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Diversity of Information Sources in the Digital Age: An Overview

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Abstract

Modern tech savvy age is brimful with different types of information sources. Having a plethora of information sources at our fingertips, a user is does not knowing where to start, access, sort and select the best sources to his needs. Moreover, the amount of information in the sources can be vast and confusing. This paper provides a list of general types of print, electronic as well as online sources of information. An extensive review of literature has been carried out to achieve the objectives of the study. Various databases, websites and research articles have been accessed to retrieve the relevant information related to various sources. The study is highly applicable to information professionals and research scholars to locate the best sources of information that they may be in need of. Besides, it can also prove to be fruitful to academic libraries to categories modern sources of information into different types so that students can select and locate their related sources quickly and precisely.

Keywords: *Information source, books, journals, Internet, databases, electronic sources*

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INTRODUCTION

The beginning of information sources may be traced to man's earliest attempts to record thoughts, concepts, ideas, and events. Invention of printing machine by Johannes Gutenberg in 1452 has contributed immensely to printing industry. His invention has significantly changed the social, economic, political, educational, scientific, technological, and cultural activities of human beings. Further, advances in printing technology have led to information explosion.

Printed documents are published in a variety of forms. Marcum and George say that time was when ambitious scholars began their research by consulting the paper card catalogues and finding aids of their campus libraries, corresponding by mail with professors, librarians, and archivists elsewhere about available resources, and checking the bibliographies of already published, printed works [1]. Then they holed up in carrels in library stacks to study printed works available there and from others by interlibrary loan, hoping all the time for financial aid to travel to other repositories that contained needed books, journals, and paper documents. In the meantime, yesteryear's professors also put printed course materials physically on reserve in campus libraries for their students, who laboriously scribbled notes to take back to their dorms, where they penned or typed their course papers (making corrections with white-out), and stayed up late reading expensive, bulky textbooks to prepare for exams.

The arrival and proliferation of electronic resources and digital libraries has already influenced and changed the way faculty and scholars use print resources and traditional libraries. It has also sparked a new wave of literature on the perceptions and preferences of print and electronic resources. Researchers and faculty have different perceptions and preferences in their choices of print and electronic resources.

Electronic publishing has become a major topic in the world literature in recent years, particularly because of the developments in information technologies. Electronic publications are usually known as electronic sources of information. Dadzie reveals that electronic resources are invaluable research tools which complement print-based resources in any traditional library [2]. Electronic resources provide access to information that

might be restricted to the user because of geographical location or finances. They also provide access to current information as these are often updated frequently. Dhanavandan *et al.* state that electronic resources are one of the emerging environments in libraries and information communication in the competitive service [3]. E-resources usually consist of e-books, e-journals, articles, newspapers, theses, dissertations, databases and CD-ROMs, which are likely to be the alternative to the print media. Kumar and Singh believe that e-resources are quick to access, save time and keep up-to-date with the current happenings in the specific fields and related areas [4]. Further, electronic information plays a pivotal role in enhancing the research and development activities and improving the productivity of an individual. The electronic media offer unique advantage for information transfer, e.g., flexibility, rapid delivery, low cost, compact storage and interactivity. It may even displace print as a major media of dissemination in foreseeable future.

OBJECTIVES

The main objectives of the study are:

1. To explore various print and electronic sources.
2. To classify various information sources into different types.
3. To provide a list of identified information sources available in print as well as electronic formats.

METHODOLOGY

An extensive review of literature has been carried out to achieve the objectives of the study. Various databases, websites and research articles have been accessed to retrieve the relevant information related to various sources. In order to classify information sources, various reputed University websites (like University of Illinois, The state University of New York, etc.) and reputed research articles have been accessed. In order to gain more authenticity, various subject experts have been also consulted.

SOURCES OF INFORMATION

Documents enable us to transfer information from one generation to another; also from one place to another. Invention of printing machine by Johannes Gutenberg in 1452 has contributed immensely to printing industry and has significantly changed the social, economic, political, educational, scientific, technological, and cultural activities of human beings. Further, advances in printing technology have led to information explosion [5]. An enormous amount of information is currently available within various information sources in the universe of knowledge and its quantity is remarkably growing. It has turned out to be a challenge to locate accurate and relevant information to meet one's needs. To fulfill the demand, various types of information sources have evolved that too in varied formats. An information source is a source that might inform a person about something or provide knowledge about it. Information specialists and professionals have divided these sources into different categories in accordance with the nature, originality, frequency of publication and the related characteristic. The main categories/types in which the information sources can be divided are as:

