example, in everyday commodities, communications, media, healthcare, transport, construction, libraries, etc. According to British Standards Institution, 'a standard is an agreed way of doing something. It could be about making a product, managing a process, delivering a service or supplying materials – standards can cover a huge range of activities undertaken by organizations and used by their customers.' Standards thus are documents prepared by an authority to specify a product, material, process, quality, etc. Initially used first for industrial products, these later began being used by services sector. The purpose of these documents is to maintain quality control and efficiency. They provide guidelines for standardization in products and activities. Standards enable us to exchange products or services with other organizations. Some organizations that provide standards internationally and nationally are International Organization for Standardization (ISO), National Information Standards Organisation (NISO) and Bureau of Indian Standards (BSI).

Standards cover several subjects like computers, construction and building safety, library activities and library equipment, etc. Standards are produced for many different products and services, and may be created for company, national, regional or global application. They may be used on a voluntary basis, or made mandatory by company policy, national or international regulation, or by law. They can be very specific or a particular type of product or general such as management practices. A standard, therefore, provides a reliable basis for people to share the same expectations about a product or service. This helps to facilitate trade; provide a framework for achieving economies, efficiencies and interoperability; and enhance consumer protection and confidence.

Standards are very useful for modern society as if we do not have any knowledge of standards the products might not work as expected, might be of inferior quality, incompatible with other equipment, non-standardized products may be dangerous, consumers will be forced to buy from one manufacturer or supplier, and due to lack of competition manufacturers may exploit consumers.

Examples:

IS 5835:1970: Method for estimation of Vitamin D in foodstuffs, 2010.

IS 4579:1968 Methods of measurements on television picture tubes, 2013.

ISO 2709: Standard for Bibliographic Record Formats. 2008.

6.3.8 Trade and Product Bulletins

Trade and product bulletins are information products brought out by the publishers, manufacturers and distributors of various types of materials, products or services. Trade and product bulletins cover every kind of material, product or service ranging from books, drugs, chemicals, household goods to complex machinery and equipment used in research and industry. The basic purpose of this type of trade literature is to describe various attributes of the product, material or service and promote its sale to the potential customers. Trade and product bulletin are primary sources of information and information reported about specific commercial product is not likely to be published in any other form of literature.

Examples:

Foreign Trade Enquiries Bulletin, Spice Board of India

Purolite Product Bulletin, ThePurolite Company, USA

Phenol Product Information Bulletin, Shell Chemicals, USA

6.3.9 Other Primary Sources

Researchers consult primary sources in pursuit of new material or knowledge which has not been reported or searched by others. We often think of primary sources as being written or as documentary sources, but they may also be in other forms, including interviews, recordings,

paintings, or even computer software, e-mail correspondence and web pages. Examples of primary sources others than those discussed above include:

- Personal papers
- Letters (both personal and business)
- Diaries (both personal and business)
- Photographs & paintings, sketches, original maps, etc.
- Advertisements, posters, and banners
- Memoirs
- Genealogy records, both personal/family and from public records
- News footage (newsreels, videotapes or audiotapes, etc.)
- Newspaper articles written at time of the event
- Speeches
- Oral histories
- Minutes of meetings related to the event
- Legal cases, treaties
- Statistics, surveys, opinion polls, scientific data, transcripts
- Records of organizations and government agencies
- Original works of literature, art or music
- Films, cartoons, postcards, posters, etc.
- Objects and artifacts that reflect the time period in which they were created(computer software, e-mail archives, web documents, etc.)
- Computer software, e-mail archives, websites, web documents, etc.

Besides the above, determining which kinds of documents to use which constitute primary sources depends upon the topic one is researching. Primary sources enable the researcher to get as close as possible to what actually happened during an event or time period. A primary source reflects the individual viewpoint of a particular topic or subject area. Many primary sources are unique and can only be found in very fewlibraries or collection in the world.

