

## Importance of Online Databases for Searching Scientific and Academic Information for Research

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### Abstract

*Scholarly communications for conducting research has prominent place in research and academic society. Nascent information in the area of research is necessary for contributing to knowledge and for this purpose searching and providing proper information to users is the key role of library and information professionals. Systematic and scholarly information search on the topic is the need of researchers in the information explosion era. Manual searching for the information has many drawbacks and these are eliminated due to searching online databases and using technology support. This communication highlights the importance and basics of online databases need for developing online databases and searching of databases as well as skills required for searching by searcher.*

**Key Words:** *Databases; online searching; scientific research, academic research; information searching; information gathering*

### 1.1 Introduction

Scholarly communication has prominent place in research and academic society. In research new facts are observed, and they are assessed in the light of established facts using systematic and scientific information search on the topic. While selection or identification of research area or topic, literature search is an essential factor for the researcher and dependable information is required by academic and researcher staff. Manual searching has many drawbacks especially information overload and getting the exact information and valuable information may be eliminated but due to searching information from online databases these difficulties are removed. In spite of cost involvement for the searching online databases, these are used by researchers to get current and pinpointed information and delay is avoided. An online database is accessible over a network, including internet. Online databases differ from local databases, which are developed by an individual professional. The online databases are delivered primarily via a web browser or internet connecting user's computer directly to the host computer available anywhere in the world and required data is retrieved, might be retrospective or current. The online databases are priced and have to be either subscribed or use on the basis of pay per use from the aggregators or vendors. Researchers use different sources in which research output is disclosed for their varied purposes.

## 1.2 Information Sources Used by Researchers

The users may be academic or scientific they depend heavily on primary and secondary information sources for carrying out scholarly research. Researchers search information for different purposes like getting general awareness, knowing in specific subject area in detail and at micro level. The out put of research work is published in the form of literature and is being published in various forms like books, journal articles, thesis etc. These publications are mainly accounts of disclosure of experimental work with results and conclusions that could be used for future research applications. Primary literature mainly covers periodicals, theses, reports (scientific and technical), standards, patents, and conference proceedings etc and covers original first hand research communications in it. These publications covers the results of research carried out in academic institutions such as universities, colleges as well as research organizations. To get proper information published in the area the databases are developed and used either online or offline for searching information. The features of the online databases are improved and contain information which is dynamic than the offline databases which has static information.

## 1.3 Importance of Searching Information

Generally information is being searched by students, teaching staff, academicians, researchers, scholars etc for fixing research topic or communicating results and for this purpose authentic information support is essential. The information search may be either manual (offline) or online using subject databases. Without literature search it is difficult to arrive at proper solution and conclusion. Literature review aims to gather relevant and pinpointed information comprehensively at economical and quicker ways. Online databases provide best support for gathering information and also search information faster and accurate than any other ways used for data collection. Information is necessary for developing research concepts and innovative practices in any discipline. Research process initiates with information collection from different sources and databases which supports to strengthening the concepts.

## 1.4 Internet: a New Source of Searching and Gathering Information

Now days over the net all most all information resources are available and accessible to users free. However the information available over the net is to be evaluated for its authentication as it is not published by any commercial vendor nor monitored and indexed properly. The results retrieved over the net are voluminous and in addition to this links may be alive or dead. The use of internet is very good at the initial stage and browsing is helpful for developing concepts of topic. No doubt internet is a source of getting information that is not available anywhere else but for scientific and scholarly research it has limitations. Hence users of internet have to pass through the information and determine its reliability and usability. In spite of few drawbacks search engines like Google scholar, Scirus, are useful as compared to other search engines. But all the information available on the net is not sufficient for research activities. The databases developed by commercial publishers have unique features and available online is to be referred for the qualitative research output.

## 1.5 What is online database?

Rice (1985) stated that databases are important part of libraries reference collection and a tool for information access to researcher. Online databases are machine readable file of organized information which helps users to interact using computers and data files.

Online databases are Web-based electronic indexes that enable to locate and retrieve articles in different information resources like journals, books, and other primary information sources. The term database refers to large collection of digital data i.e. information file on a specific or general subject. It is organized and designed to use by number of users to retrieve information for various purposes.

