Online Resources and Web Research

Alice M. Okore
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Introduction to

THE USE OF THE LIBRARY AND STUDY SKILLS

Second Edition

Edited by:
Charles O. Omekwu (Ph.D)
Michael O. Okoye (Ph.D)
Chinwe N. Ezeani (Ph.D)

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Chapter Seven

ONLINE RESOURCES AND WEB RESEARCH

Alice M. Okore (Ph.D)
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Helen N. Okpala

1.0 Introduction

Teaching, learning and research are the goals of any institution of higher learning. The goal can be achieved through the consultation of already existing resources which may be in print or electronic format. In libraries, resources comprise documents, databases, e-books, e-journals and multimedia materials. When these resources are stored, transmitted and accessed over a Local Area Network (LAN), Wide Area Network (WAN), Intranet or Internet, they are referred to as online resources or e-resources.

The use of online resources for research and educational purposes by students (undergraduate and postgraduate) means that they benefit from the works of experts in the different fields of study. Though libraries acquire and house significant number of print materials, such limited acquisitions may not meet the needs of researchers with the proliferation of information in various academic disciplines. Researchers (students inclusive) often extend their searches to online resources, so as to benefit from the numerous works of experts in the different fields of study. They use online resources for a wide variety of reasons which include acquisition of knowledge, monitoring publications in the different fields of study (journal/database, e-mail alerts), looking for information to fuel some academic or scientific debate, retrieving resources to carry out some assignment.

Using resources online requires some knowledge of web research. Students must understand this concept and all it entails in order to effectively and efficiently extract information from the Internet. This is as a result of web technologies which have
advanced in numerous ways, one of which is to provide full text search capabilities. Though print journals provide search aids such as indexing, this does not match the capabilities of e-journal databases that facilitate searching the text of articles using Boolean Logic (Ganesh, 2003). For students to make a good search for information on the Internet, they need to understand the various online resources and how to carry out a web research.

2.0  E-Resources

The term 'resource' means different things to different people depending on the area of application. For instance, in project management terminology, resources are required to carry out the project tasks. In this concept, a resource can be people, equipment, facilities for funding or any other aid required for the completion of a project. In manufacturing, a resource is anything that helps in manufacturing goods and services such as raw materials or personnel. In Wikipedia, a resource is defined as any physical or virtual entity of limited availability or anything used to help one earn a living. In libraries, resources are integrated contents consisting of documents, databases, e-books, e-journals, links to other resources and multimedia materials.

An e-resource (electronic resource) is any resource which is accessed via the Intranet or Internet. The library provides access to a wide variety of e-resources including electronic books (e-books), electronic journals (e-journals), indexes and collections of journal articles, reference works, digital collections, databases, and websites. All library e-resources can be accessed on campus and most can be accessed off campus. E-resources are useful because of the volume of information they contain and because of the convenience of being able to access them both on and off-campus at any time. It should be noted however, that e-resources are online resources.
2.1 Examples of E-resources

There are different types of e-resources, namely, e-books, e-journals, directories, newspapers, etc. Examples of e-resources are tabulated in Table I.

Table 1: Examples of E-resources

<table>
<thead>
<tr>
<th>Information Resources</th>
<th>Examples</th>
<th>Web Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directories</td>
<td>Librarians’ Internet Index, Google Directory</td>
<td><a href="http://lii.org">http://lii.org</a> <a href="http://www.google.com">www.google.com</a></td>
</tr>
<tr>
<td>Audio &amp; Visual Materials</td>
<td>Communication cameras, Control system</td>
<td><a href="http://www.avmltd.co.uk">http://www.avmltd.co.uk</a></td>
</tr>
</tbody>
</table>
2.1.1 E-Journals (electronic journals): These are electronic issues of journals and articles that are accessed via the Internet. E-journals are essential because they contain current information and the publications are always timely.

2.1.2 E-Books (electronic books): These are electronic versions of printed books which are often purchased by the Library to supplement printed copies of books which are in heavy or regular demand. In addition to the e-books purchased by the library, there are many e-book collections freely available online (see 2.2.2).

2.1.3 Online Databases: These are organized collection of computerized information or data such as articles, books, graphics and multimedia that are in general or subject-based in form of abstracts and or full text and can be accessed online or over the Internet. This is different from a local database in that the later (local database) is usually held in an individual computer or attached storage, such as a CD or external hard drive and accessed via the Intranet rather than Internet. A typical example of a local database is the TEEAL database which has been recently acquired by the University of Nigeria and is available in the MTN Connect Library.