7. Secondary Sources

Secondary sources analyse, review, or summarize information contained in primary resources or other secondary resources. Even sources presenting facts or descriptions about events are secondary unless they are based on direct participation or observation. Moreover, secondary sources often rely on other secondary sources and standard disciplinary methods to reach results, and they provide the principle sources of analysis about primary sources.Secondary Sources build on the primary sources with more extensive and in-depth analyses. They summarize, evaluate, and analytically interpret primary material, often by offering a personal perspective. It is thus one step removed from the original source.

A secondary source, therefore, provides "second-hand" information that has been digested, analysed, reworded or interpreted, and often combines information taken from primary sources and even other secondary sources.They are mostly dependent upon primary sources of information for their existence. Secondary sources are often written well after the events they report on, and can put past information into its historical context. In a secondary source, the impressions and experiences of other works are reported. Their main advantage is that they usually present the contents of primary documents in condensed form or list them in a helpful way so that existence of primary documents is known and access to them is made

easy. For example in sciences, a primary source is a journal article where a scientist describes his research work on the subject 'Cloud Computing.' A secondary source would be a review article commenting or analysing the various scientists' research on the subject 'Cloud Computing.'

7.1 Need for Secondary Sources

In a secondary source, the impressions and experiences of other works are reported. They are required for most of the researcher and library professionals as these:

- Present the contents of primary documents in condensed form or list them in a helpful way so that existence of primary documents is known and access to them is made easy.

- Help to get expert opinions in order to evaluate what the primary sources really contain.

- Enable to gain insight by examining the same content from different perspectives.

- Assist the researchers to form own opinion.

- Save reading time of users by collecting information from a number of different sources.

- Can broaden a user's perspective and research.

7.2 Category of Secondary Sources

Based on the reorganization of information in these sources, the secondary sources can be grouped under following categories:

7.2.1 Books

A book is defined as a written or printed literary work, which is separately published and has an independent physical existence, with pages fastened along one side and encased between protective covers. In many libraries, books are referred to as monographs. UNESCO defines a book as 'a bound non-periodical publication having 49 or more pages, exclusive of cover pages, published in a country and made available to the public.

In other words, a book is a document that normally deals with one particular subject having continuous thought content. Most books have a protective cover. Books are reasonably inexpensive and convenient to store, transport and find knowledge and information. The book thus ranks as one of the humanity's greatest inventions. People have used books in the same form for over 5,000 years. Although most books in libraries are usually bound with hard covers, paperbacks are also becoming popular now. A book can be simple or composite, single-volume or multiple-volume, a general book, a text-book or a reference book.

7.2.1.1 Text Books

A book supporting any teaching programme or belonging to some course curricula is referred to as a text book.There are several definitions for textbooks, one common definition is that a textbook is a printed and bound artefact for a course of study. They contain facts and ideas around a certain subject. They have been used to aid teaching as these are not just teaching and learning objects but are documents that hold content that reflects the vision of a specific group. Although their presentation has changed over the years, their main goal has remained the same, i.e., to help build the platform of knowledge for students.Although most textbooks are only published in printed format, many are now available as online electronic books.

A textbook is a secondary source as a primary source is a work of the research done by a scholar. A textbook combines a number of pieces of research reports into one united book. Instead of reading a hundred books on a subject, the users read the summary provided in one single books or a few of those few books.

Examples:

G. Edward Evansand Patricia Layzell Ward: Management Basics for Information Professionals. Neal Schuman Publishers, 2007.

Arlene G. Taylor: Introduction to Cataloging and Classification (Library and Information Science Text Series). Libraries Unlimited, 2006.

7.2.2 Reference Books

The Merriam-Webster Dictionary defines reference books as 'a book (as a dictionary, encyclopaedia, and atlas) intended primarily for consultation rather than for consecutive reading' and also 'a library book that may be used on the premises but may not be taken out.'Another definition by Business Dictionary is reference books are, 'Atlas, dictionary, directory, encyclopaedia, handbook, thesaurus, or any other workdesigned to be used in finding specific items of information, rather than for cover to cover reading.'