The prominent features of online database are:

- can be produced and distributed quickly
- easily updated and duplicated
- compiled jointly and interactively
- information downloaded can be manipulated and repackaged
- discriminated or accessed world wide
- free or fee based structure
- multiple access for the same source
- powerful searching utilities and capabilities

Thus online databases are best tools for searching information.

## 1.6 Why Use Online Databases?

Online databases have many benefits and specialised features where as print counterparts and also to certain level offline databases do not have, for example:

- Coverage of scholarly publications written by professionals in the field and made available online.
- Articles are reviewed and selected by publishing group or special committee of experts in the subject.
- Information is updated regularly and dynamic
- More appropriate for academic and scientific research
- Speed and ease in searching information with many access points
- 24/7 access
- Avoids duplication

## 1.7 Types of Databases

The databases are of different nature as they are developed keeping in view the user community. The main types are :

- Reference or Bibliographic ( Indexing and abstracting) (Subject specific and comprehensive)
- Full text or textual
- Data Banks or Numeric
- Multimedia databases
- Citation databases
- Referral or Source databases (World of learning)
- Open source databases (IR's)
- Catalogue databases (OCLC, LC, DELNET, OPAC)

These are developed or distributed through proper agencies.

## 1.8 Advantages of Online Databases for Searching Scholarly Information?

The advantages of searching online databases are:

- To get accurate and pinpointed information on the topic of specialization
- One can get the exact information from the published literature either from the print or digital source.
- Authenticity and reliability of data
- For both retrospective and current information
- searching and retrieving data with various combinations and extract the exact data from the database ( Boolean , free text, browse, root search etc)
- faster than manual searching with less chances of missing data
- Wide coverage of information
- multiple database searching and removal of duplication is possible
- user friendly searching tips
- Save time, space, money, effort, person-hours etc
- Easier to assess quality information for problem solving
- Processing of search results in variety of ways (Sort, rank, report, export, integration).
- Highly focused information that is actionable
- 24/7 access
- Multi user accessibility

The only drawback is that these are costly, but those who needs valuable information without spending time and ready to spend money for them this is the best tool. Further needs advanced technology, equipments, techniques and specialised searching skills, training, and expertise in subject.

## 1.9 Databases for Academic Libraries

Some prominent databases like Newspaper source, ABI / Inform Global, Medline (Pubmed, pubchem), Health sources : Nursing, Clinical pharmacology, ERIC, EBSCO, EMERALD, Science Direct ( Elsevier), LISA, LISTA (Library, Information Science and Technology Abstracts), Academic periodical collection, Business periodical collection, Ebrary ( more than 60,000 fullest E-Books database), NetLibrary (more than 1 lack titles and many global publishers), Helecon Scima (Economics), Engineering Village 2 ( Engineering), IEEEEXPLORER ( Engineering), JSTORE, ESDS ( Economics), Patent Café, Thesis Databases ( Infilbnet, shodhganga, vidhyanidhi), Who's Who, Web of Science / Scopus, TOC Search, PsycINFO, OhioLink, Social Science Research Network, ProQuest, Lexis Nexis, IBISworld, Hoover's, Higher Intellect Project, Facts on File, Current biography etc are seen in the collection. The selection of the database is as per the need of the organization and users demand.

## 1.10 Criterion for Selection of Databases

Each database has its own search interface and capabilities for searching information. The criterion for selection of databases generally depend on following

- Coverage of information (current or retrospective) and resources covered like primary, scholarly, popular, trade etc
- Coverage of information on subject
- Availability of abstract or full text
- Availability of similar subject related other databases
- Limit to the search for scholarly publications only
- Searching parameters ( Keyword, subject, general subject, free text, author, source, structure, Boolean, root, proximity) provided
- multiple fields searching
- Training provided
- Cost of the database
- Access restrictions

## 1.11 Database vendors / Producers

The re are many database vendors, act as an intermediary between user and publisher (original source). The major vendors in the field are respective publishers, learned societies, BRS, DIALOG, STN, SDC, Informatics etc. The major databases producers are Chemical Abstracts Survive (CAS) in the area S and T, Science and Technology Network (STN), Data Star, Thomson Reuters, ISI, Elsevier (Science Direct), IEEE, NTIS, MicroPatents, Delphion, Wiley, National Medical Library (PubMed), Springer ( Springer Link), OCLC ( Woldcat), DELNET, INFLIBNET (N-List), Library of Congress (Catalogue) etc. The librarians have to search the availability of databases in the area of interest.