Some of the online databases provide access to the full text. Examples of such online databases include: Ebscohost, Agora, Hinari, Jstor, NEXUS, Keesings, Sabinet Online, Researchpro, MEDLINE, Academic Source Complete, Business Source Complete, Legal Collection, etc.

2.2 Open Access Resources: ‘Open Access’ simply connotes free access to any collection of materials which otherwise could have been assigned restrictions but for the need to bridge the digital divide. Digital divide means not having equal access to information by people, some would be the information-haves and others information have-nots. What this simply means is that some people who do not have the financial resources to subscribe
or purchase materials online cannot have access to such needed information as opposed to the rich ones who can afford such. With open access resources, books and journals can be accessed by anyone, at any time, without restraint and made use of at one’s convenience. Example of open access databases include Directory of Open Access Journals (DOAJ) and Directory of Open Access Books (DOAB).

2.2.1 **Directory of Open Access Journals** (DOAJ): This is an online directory that indexes and provides access to quality open access, peer-reviewed journals. Open Access (OA) journals are scholarly journals that are available online to the reader without financial, legal or technical barriers other than those inseparable from gaining access to the Internet itself (Wikipedia). Some journals could be open access but may require individual payment of some fee to finance the production and publication of the journal online. Academic institutions or government can also finance open access journals. The directory of open access journals covers all subject categories. Visit the website at www.doaj.org.

2.2.2 **Directory of Open Access Books** (DOAB): The primary aim of DOAB is to increase discoverability of peer-reviewed Open Access Books that have been published under an Open Access license. The address for DOAB is www.doabooks.org

3.0 Introduction to Web Research
Web research is simply the art of making searches on the web. The Web or Website is composed of one or more linked Web pages. The ‘World Wide Web’ (WWW) means that part of the Internet that is accessible via web browser software. The WWW was developed to make the Internet much easier to use for accessing texts, images and audio-visual materials, regardless of where they are in the world. As a result, the WWW has become a significant repository of information for researching essays and other projects. Something is ‘on the Internet’ if it is located
somewhere on another network of computers, and a software must be used to access it. A web browser (e.g., Internet Explorer, Firefox) is just a kind of software that accesses the Internet. There are others such as email client software or FTP (File Transfer Protocol) for transferring files.

3.1 Web Research Process
Have you ever imagined the amount of irrelevant information you would gather when you search for a certain term on the web? For instance, if you search for ‘buying a book’ on the Internet, you will be amazed, the result your search would return. In this section, you will learn how to construct and refine your search on the web in order not to be overloaded with irrelevant results.

3.2 Steps in Web Research
The following steps may serve as a guide in conducting research on the web:

1. Create a list of keywords from your topic
2. Choose the right database, search engines or online journals
3. Construct a search query
4. Refine your search

3.2.1 Create a list of keywords from your topic
Whenever a topic is given for an assignment, one thing comes to mind and that is: ‘how do I go about getting relevant materials on this topic without much ado?’ Of course this happens to everybody who embarks on one research or the other but the difference between a good research and a better one is the possession of basic information literacy skills required in carrying out a research on the Web.

A good researcher first creates a list of keywords and phrases that will produce the longest list of relevant pages from the Web. Keywords have to be chosen carefully because a search with just the word ‘Buhari’ might produce a list of thousands of pages that would include blogs and facebook pages of people that bear that
name. Assuming a student has been given a topic on ‘Chibok Girls and the Boko Haram Insurgency in Nigeria’, the first step to take is to write down the search terms (keywords) – Chibok Girls, Boko Haram, Insurgency, Nigeria. The next step is to choose the platform to search for these terms.

3.2.2 Choose the right database, search engines or online journals. So many databases exist for research – both those that comprise secured resources, and the ones that have open access (OA) resources. OA, according to Bothma, et. al (2014), means that if the authors of a research article would like to make the content freely available, they can do this in two ways:

a. On the Internet before it is published in the journal (pre-print)
b. After it has been published (post-print)