Some unique features of reference books are that:

- These are looked up rather than reading from beginning to end.
- Reference sources provide a representation based upon which we proceed with retrieval of information from another source (mostly primary).
- They are information source that provides access to organized information.
- Reference collection specifically serves to address information queries.

From the above we can conclude that the reference books are those sources that are referred to only for referencing. Most popular reference sources containing information are-encyclopedias, almanacs, dictionaries, directories, handbooks, yearbooks, atlases, government information, statistical sources, etc.

For further details of reference sources, independent Modules devoted to most of the above mentioned reference sources may be consulted. (Paper: Information Sources, Systems and Services - Module nos. 4, 5, 6, 7, 8, 9, 11)

7.2.3 Indexing/Abstracting Periodicals

Secondary periodicals regularly scan the literature published in primary sources, select the relevant items, arrange them in helpful sequence and bring them to the notice of researchers at regular intervals, viz. weekly, fortnightly, monthly or quarterly interval basis. These publications contain bibliographical references of each item with or without abstracts. A secondary periodical with abstract is an abstracting periodical and without abstract is an indexing periodical. These publications bring together recently published literature in specific subject discipline scattered over wide range of primary sources. The researchers, however, need indexes, firstly, to keep them abreast of the literature of their field, and secondly, to serve for retrospective searches of all the literature appropriate to their subject.

Secondary publications list and arrange the relevant items from the primary documents for easy and quick access. For instance, indexing and abstracting periodicals systematically scan the current primary sources of information (like primary periodicals, research reports, conference proceedings, etc.) on a particular subject field, select the relevant items, index (or provide brief summary of) each item, and arrange it in a helpful sequence so that each item can be easily located and identified. Indexing and abstracting periodicals are brought out at regular intervals and keep users abreast of the current literature on a subject and serve as important guides to the primary literature. Without these secondary sources, a large part of primary literature may remain unknown and unused. Indexing and abstracting periodicals are available in every subject field. At present most of the national as well as international indexing and abstracting periodicals are available in print form, CD-ROM and online on the web.

7.2.3.1 Indexing Periodicals

In indexing periodicals the relevant items with full bibliographical details are selected from primary sources and are arranged either under broad subject headings or under class numbers. This arrangement brings all the items on the same subject together. Bibliographical details help the reader to identify and locate the original document. For example, if the document is a journal article, bibliographical details will provide the name(s) of the author(s), title of the article, title of the journal, its volume number, issue number, year of publication and the page numbers of the article. The indexing periodical also provides author and subject indexes of the items covered.

Indexing periodicals are of following three types:

a. **General Indexing Periodicals:** These indexing services cover various periodicals in a wide field of knowledge. The coverage is not limited to single subjects and several subjects are covered in this category.
    Example: Humanities Abstracts (H.W. Wilson), Current Contents (Thomson Reuters)

b. **Subject Indexing Periodicals:** This category covers the various documents in a narrow field or subject area that includes besides periodicals, new books, pamphlets, conference proceedings, reports, etc.
    Example: Applied Science & Technology Index (H.W. Wilson), Library Literature and Information Science Index (H.W. Wilson).

c. **Indexes to Individual Periodicals:** These indexing services belong toa single periodical and are usually issued on an annual basis.
    Example: Guide to Indian Periodical Literature: Social Sciences and Humanities (Indian Documentation Service).

7.2.3.2 Abstracting Periodicals

In abstracting periodical, the contents of the selected items are condensed or summarized (called abstracts) along with bibliographical details of the documents. Bibliographical details of the documents help the users to identify and locate the original documents. The abstracts of the documents enable the users to make decisions regarding accessing the full documents. At times a well prepared abstract serves as substitute for the original document. Abstracting periodicals also provide author and subject indexes.

Examples:

Chemical Abstracts (Chemical Abstracts Service), Biological Abstracts (BIOSIS, Thomson Reuters)

Further details on Indexing/abstracting periodicals are available in Paper 2: Information Sources, Systems and Services - Module no. 10.