- ✓ According to the originality of information, the sources of information can be divided into:

Primary Sources

These are original materials which have not been filtered through interpretation, condensation, or, often, even evaluation by a second party; for example, journal articles, monographs, reports, patents, theses, diaries, letters, photographs, poems [6]. While as, according to TEXAS A&M University Libraries, (2010), a primary source is an original work created by a person who was directly involved in the subject of the work. Primary sources give you first-hand information. Your instructors will usually want you to use primary sources for your assignments. Primary sources include things like:

- Diaries
- Letters
- Autobiographies
- Art objects
- Research articles written by those who performed the research
- Artifacts
- Interviews
- Blog posts
- Newspaper article written by a reporter who witnessed the event

Secondary Sources

A secondary source is information about primary or original information, which usually has been modified, selected, or rearranged for a specific purpose or audience. It is not always easy to discern the difference between primary and secondary sources. Examples include biographies, histories, monographs, review articles, textbooks, and any index or bibliography used to locate primary sources [6]. While as The State University of New York [7] states that the secondary source is a second-hand account; it is the researcher-author's original thinking based on primary sources. Secondary sources interpret concepts. They are used to inform and substantiate a researcher's interpretation of the evidence. Examples include:

- Scholarly books (monographs) or articles
- Some non-scholarly books and articles
- Some documentaries

Tertiary Sources

These consist of information, which is a distillation and collection of primary and secondary sources. Twice removed from the original, they include encyclopedias, fact books and almanacs, guides and handbooks. Some secondary sources such as indexing and abstracting tools can also be considered tertiary sources [6].

Halder *et al.* [8] also state that information finds its way into different types of sources: (1) primary sources such as periodicals, research reports, conference proceedings, and theses; (2) secondary sources such as periodicals, reviews of progress, reference books, and textbooks; and (3) tertiary sources such as yearbooks and directories, bibliographies, guides to the literature, and guides to organizations.

The State University of New York [7] has categorized the sources of information on the basis of use in research as:

- **Articles, Online and in Print** – Scholars publish their latest findings in articles, which are published in periodicals. Articles cover topics that are important, but not broad enough to fill a whole book.
- **Newspaper Articles, editorials** – Journalists (who are usually not subject experts) write articles based on interviews and press releases. Investigative reports, as their name suggests, may also involve some research. Editorials are based on opinions.
- **Books, e-Books** – Also called monographs. Scholars write monographs after they have done many years of study on a topic and have a lot to say about it. The information is not as recent as the information in articles, but it is usually much more in-depth.
- **Dissertations, Theses** – Graduate students write these at the conclusion of their graduate studies. A dissertation or thesis has to be original research, so it is very cutting-edge when it comes out. Also, because the topics are obscure, a dissertation or thesis may be the only source that actually talks about that topic in that way.
- **Conference Proceedings** – Scholars get together and present their latest research to one another. It is less formal than a published article, and it is not peer reviewed, but the information may be newer and may not yet be available in articles or books.
- **Websites** – Government agencies, organizations and companies make reports, white papers, articles and data available on the Web. Libraries, archives and museums digitize primary sources – documents, scanned images, audio and video recordings and photographs of artifacts.
- **Microform** – Many libraries have microfilm or microfiche archives of primary sources such as old newspapers and census records.
- **Images** – Available in online archives and databases, images may also be photocopied out of art books and print journals, or printed from microfilm machines.
- **Videos** – Documentaries and other kinds of films may be used as primary sources for research and are available in a variety of formats, such as reel-to-reel, VHS, DVD, streaming online video and online video recordings.
- **Audio** – Audio-books, music and spoken art forms may be used as primary sources

and are available in a variety of formats, such as records, tapes, CDs, streaming online audio and online audio recordings.

On the basis of physical nature, there are mainly two types of information sources. They are: documentary and non-documentary.

1. **Documentary sources:** A document constitutes embodied thought which is a record of work on paper or other material fit for physical handling, transport across space and preservation through time. It may include manuscripts, handwritten and engraved materials including printed books, periodicals, microforms, photographs, gramophone records, tape records, etc. [9].
2. **Non-documentary Sources:** The non-documentary sources of information are live sources which are extremely important in the process of communication. The non-documentary sources of information include government establishments, departments, universities, technological institutions, data centers, information centers, referral centers, clearing houses, consultants, technological gatekeepers, etc. Non documentary sources of information also include discussion with colleagues, visitors, participants of seminars and conferences, etc. [9].