### 1.12 Methods for searching online databases

Searching online databases has many ways and methods and it depends on how users can query the database for searching his appropriate information. In general while searching databases online, many utilities and search facilities are provided like simple search, advanced search, structure search, field search, free text searching, browsing, etc. But another elements used for precise searching are boolean search, wild card and truncation or root searching or proximity searching, phrase searching or pattern searching, limiting search is also possible by adding language, year, publication type, etc

### 1.13 Online v/s Off Line Databases searching

The terms "online" and "offline" have specific meanings in regard to computer technology and telecommunications. In general, "online" indicates a state of connectivity, while "offline" indicates a disconnected state. The difference is elaborated below.

Sr No	Features of Online Databases	Offline Databases
1	Dynamic and current information	Static and old information
2	Online connectivity using net	Inhouse connectivity
3	Pay per use model	Have to pay subscription irrespective of use
4	Costly	Economical
5	Digital form	In electronic CD form
6	Access points more	Access points better than manual but not similar to online
7	Roles can be used to limit the hits	Many a times not available
8	Searching online and needs network connectivity	Available in library and used any time

### 1.14 Internet v/s Online Databases

The kind of information available on the web pages / websites covers all most all kind of information available in public domain for free usage over the net like commercial, academic, scientific, educational, trade, personal opinions, govt. documents, entertainment related information etc. The terms Internet (net) and World Wide Web (Web) interchangeably, but in fact the two terms are not synonymous. The Internet and the Web are two separate but related things. The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the internet. (<http://www.internetworldstats.com/stats.htm>)

The Web is a way of accessing information over the medium of the internet. It is an information-sharing model that is built on top of the internet. The Web also utilizes browsers, such as Internet Explorer or Netscape, to access web documents called web pages that are linked to each other via hyperlinks. Web documents also contain graphics, sounds, text and video. The Web is just one of the ways that information can be

disseminated over the internet. So the Web is just a portion of the internet, albeit a large portion, but the two terms are not synonymous. (<http://www.internetworldstats.com/stats.htm>)

Online databases are also made available over the net, but they are commercial and have charges and not free. Information covered in databases is trustworthy as it is made available by the commercial, academic, scholarly subject societies and scientific publishers on subscription basis. The data covered is for many years and accessible to subscribers only with authentication (user ID and password). Libraries subscribe to several useful databases and provide access to users as and when required to search the information. Online databases contain scholarly information abstracted from the major primary information resources. The materials in the database is received from publishers, or developed by the commercial publishers and checked for accuracy and reliability of information (eg LISA, LISTA, EMERALD, EBSCO). The users are making use of online databases for getting current and accurate pinpointed information.

### 1.15 Role of Librarian and Skills Required for Searching Online Databases

Medical Library Association (2005), prepared a statement policy in which listed the essential skills for information searching. According to policy the librarian or information professional who has assigned the task of searching information using online databases have following skills.

- Ability to accurately identify information need of users through effective personal interaction and to clarify and refine the topic and retrieval requirements. For this purpose discussions with users and getting his requirement is essential and mandatory.
- The searcher has subject domain knowledge to analyze the retrieved data
- Ability to identify and search resources beyond the electronically available published literature, including the older published literature, gray literature, unpublished information, and Web documents etc.
- Ability to recognize limitations related to subject domain or resource specificity as well as available institutional resources in the area
- Knowledge of database subject contents, indexing or metadata conventions, and online record format to determine relevance to the information need and the method of retrieval access
- Expert knowledge of retrieval system interfaces to determine appropriateness of one interface over another
- Expert application of retrieval system logical, positional, and weighting capabilities;
- Ability to be mindful and reflective; to think about and observe what is being retrieved through the use of an iterative and heuristic search process for discovery of relevant evidence
- Ability to use both deductive and inductive reasoning combined with subject domain knowledge to respond to a desired outcome, not necessarily to a literal request