7.2.4 Bibliographies

A Bibliography is defined as 'acompleteorselectivelistofworkscompileduponsomecommonprinciple, as authorship, subject, place of publication, or printer' (Dictionary.com). In other words, it is a systematic list of documents that share a common factor that may be subject, a language, a period, an author or some other criteria. The list may be comprehensive or selective. The list is arranged by some order. Such bibliography, known as enumerative or systematic bibliography, attempts to record or list. Each entry provides bibliographical details of the document.

Bibliography is considered as a secondary source of information as it is a systematic compilation of already produced primary sources of information. Bibliographies have a vital role for users as they help to retrieve relevant information and thus save the time of the user. They bridge the gap between the original document and the user acting as a key to the treasure of primary knowledge.

Bibliographies help to identify important and relevant sources on a topic, find what research has already been done on a topic, find articles and books written by or about a particular person and find out where to look for relevant information. Bibliographies are available as national bibliographies, trade bibliographies and subject bibliographies.

Examples:

The British National Bibliography (BNB) lists the books and new journal titles published or distributed in the United Kingdom and Ireland since 1950.

American Book Publishing Record® provides immediate access to the cataloguing records for the entire year of the books published or distributed in the United States.

Books in Print, United States

Further details on Bibliographies are available in Paper 2: Information Sources, Systems and Services - Module no. 9.

7.2.5 Survey Publications

When plenty of information is available on certain subjects, survey publications which are prepared as a result of information consolidation are found to be the possible solution. These are usually in the form of reviews, state-of-the-art reports, trend reports and technical digests. These publications survey the selected portion of primary literature and provide an overview of the subject or highlight significant literature on the subject (e.g., Treatises) or depict the progress of a particular field of study (e.g., Annual Reviews, advances,etc.) or present the contents of primary literature on a subject in easy and understandable form keeping in view the particular group of users (e.g., Couse material, Instructional books, etc.).

Examples:

Annual Review of Financial Economics, 2009-

Advances in Electrical and Computer Engineering, 2001-14

George Reisman—Capitalism: A Treatise on Economics

State-of-the-Art Reporton Fiber Reinforced Concrete, 2002.

8. Tertiary Sources

Tertiary sources are based on primary and secondary sources of information and serve as key to the primary and secondary sources. Tertiary sources are usually compilation from primary or secondary sources and help the searcher to select required primary or secondary source which will be most relevant for his purpose. These publications do not carry subject information but guide the users to the source where information on that subject will be available. Tertiary sources are usually not credited to a particular author.

In the order of appearance, first primary sources are published, and then based on primary sources, secondary sources are compiled. Tertiary sources are third in the order of appearance and these sources are based on primary as well secondary sources and serve as guide to primary as well secondary sources.

Tertiary sources consist of information which is a distillation and collection of primary and secondary sources. Tertiary sources provide overview of topics by synthesizing information gathered from other resources and often provide data in a convenient form or provide information with context by which to interpret it. The information is compiled and digested into factual representation, so that it does not obviously reflect points of view, critiques or persuasions. Tertiary sources are typically the last to be published in the information cycle. Under tertiary sources of information come publications like 'guide to the literature', 'guides to the reference sources', bibliography of bibliographies, etc. Other examples of tertiary sources are the almanacs, directories, handbooks, guides, manuals, etc. Textbooks are also considered by some information scientists as tertiary sources. Some reference materials and textbooks are considered tertiary sources when their chief purpose is to list, summarize or simply repackage ideas or other information. As tertiary sources, encyclopaedias and textbooks attempt to summarize and consolidate the source materials into an overview, but may also present subjective commentary and analysis (which are characteristics of secondary choices).However, most information scientists categorise textbooks as secondary sources only and these have been discussed in the previous section.

The various tertiary sources are explained in the following sections.