S. R. Ranganathan Classification: Based on the physical characteristics of documents, S. R. Ranganathan classified documentary sources of information into four categories. These also reflect the chronological order of their development. They are:

i) Conventional: Books, periodicals, map, etc.
ii) Neo-conventional: Standards, specifications, patents, etc.
iii) Non-conventional: Audio visual, microcopy, etc.
iv) Meta document: Direct records unmediated by human mind [8].

Further, The State University of New York, [7] has divided the information on the basis of origin into:

1. Current resources are contemporary resources that have been created, published or updated recently enough to be considered up-to-date.
2. Retrospective (historical) resources are the sources that are older in origin. These sources are usually found in the field of philosophy, history, geography, humanities, etc.

Information sources can be further classified on the basis of their format into print and electronic sources.

1. Print Sources

The sources of information which are available in print format are known as print sources. Printing is facilitated by various tools like typewriters, computers etc. A variety of machines in the form of printers are used to obtain the print out on paper using various types of inks. Print sources are mostly in the form of text books, reference books, periodicals, diaries, etc.

2. Electronic Sources

The sources of information which are in electronic or digital media are usually known as electronic sources of information. In early 1970s, most of the electronic sources were available on magnetic tapes and some were online. These were of course, mostly secondary sources (bibliographical databases). Since then, many developments have taken place. Today, electronic sources are available on CD-ROMs or on the Net. In the present day context, sources which are available on the Net are often referred to as online sources. These sources consist of reference documents (dictionaries, encyclopedia, directories, handbooks, atlases, etc.), data, research publications, serial publications, etc. [5].

List of General Information sources

In general, a list of sources of Information can be summed up:

1. **Database** – A large, regularly updated file of digitized information (bibliographic records, full-text documents, directory entries, images, statistics, etc.), sometimes related to a specific subject or field, consisting of records of uniform format organized for ease and speed of search and retrieval and managed with the aid of database management system (DBMS) software that includes an internal mechanism (search interface) for searching based on proprietary metadata.

Content may be created by the publisher or be an aggregation of material published by other entities. Databases are often accessible online through the Internet.

Databases can be organized by the scope of the information they contain. Being aware of what this scope is can be helpful in selecting a database to begin your information search.

i) General interest databases include information from several different subject areas and disciplines.
ii) Discipline-specific databases include information for several related subject areas.
iii) Subject-specific databases focus on providing information for one particular subject [10].

2. **Electronic Book (e-book, e-library book) –** A digital version of a traditional print book, or a book-like electronic publication with no print counterpart, designed to be read on a personal computer or an e-book reader.
3. **Repository** – is a central place in which an aggregation of data is kept and maintained in an organized way, usually in computer storage. The term is from the Latin *repositorium*, a vessel or chamber in which things can be placed, and it can mean a place where things are collected. Depending on how the term is used, a repository may be directly accessible to users or may be a place from which specific databases, files, or documents are obtained for further relocation or distribution in a network. A repository may be just the aggregation of data itself into some accessible place of storage or it may also imply some ability to selectively extract data.
4. **Portals:** An Internet portal is a Website that acts as a starting point for browsing the Web. Portals typically include search engines and large directories of websites. Some popular portals are Yahoo, Excite, Lycos, Netscape, AltaVista, MSN, and AOL.com. There are also many smaller portals, known as "niche portals," for specific interests. These sites include C|net (for computers and technology), Fool.com (for investors), and Garden.com (for gardeners). Most large portals have millions of Web pages indexed for visitors to search through. They also have large directories of Web sites, which are categorized by topic. Though the primary purpose of a portal is to find other sites for you, many now include a lot of information within their own sites.
5. **Website:** An information resource suitable for the Internet which is accessible through a Web browser. The content is formatted with a markup language and often provides navigation to other web pages via hypertext links. Websites are differentiated from online databases by their general lack of internal database management system (DBMS) software although they may have a "search this site" box (powered by external software like Google, Yahoo!, Ask.com, etc.) that allows a keyword search of the site.

i) Internal websites are sites whose content is created and maintained by library personnel.
ii) External websites are sites whose content is not created and maintained by library personnel.

6. **Text Book:** A text book is made of continuous exposition, sentences mount into paragraph, paragraphs into chapter, chapters get woven into a single swelling exposition in the continuous pursuit of a single or many ideas, simple or complex. Text books are read consecutively for inspiration, enjoyment or information. There is a link at each stage. There is an element of continuity. According to Grogan, "A text book is a teaching instrument; its primary aim is not to import information about its subject but to develop understanding of it. It concentrates on demonstrating principles rather than recounting detail."
7. **Newspaper**: Newspapers are usually published as dailies or weeklies. The type of paper they are printed on, called newsprint is not meant to last. They are usually preserved on microfilm for this reason. Libraries usually keep paper copies of newspapers until the microfilm copies arrive. Nowadays many newspapers are available on the Internet, some for free, and others by subscription.