Choosing the right database for research is often a daunting task to many people as a result of the vast number of available databases. However, the good news is that you can learn about how to access and search databases, online journals and other full-text publications indexed in databases. First, you need to understand what a database is. Bothma, et. al (2014) defined a database as an organized collection of data or information that is stored in records in electronic format. The content of databases includes conference papers, research reports, patents, book reviews, journal articles, books. An understanding of what the topic is all about will greatly help any researcher in choosing the correct database. You have to first identify the keyword in the topic and also the discipline. For example, if your topic is about ‘Pest Control’, you already know that the discipline is Agriculture. The database to look up becomes TEEAL or AGRICOLA, etc. It should be noted that some topics could fall under more than one discipline and so, more than one database could be used in locating information on such topics (see Table 2).
<table>
<thead>
<tr>
<th>Topic</th>
<th>Discipline</th>
<th>Database</th>
<th>Access Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pest Control</td>
<td>Agriculture</td>
<td>TEEAL, OARE, HINARI, AGORA</td>
<td>Subscription (Available in UNN)</td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>Medicine</td>
<td>MEDLINE</td>
<td></td>
</tr>
<tr>
<td>Yam cultivation</td>
<td>Agriculture</td>
<td>AGRICOLA</td>
<td>Subscription</td>
</tr>
<tr>
<td>Purification of H₂O</td>
<td>Chemistry</td>
<td>PubChem</td>
<td>Free</td>
</tr>
<tr>
<td>Tax Policies</td>
<td>Social Sciences</td>
<td>SSRN</td>
<td>Free</td>
</tr>
<tr>
<td>Any topic</td>
<td>Multidisciplinary</td>
<td>Academic Search Complete</td>
<td>Subscription</td>
</tr>
</tbody>
</table>

[Table 2: databases]

When choosing a database, you should note the coverage, i.e. a brief description of the topics covered by the database which always comes up at the home page of the database. For instance, if you visit TEEAL (The Essential Electronic Agricultural Library), the home page describes the coverage of the database (see Fig. 1).
Some databases offer access to full text while others do not. No doubt, many users have experienced difficulties in accessing journal articles from ScienceDirect. This is because unlike many other databases, ScienceDirect only offers full-text access to selected journals. JSTOR (www.jstor.org) is an IP-driven database that offers full-text access to most of the journals, only that you may have to install some pdf add-ins on your PC to be able to access the articles which appear in pdf format. It is important to note that users can have controlled access or free access to databases on the Internet. In controlled access, the resources are made accessible via the library of an academic institution. When accessing the secured resources, it is advised that users should avoid unnecessary download of articles from databases and NEVER give out the passwords to people indiscriminately.

The use of advanced search forms is very apt in accessing resources from databases, just that it is only experienced researchers that may be familiar with the interface. As opposed to Basic Search boxes, the Advanced Search form is very necessary in retrieving relevant information. Here, the use of Boolean
operators (AND, OR and NOT) becomes useful in constructing a search query (see 3.2.4 for more highlights).

3.2.2.1 Search Engines

A search engine is the most common tool used to locate information on the Web. In Wikipedia, it is seen as a tool designed to search for information on the World Wide Web, and the search results are usually presented in a list and are commonly called hits. In Webopedia, a search engine is defined as a program that searches documents for specified keywords and returns a list of the documents where the keywords were found. Although search engine is really a general class of programs, the term is often used to specifically describe systems like Google, Alta Vista and Excite that enable users to search for documents on the Web. A search engine searches for Web documents with the keyword(s) specified. Yahoo! and Google™ are the two most popular examples of search engines that have been created to meet the demand for quickly finding information.

When conducting a research, a student can choose from a long list of search engines in order to get a wide range of results. Under-listed are some examples of search engines:

- Alta Vista
- AOL Anywhere
- BigBook
- Cyber411
- EiNet Galaxy
- Eureka
- EuroPages
- Excite
- Google
- Yahoo

For more lists of search engines, visit
http://lorien.ncl.ac.uk/ming/resources/searcheng/search.htm
3.2.3 **Construct a Search Query:** When information needed is matched with available information, precise information is retrieved. After you must have identified the search terms/keywords, you have to attempt choosing the same words that the information provider used in order to make a meaningful match. You can only retrieve a document you need if the words in the document are represented in the query you have made. This is definitely not an easy task, but with the help of information retrieval systems such as Boolean operators, you can obtain the information you need to a reasonable degree. It is common knowledge that formal logic Boolean operators are named after George Boole, a mathematician who lived in the 19th century. The three Boolean operators are: AND, OR and NOT.

3.2.3.1 **The AND operator:** This is used when you want to retrieve all of the search terms in a query. For example, if you are seeking information on ‘Ladies that are pretty and plump’, the query will be: Pretty**AND**Plump. The Venn Diagram (diag. 1) illustrates this:

![Venn diagram](image)

From the Venn diagram above, interception (C -shaded area) represents ladies that are both pretty and plump. All the records containing both terms will be retrieved in the search.