8.1 Almanacs

Almanacs, originally a calendar with notations of astronomical and other data have been known in simple form almost since the invention of writing, for they served to record religious feasts, seasonal changes, and the like. Present day almanacs include a comprehensive presentation of statistical and descriptive data covering the entire world. Major topics covered are geography, government, demographic data, agriculture, economics and business, health and medicine, S&T, transport, sports, awards and prizes. Contents also include articles focusing on events of previous year as well as summary of recent events. The present almanacs are more like yearbooks as both depend on government sources for statistical data. The only differencebeing that almanacs present astronomical data, which is absent in the yearbooks.Almanacs are brought out annually.

Examples:

Kalnirnay (India)

Whitaker's Almanack (United Kingdom)

Astronomical Almanac (USA)

8.2 Handbooks

A handbook is defined as a comprehensive and detailed work on a particular topic for practitioners, structured for quick reference and often used as a supplement to a text book. Handbooks are collection of useful information, combining some of the features of both a dictionary and an encyclopaedia. It is also a publication that reviews available information concentrating on critical data and/or guidelines for accepted and tested procedures, techniques, processes and standards. Here critical data refers to chemical structures, mathematical formulae and other such data. Handbooks are very popular and have widespread uses, particularly in science, technology, industry, manufacturing, healthcare and other related subject areas.

Professional organizations usually produce a variety of handbooks ranging from short, duplicated or photocopied set of regulations to glossy multi-coloured reports. These are produced for different type of users such as technical personnel, office staff, industrial workers, shareholders of a company, etc. Certain handbooks are brought out for general information, for example, history of the organization, and certain only for the benefit of the employees, for example, set of rules.

Examples:

MLA Handbook for Writers of Research Papers, 7th ed., 2009

Perry's Chemical Engineers' Handbook, 8th ed. 2007

CRC Handbook of Chemistry and Physics, 92nd ed. 2011

Saracevic (Tefko) and Wood (J B): Consolidation of Information, A Handbook on Evaluation, Restructuring & Repackaging Of Scientific & Technical Information. UNESCO, 1981.

8.3 Manuals

Manual is defined as a document with instructions, especially for operating a machine or learning a subject or performing an operation. A manual is a concise reference handbook dealing with a particular process, procedure, operation, mechanism, job instruction, etc. It is essentially a how-to-do-it document prepared with meticulous care containing details of the concerned subject-matter. It explains howa certain things happen or how a particular job should be done.

Manuals are of different kinds dealing with various jobs, functions of descriptions. An examination of various kinds of available manuals in the present day professional world indicates that they can be classified into three main categories, namely, Technical Manual, Procedure Manual and Laboratory Manual. Plenty of manuals related to company products, automobiles, softwares, etc. are available online and can be downloaded freely.

Examples:

PHP Manual, 2014

Merck Manual of Medical Information–Home Edition, 2nd ed. 2003

Sony Manuals

8.4 Directories

A directory is a list of names and addresses of people and organizations. Directories are ready reference tools in the libraries that provide information related to individuals, organisations, institutions, etc. Entries in the directories are arranged in the alphabetic or classified order. Directories of persons cover name, address, status, experience, etc. of individuals. The directories of organisations or institutions contain name of the organisation, address, functions, objectives, activities and names, addresses, phone numbers, email id, etc. of the officials of the organisation. Directories are broadly categorized as General Directories and Special Directories. An example of General Directories is the telephone directory and examples of Special directories are professional, trade and business directories.

Examples:

Universities Handbook, 32nd ed. 2010
The Europa World of Learning 2013, 63rded.
Kothari Industrial Directory of India, 40thedition, 1996
IndiaMART- Indian Manufacturers Suppliers Exporters

8.5 Bibliography of Bibliographies

Bibliography of bibliographies is defined as a type of bibliography which includes information about bibliographical aids.It is a list of bibliographies listed in a systematic and logical order. It includes all types of bibliographies published in different fields. The listed bibliographies lead readers to useful bibliographies though various approaches.
Examples:

Bibliography of Bibliographies of the Languages of the World, Volume I: General and Indo-European languages of Europe. Compiled by Rudolph C. Troike. 1990.