8. **Periodical:** Periodicals are used at intervals and numbered consecutively. They are given volume designations, several issues making up a volume. Periodicals include journals and magazines, transactions, proceedings or similar works.
9. **Journal:** Journal is a scholarly publication devoted to disseminating current information about research and development in a specific field or subfield of human knowledge. Journal is usually regularly published at intervals. Most journal articles are long and include a paragraph at the beginning, called an abstract which summarizes the main points of the article and at the end a bibliography or list of works cited. The writings of the journals are most often peer-reviewed.
10. **Magazine:** The magazine usually refers to the non-scholarly publications written for an educated audience and contains popular reading.
11. **Reprint:** Once an article is published in a journal, additional copies are taken out separately and provided to the author. A fixed number is generally supplied free of charge. Additional copies are supplied at a cost; these copies are known as reprints and used for exchange with other scientists working in the same field.
12. **House Journal:** It is a publication issued by an organization to inform the public of its performance and style of function and also to know the reaction, opinions of its public. Generally, house journals are of two types:
13. **External House Journals:** The external house journal is meant for the external audience of an organization. The external audience of an organization refers to those who do not work under the roof of the organization, but are interested in it.
14. **Internal House Journal:** Internal house journals are meant for the employees under the roof of an organization. Broadly speaking, it aims to inform and educate the employees of all levels about the organization's activities, functions, etc.
15. **Newsletter:** Newsletter is a publication issued by an organization often simple in format and crisp in style to provide speedy information for a definite audience. Newsletters are always issued regularly and have a short life span. It is a modest publication containing limited pages, nearly four to eight, and a few pictures and illustrations. Generally, the organizations that do not go for house journals find a good substitute in newsletters. While some newsletters are intended for the employees, others are meant for the external public.
16. **Patents:** A patent presents a detailed account of a new manufacturing process or improvement of an existing process, a new product, a new method of testing and control, etc. Generally, when some kind of invention is made, the manufacturer wants to protect his invention and the patent offices in various countries on the request of the manufacturer generally issue the patent, which provides an exclusive right to the manufacturer on the invention. It takes the form of an official document having the seal of the government attached to it, which confers an exclusive privilege or right over a period of time to the proceeds of an invention.
17. **Standards:** Standards are units or measures in terms of weight, size, length, quality, composition, process of production, etc., established by national and international organizations. Standards are often finalized through testing, research, and study and prescribe the accepted quality or performance value of a product.
18. **Research Report:** Research reports are published as part of the annual report of an organization or as a separate report published at periodical intervals by individuals and agencies that obtain research grants and have to produce them as a condition of such grants. The research reports are generally produced in a limited number of copies and the distribution is also restricted and controlled.
19. **Trade and Product Bulletin/Journal:** Trade journals contain primary articles but of the nature of applied research. It contains the particulars of goods manufactured by or sold by a firm. Frequently illustrated and containing prices, it also often contains application-oriented description rather than theoretical description. These are published by

research and development organizations, trade associations, etc. The original objectives of all trade journals are product advertisement. The complete description, principles and working of a newly developed and highly sophisticated instrument may for quite time be available only in the manufacturer trade journals, e.g., *International Product Finder*. Bombay: Business Press.