3.2.3.2 **The OR operator:** This is used to combine terms in such a manner that any of the terms it is combined with can be present in the document to be retrieved. In other words, OR is used to
broaden a search by linking together a number of synonyms. The OR operator links two terms and finds matching documents if either or both of the terms exist in the database (Nwachukwu and Ogwo, 2014). For instance, if a searcher is looking for either pretty or beautiful, the search retrieves resources on either pretty or beautiful, or that compares both terms.

[Venn diag. 2 - OR]

3.2.3.3 The NOT operator: This is also called the ‘exclusion operator’ – used to exclude unwanted search terms from a query. If you want to obtain information on all kinds of pets excluding dogs, then your query would be: pets NOT dogs.

[Venn diag. 3 - NOT]

[Credit: Oregon School Library Information System]
3.2.3.4 Search Queries: In a bid to satisfy one’s information needs, a user enters a query into the web search engine box. Search engines allow users to enter search terms such as keywords, which can either be words or phrases. The act of conducting a keyword search is called a search query. For instance, imagine you are looking for information on ‘Chinua Achebe’; you can type his name into the search field of one of the search engines. The search engine will scan the database for the keywords Chinua Achebe and locate all Web pages that contain these words. Then the search engine will compile the relevant pages and generate a list of their URLs (Uniform Resource Locators) which is likened to the web addresses.

3.2.3.5 Search Results: A search engine results page, or SERP, is the listing of web pages returned by a search engine in response to a keyword query. The results normally include a list of web pages with titles, a link to the page, and a short description showing where the keywords have matched content within the page.

It is important to note, that not all search engines deliver the same results.

- First of all, different engines search different databases for the information you specify in your search query. Some databases are more sophisticated and more detailed than others.
- Secondly, the organization of search results varies, depending on the search engine you are using. Generally, the results at the top of the page are what the search engine interprets as the most relevant to your search. However, not all search engines measure relevancy in the same way. For example, with many search engines, a Web page will have a higher ranking in the list of results if your keywords appear many times throughout the
Web page – in the title, near the beginning, or close together on the page.

For these reasons, you should NEVER rely on just one search engine when you are conducting research on the Web. Try using more than one search engine; doing so will likely yield better, richer results!

3.2.4 **Refine your search:** The Boolean Operators are mostly utilized during Advanced searches wherein searches are refined in order to retrieve precise/relevant resources needed *(see fig. 5).* In refining your search, you are bound to specify:

- **a.** The type of materials you want (e.g. Journals, books, conference proceedings, reports, etc.)
- **b.** The date range
- **c.** The limitation (e.g. Full text, peer reviewed, scholarly journals)
- **d.** The document type (e.g. Blog, book, business case, book chapter, commentary, etc.)
- **e.** The Language (English, Ibo, Hausa, Yoruba, French, etc).
- **f.** The number of items per page (e.g. 50, 100).

![ProQuest Interface]

*Fig. 5: Proquest interface*
Conclusion

E-Resources have contributed a lot to research and development in the society. Students and academics should not be left behind. Maximum use should be made, of these resources especially this period when most of the materials we need are not readily available in the physical format. As researchers and students in the third world countries where less importance is attached to the procurement of educational facilities, we should always explore the web and harness the information resources that are available.
References


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http:www.wikipedia.org
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<td><a href="http://freemedicalbooks.com">http://freemedicalbooks.com</a> <a href="http://20200k.com">http://20200k.com</a></td>
</tr>
<tr>
<td>Directories</td>
<td>Librarians’ Internet Index, Google Directory</td>
<td><a href="http://lii.org">http://lii.org</a> <a href="http://www.google.com">www.google.com</a></td>
</tr>
<tr>
<td>Audio &amp; Visual Materials</td>
<td>Communication cameras, Control system</td>
<td><a href="http://www.avmltd.co.uk">http://www.avmltd.co.uk</a></td>
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2.1.3 **Online Databases:** These are organized collection of computerized information or data such as articles, books, graphics and multimedia that are in general or subject-based in form of abstracts and or full text and can be accessed online or over the Internet. This is different from a local database in that the later (local database) is usually held in an individual computer or attached storage, such as a CD or external hard drive and accessed via the Intranet rather than Internet. A typical example of a local database is the **TEEAL database** which has been recently acquired by the University of Nigeria and is available in the MTN Connect Library.