P. William Filby: A Bibliography of American County Histories. 2002.

8.6 Guides to the Literature

The Guides to the Literature direct the users to appropriate sources in a particular field of knowledge. In each of the Guides to the Literature, we can find annotated bibliographies of books, journals, websites, databases, and other types of publications or information sources on specific topics. These can be useful when we cannot find desired information in other resources, or when attempting to comprehensively cover a topic. These guides also covers other literature guides; databases, and indexing and abstracting services; bibliographies; dictionaries, encyclopaedias, and handbooks; directories, guides, and other reference sources; Web-based reference sources; and associations and publishers. These guides are available in most of subject areas, especially in sciences and technology and are useful sources for any specific subject specific library or information organisation. Most of the major publishers bring out series of these guides.

Examples:

Schmidt, Diane: A Guide to Reference and Information Sources in Plant Biology.2006

Max Marmor and Alex Ross, Eds.: Guide to the Literature of Art History 2. 2004

Computer Science and Computing: A Guide to the Literature. 2006

Freides, Thelma: Literature and Bibliography of the Social Sciences. 1973

Directories of periodicals may also included in this category of tertiary sources. This is due to the reason that the Directories of Periodicals identify and describe the journals pertinent to a field of study. Their this function resembles that of guides to the literature as directories to periodicals do not point out any specific literature in a subject, but indicate the publications that are most likely to contain types of relevant material.

Examples:

World List of Social Science Periodicals, Unesco.

Ulrich's Periodicals Directory, 52nd ed. 2014

8.7 Guides to the Reference Sources

Reference sources provide answers to specific questions, such as brief facts, statistics, and technical instructions; provide background information; or direct users to additional information sources. In most libraries, reference sources are not circulated and are located in a separate reference collection. This practice makes reference sources readily available and easily accessible. However, at times, it becomes a little difficult for users and library staff too to identify suitable reference sources for particular activities. For this, there are sources that are required to direct us to the best reference sources by field or type of source (e.g.,

dictionary or encyclopaedia or biography or reviews, etc.). The Guides to Reference Sources enable us to identify the best possible reference sources for research needs. Like the guides to the literature, these guides cover reference sources in various subject fields arranges in helpful order to enable the users to search the relevant information sources.

Examples:

Guide to Reference Books, 11th ed. (Formerly referred to as Winchell (Constance) Guide to Reference Books.

Guide to Reference, online successor to Guide to Reference Books, is a selective guide to the best print and online reference sources since 2008.

Walford, Albert John. Walford's Guide to Reference Material.3volumes, 1998

Lester, Ray (Ed.)The New Walford Guide to Reference Resources. Vol. 1: Science, Technology and Medicine. 2005.

8.8 Union Catalogues

A union catalogue is a catalogue listing the holdings or part of holdings of two or more libraries. It may be local, regional or national and cover the book collection or periodical holding or any other part of the collection of the participating libraries. Their chief function is to serve as a tool for location of the library materials. They are to be updated regularly to indicate new additions to the libraries and also enable inter-library loan, thereby, being a major tool for resource sharing or networking. With the use of computer applications in modern libraries, it has become very convenient to use and maintain the union catalogues.

9. Distinction between Primary, Secondary and Tertiary Sources

The distinction between primary, secondary, and tertiary sources can be ambiguous and is not always clear. An individual document may be a primary source in one context and a secondary source in another. Depending on how or why it is being used, a secondary source may also be a primary source. As discussed in the previous sections, the 'Primary Sources' are original materials from the time period involved, and have not been filtered, influenced or analysed through interpretation. They bring us as close to the original event or thought as possible. The 'Secondary Sources' build on the primary sources with more extensive and in-depth analyses. Lastly, the 'Tertiary Sources' are distillations and collection of primary and secondary sources.