- Ability to efficiently and effectively evaluate retrieved data to determine closeness of fitness to requestor's recall and precision requirements, expectations, or subject domain familiarity
- Ability to expertly process retrieval for results presentation through removal of irrelevant material from search results, application of data mining techniques to identify themes and gaps in retrieved information, and performance of other editing procedures aimed at optimizing and economizing the subsequent work by the end user; and
- Ability to effectively document the search process for end-user information or retention for legal purposes.

Apart from the above stated skills few more skills are also necessary for successful searching of electronic or online databases.

- Understanding the topic of searching and its possible retrieval from different databases. The ability to break topic into concepts that are easily searched and appropriate to topic
- Development of a suitable, proper, flexible search strategy covering maximum access points and key roles
- Computer skills, knowledge of the content and format of the database, and access search points, display results options and output commands.
- Increase awareness about online databases among the users.

Search strategy preparation is an essential part of searching databases online. The search strategy means a way to search the topic systematically and narrowing the search output to accuracy. An expertise in developing search strategy is an essential skill of the information professionals. The search strategy contains few basic steps.

### 1.15.1 Steps for Developing Search Strategy

**Basic steps needed to follow while planning to search an online database are:**

**Step 1: Advance Planning:** Examine types of databases available such as full text or full image and bibliographic etc. Choose a database related to subject area. Even more than one relevant to subject

**Step 2: Preliminary Search preparation:** Get the detailed query from user and understand the need of the user. Analyse the search query first. Write search query as a statement i.e. main terms that wish to be searched for. Specify all different ways in which a term can be described i.e. key words, synonyms and alternative spellings etc. Identify all the possible ways to limit the search results such as by date, language, and type of publication. Use searching techniques such as Boolean operators (AND, OR and NOT) and phrase searching. Understand different commands used for searching online information. Finally prepare an outline of the search by breaking the topic in to prominent keywords and connecting them for meaningful full search



**Step 3: Comprehensive Literature search:** Select databases to be effectively searched and define the cluster of databases for searching. Conduct comprehensive search initially and analyse the results.

**Step 4: Refinement of search:** If hits to query are more, then limit the results with roles like author, year, country, year etc. Sometimes add new terms or delete terms in search strategy and redo the exercise by modify the query.

**Step 5: Finalising the search:** Print or save or download the relevant results. Download abstracts as well as search for the availability of full text information resources.

### 1.16 Best Practices

To perform the best searches using online databases few best practices are to be adapted by the information professionals.

**1) Selection / Evaluation of Online Databases:** To develop online services in the library it is necessary to subscribe databases and for this availability of similar information databases are available in the commercial domain. Information professional has to develop practice of evaluation of contents, and properly select the databases using the selection criterions like cost, availability, information content and coverage, developer, ease in search, format of display, free information display, etc.

**2) Information and search literacy:** The librarian must know the different print and digital information resources, why to search information, how to search, where to search, how to gather information, how to analyse information and how to present information in usable and applicable form for users.

**3) Technological literacy:** Librarian must handle computers and network based information resources and adapts communication skills to connect computer to host and retrieve information effectively and efficiently at economical cost. The web based resources use of internet is essential as many free databases are available for deciding the search strategy.

**4) Acquiring skills related to search databases:** Librarian has to adapt skills like searching, subject, assessing user needs, information resources, communication, technology, technical, repackaging, presentation, evaluation, marketing etc. to suit the demands in future librarianship in digital era.

**5) Awareness of new information products:** Information professional must always search for the new and useful tools available for searching. e.g analytical tools to analyse and present the data.

## Conclusion

Bibliographic or any type of databases is widely used in libraries as reference tools. There is a need for conducting quality literature search for research and writing scientific proposals. There is no substitute for literature search while conducting research in any field and for this online searching of available databases is best solution. The librarian and information professionals have to become expert in searching online databases as future is only digital.

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