Some of the online databases provide access to the full text. Examples of such online databases include: Ebscohost, Agora, Hinari, Jstor, NEXUS, Keesings, Sabinet Online, Researchpro, MEDLINE, Academic Source Complete, Business Source Complete, Legal Collection, etc.

2.2 **Open Access Resources:** 'Open Access' simply connotes free access to any collection of materials which otherwise could have been assigned restrictions but for the need to bridge the *digital divide*. Digital divide means not having equal access to information by people, some would be the *information-haves* and others *information have-nots*. What this simply means is that some people who do not have the financial resources to subscribe
or purchase materials online cannot have access to such needed information as opposed to the rich ones who can afford such. With open access resources, books and journals can be accessed by anyone, at any time, without restraint and made use of at one’s convenience. Example of open access databases include Directory of Open Access Journals (DOAJ) and Directory of Open Access Books (DOAB).

2.2.1 Directory of Open Access Journals (DOAJ): This is an online directory that indexes and provides access to quality open access, peer-reviewed journals. Open Access (OA) journals are scholarly journals that are available online to the reader without financial, legal or technical barriers other than those inseparable from gaining access to the Internet itself (Wikipedia). Some journals could be open access but may require individual payment of some fee to finance the production and publication of the journal online. Academic institutions or government can also finance open access journals. The directory of open access journals covers all subject categories. Visit the website at www.doaj.org.

2.2.2 Directory of Open Access Books (DOAB): The primary aim of DOAB is to increase discoverability of peer-reviewed Open Access Books that have been published under an Open Access license. The address for DOAB is www.doabooks.org

3.0 Introduction to Web Research
Web research is simply the art of making searches on the web. The Web or Website is composed of one or more linked Web pages. The ‘World Wide Web’ (WWW) means that part of the Internet that is accessible via web browser software. The WWW was developed to make the Internet much easier to use for accessing texts, images and audio-visual materials, regardless of where they are in the world. As a result, the WWW has become a significant repository of information for researching essays and other projects. Something is ‘on the Internet’ if it is located
somewhere on another network of computers, and a software must be used to access it. A web browser (e.g., Internet Explorer, Firefox) is just a kind of software that accesses the Internet. There are others such as email client software or FTP (File Transfer Protocol) for transferring files.

3.1 Web Research Process
Have you ever imagined the amount of irrelevant information you would gather when you search for a certain term on the web? For instance, if you search for ‘buying a book’ on the Internet, you will be amazed, the result your search would return. In this section, you will learn how to construct and refine your search on the web in order not to be overloaded with irrelevant results.

3.2 Steps in Web Research
The following steps may serve as a guide in conducting research on the web:

1. Create a list of keywords from your topic
2. Choose the right database, search engines or online journals
3. Construct a search query
4. Refine your search

3.2.1 Create a list of keywords from your topic
Whenever a topic is given for an assignment, one thing comes to mind and that is: ‘how do I go about getting relevant materials on this topic without much ado?’ Of course this happens to everybody who embarks on one research or the other but the difference between a good research and a better one is the possession of basic information literacy skills required in carrying out a research on the Web.

A good researcher first creates a list of keywords and phrases that will produce the longest list of relevant pages from the Web. Keywords have to be chosen carefully because a search with just the word ‘Buhari’ might produce a list of thousands of pages that would include blogs and facebook pages of people that bear that
name. Assuming a student has been given a topic on ‘Chibok Girls and the Boko Haram Insurgency in Nigeria’, the first step to take is to write down the search terms (keywords) – Chibok Girls, Boko Haram, Insurgency, Nigeria. The next step is to choose the platform to search for these terms.

3.2.2 Choose the right database, search engines or online journals. So many databases exist for research – both those that comprise secured resources, and the ones that have open access (OA) resources. OA, according to Bothma, et. al (2014), means that if the authors of a research article would like to make the content freely available, they can do this in two ways:

a. On the Internet before it is published in the journal (pre-print)

b. After it has been published (post-print)