The distinction of these three sources is presented in the table below:

Source	Definitions	Timing Of Publication Cycle	Formats	Example
Primary	Sources that contain raw, original, interpreted and	Primary sources tend to come first in the publication	Research papers, preprints, letters, conference papers, diaries,correspondence,	Article in a Library and Information Science

	unevaluated information.	cycle.	fiction, poetry, newspaper articles about current events.	journal
Secondary	Sources that digest, analyse, evaluate and interpret the information contained within primary sources. They tend to be argumentative.	Secondary sources tend to come second in the publication cycle.	Indexing and abstracting periodicals, Bibliographies, Reference Books	Library and Information Science Abstracts (LISA)
Tertiary	Sources that compile, analyse, and digest secondary sources. They tend to be factual.	Tertiary sources are the last in the publication cycle.	Reference books like Encyclopaedias, Directories, Bibliographies of Bibliographies, Guides to Reference works, etc.	Ulrich Periodicals Directory

Examples from various subjects

Subjects	Primary	Secondary	Tertiary
Agriculture	Conference paper on Animal Nutrition	Review article on the current state of research in the field of Animal Nutrition	Encyclopaedia article on Animal Nutrition
Chemistry	Chemical patent	Chemical Abstracts	Table of Related reactions
Library Science	ISO 2709: Standard for Bibliographic Record Formats. 2008.	Progress in Librarianship	Walford's Guide to Library Material
Physics	Einstein's diary	Bibliography on Einstein	Bibliography of Bibliographies on Relativity

10. Summary

In this Module, we have discussed the information sources and categorised them based on their type, information contents and physical form. Information sources are of two types, namely, Documentary Sources and Non-Documentary Sources. All recorded sources are documentary sources. All non-recorded sources are non-documentary sources.Based on the Information content and organizational level, a documentary source may be primary, secondary or tertiary source.

Primary sources contain original information, are in large number and widely scattered. Primary periodicals, technical reports, dissertations and theses, patents and standards are primary sources of information. Secondary sources of information are based on primary sources and present the contents of primary sources in condensed form and list them in helpful way, so that the existence of primary documents is known and access to them is made easy. Secondary sources can be grouped as Indexing/Abstracting, Survey type and Reference type. The Tertiary sources of information are based on primary and secondary sources of information and act as key to the primary and secondary sources. Some reference materials and textbooks are considered tertiary sources when their chief purpose is to list, summarize or simply repackage ideas or other information.

The primary sources are easily identifiable as they are the original sources of any newly generated information. The secondary sources are less easily defined than primary sources. Generally, they are accounts written after the fact with the benefit of hindsight. They are interpretations and evaluations of primary sources. Secondary sources are not evidence, but rather commentary on and discussion of evidence. However, what some define as a secondary source, others define as a tertiary source as context is everything. The tertiary sources compile or digest other sources. Some reference materials and textbooks are considered tertiary sources when their chief purpose is to list, summarize or simply repackage ideas or other information.

Lastly, the distinction between the primary, secondary and tertiary sources has been discussed.

Tertiary sources of information are based on primary and secondary sources of information and act as key to the primary and secondary sources.

11. References

1. Cassel, Kay Ann, and Hiremath, Uma. Reference Information Services 21st Century: An Introduction. 2nd ed. London: Facet Publishing Inc, 2009.

2. Grogan (D J): Science and Technology: an introduction to the literature. 4th ed. London: Clive Bingley, 1992.

3. Katz (W A): Introduction to reference work. 8th ed. New York: McGraw-Hill, 2001. 2 V.

4. Kawatra, P S. Textbook of Information Science. New Delhi: APH Publishing Corp, 2000.

5. Lester (Ray), ed.:The New Walford Guide to reference resources. Vol. 1: Science, Technology and Medicine. London: Facet Publishing, 2005. xix, 827 p.

6. New Walford's Guide to Reference Resources. 3 volumes. London: Facet Publishing, 2005.