20. **Conference Proceedings:** Many conference proceedings present new findings or results of work for the first time or at least months before they are published in scientific journals. Sometimes, conference proceedings also include questions from participants and answers and clarifications from the authors of the papers. The conference proceedings generally contain the statement of objectives, opening address or presidential address, list of participants or conference's who's who, resolutions or recommendations, etc.
21. **Thesis and Dissertation:** Thesis and dissertation are the results of purely academic pursuit. It reports some original work in a specific field. Among all the primary sources of information, thesis and dissertation are probably least used mainly because their existence is not known in many cases and also due to the limited number of copies of the document.
22. **Treatise**: A treatise provides an exhaustive treatment of a broad subject. It is encyclopedic in coverage of the subject but different in its treatment. It presents in a systematic and consolidated manner the result of work and research in the field with full reference to the primary sources.
23. **Monograph:** The scope of a monograph is narrower than that of a treatise. Monograph is on a single topic whereas a treatise is on a broad subject. Research monographs are separately published reports on an original research that is too long, too specialized or otherwise unsuitable for publication in one of the standard journals. Each monograph is self-contained which frequently summarizes the particular existing theory or practice along with the author's original work.
24. **Review:** A review is actually a narrative account or critical synthesis of the progress of a particular field of study prepared by an expert in the field. It shifts, evaluates and puts each significant contribution into its proper perspective. It indicates interrelationship of ideas, significance and possible areas of application and so on, so that one can easily get an expert view of the subject without having to go through the mass of literature.
25. **State-of-the-Art Report:** These are types of reviews which do not have all-embracing scope and historical orientation. These present information assembled from various sources and subjects to the operation of analysis, consolidation, extraction and evaluation in a formal presentation representing the most advanced degree of technical achievement in its field at the present time. Some owe their existence to a specific query while others are issued on a regular basis, in many cases once in a year. State-of-the-art report emphasizes on the recent and up-to-date ideas.
26. **Trend Report:** Trend report gives an account of the general direction of research in the subject based on a review of the documents on current development.
27. **Technical Digest:** A digest service is directed to executives, engineers, technical workers, etc., working in industries. It provides up-to-date technical information. It presents descriptive text of information in a condensed form and on the core ideas in brief and orderly forms [8].
28. **Almanac and Yearbook:** These reference books are published yearly and contain factual information pertinent to a specific span of time. Medical, governmental, industrial, and vital statistics are some examples of information that can be found in these resources.
29. **Technical Report:** A report is an account or a text describing in detail an event, situation or the like, usually as a result of observation, inquiry, experiment, etc. Technical reports generally give the results of R&D experiments/projects; they are primitive in the sense that they are published as and when research activities

progress; often, these are considered as primary sources of information, especially in the area of aeronautics, and applied atomic energy. These are generally unpublished or semi-published literature.

30. **Pamphlet:** It is a short treatise or essay, generally a controversial tract on some subject of contemporary interest. It is in fact a complete publication, of fewer "pages" stitched or stapled together and usually has a paper cover [5].
31. **Atlas:** Books filled with maps, charts, and tables. Atlases provide information pertaining to populations and place locations. Current and historical are the two major types of atlases; however, there are human anatomy atlases too.
32. **Handbook and Manual:** Handbooks normally give a broad treatment of one subject area. Manuals are reference books that explain how something is done or how something operates.
33. **Library Service Desk** is the source that helps in identifying the right tools to find information.
34. **Subject Guide:** Librarians who specialize in different subject areas have created Web pages called subject guides to find particular information. These pages provide links to online journals and library databases, and recommend books and other resources for doing research in specific academic disciplines [11].
35. **Bibliography:** A compilation of sources of information that provides literature on a specific subject or by a specific author.
36. **Dictionary:** Defines words and terms; confirms spelling, definition, and pronunciation; used to find out how words are used; helps to locate synonyms and antonyms and to trace the origin of words
37. **Biographical Dictionary:** Sources of information about the lives of people.
38. **Directory:** Lists names and addresses of individuals, companies, organizations, and institutions.
39. **Encyclopedia:** Covers knowledge or branches of knowledge in a comprehensive, but summary fashion; useful for providing facts and giving a broad survey of a topic; written by specialists.
40. **Gazetteer:** A dictionary of geographical places (no maps).
41. **Guidebook:** Provides detailed descriptions of places; intended primarily for the traveler; geographical facts plus maps (e.g., *Great Lakes Guidebook*) [12].

CONCLUSIONS

Advancement in information technology has highly boosted the information generation process thereby leading to the creation of numerous information sources that too in print as well as electronic formats. Although, print sources of information are highly significant but literature reveals that electronic sources are surpassing those and are found in good numbers and varieties nowadays.

Information sources in any format are facilitating enormous amount of information to the end users and are acting as reliable information channels. Electronic and online sources have left no stone unturned in facilitating fountains of information and acting as backbone to the research and development to not only academic institutions but also to the government as well as private set ups.

The need of the hour is to organize the ocean of information generated each day in various subjects in the form of databases, portals, etc., so as to channelize that to the end user in a precise and sophisticated manner. A good number of sources are available on the Web with much relevant and reliable information but the user needs to know which of these is more reliable than others. The paper has the limitation of evaluating each information source individually thereby giving more dimensions to this work in that regard. A lot has been done in this regard as witnessed in the list of information sources provided above but there is a long way to keep track of every piece of information generated globally.

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