Choosing the right database for research is often a daunting task to many people as a result of the vast number of available databases. However, the good news is that you can learn about how to access and search databases, online journals and other full-text publications indexed in databases. First, you need to understand what a database is. Bothma, et. al (2014) defined a database as an organized collection of data or information that is stored in records in electronic format. The content of databases includes conference papers, research reports, patents, book reviews, journal articles, books. An understanding of what the topic is all about will greatly help any researcher in choosing the correct database. You have to first identify the keyword in the topic and also the discipline. For example, if your topic is about ‘Pest Control’, you already know that the discipline is Agriculture. The database to look up becomes TEEAL or AGRICOLA, etc. It should be noted that some topics could fall under more than one discipline and so, more than one database could be used in locating information on such topics (see Table 2).
<table>
<thead>
<tr>
<th>Topic</th>
<th>Discipline</th>
<th>Database</th>
<th>Access Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pest Control</td>
<td>Agriculture</td>
<td>TEEAL, OARE, HINARI, AGORA</td>
<td>Subscription (Available in UNN)</td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>Medicine</td>
<td>MEDLINE</td>
<td></td>
</tr>
<tr>
<td>Yam cultivation</td>
<td>Agriculture</td>
<td>AGRICOLA</td>
<td>Subscription</td>
</tr>
<tr>
<td>Purification of H₂O</td>
<td>Chemistry</td>
<td>PubChem</td>
<td>Free</td>
</tr>
<tr>
<td>Tax Policies</td>
<td>Social Sciences</td>
<td>SSRN</td>
<td>Free</td>
</tr>
<tr>
<td>Any topic</td>
<td>Multidisciplinary</td>
<td>Academic Search Complete</td>
<td>Subscription</td>
</tr>
</tbody>
</table>

[Table 2: databases]

When choosing a database, you should note the coverage, i.e. a brief description of the topics covered by the database which always comes up at the home page of the database. For instance, if you visit TEEAL (The Essential Electronic Agricultural Library), the home page describes the coverage of the database (see Fig. 1).
Some databases offer access to full text while others do not. No doubt, many users have experienced difficulties in accessing journal articles from ScienceDirect. This is because unlike many other databases, ScienceDirect only offers full-text access to selected journals. JSTOR (www.jstor.org) is an IP-driven database that offers full-text access to most of the journals, only that you may have to install some pdf add-ins on your PC to be able to access the articles which appear in pdf format. It is important to note that users can have controlled access or free access to databases on the Internet. In controlled access, the resources are made accessible via the library of an academic institution. When accessing the secured resources, it is advised that users should avoid unnecessary download of articles from databases and NEVER give out the passwords to people indiscriminately.

The use of advanced search forms is very apt in accessing resources from databases, just that it is only experienced researchers that may be familiar with the interface. As opposed to Basic Search boxes, the Advanced Search form is very necessary in retrieving relevant information. Here, the use of Boolean
operators (AND, OR and NOT) becomes useful in constructing a search query (see 3.2.4 for more highlights).

3.2.2.1 Search Engines

A search engine is the most common tool used to locate information on the Web. In Wikipedia, it is seen as a tool designed to search for information on the World Wide Web, and the search results are usually presented in a list and are commonly called hits. In Webopedia, a search engine is defined as a program that searches documents for specified keywords and returns a list of the documents where the keywords were found. Although search engine is really a general class of programs, the term is often used to specifically describe systems like Google, Alta Vista and Excite that enable users to search for documents on the Web. A search engine searches for Web documents with the keyword (s) specified. Yahoo! and Google™ are the two most popular examples of search engines that have been created to meet the demand for quickly finding information.

When conducting a research, a student can choose from a long list of search engines in order to get a wide range of results. Under-listed are some examples of search engines:

Alta Vista
AOLAnywhere
BigBook
Cyber411
EiNet Galaxy
Eureka
EuroPages
Excite
Google
Yahoo

For more lists of search engines, visit
http://lorien.ncl.ac.uk/ming/resources/searcheng/search.htm
3.2.3 Construct a Search Query: When information needed is matched with available information, precise information is retrieved. After you must have identified the search terms/keywords, you have to attempt choosing the same words that the information provider used in order to make a meaningful match. You can only retrieve a document you need if the words in the document are represented in the query you have made. This is definitely not an easy task, but with the help of information retrieval systems such as Boolean operators, you can obtain the information you need to a reasonable degree. It is common knowledge that formal logic Boolean operators are named after George Boole, a mathematician who lived in the 19th century. The three Boolean operators are: AND, OR and NOT.

3.2.3.1 The AND operator: This is used when you want to retrieve all of the search terms in a query. For example, if you are seeking information on ‘Ladies that are pretty and plump’, the query will be: Pretty AND Plump. The Venn Diagram (diag. 1) illustrates this:

[Venn diag. 1 – AND]

From the Venn diagram above, interception (C -shaded area) represents ladies that are both pretty and plump. All the records containing both terms will be retrieved in the search.

3.2.3.2 The OR operator: This is used to combine terms in such a manner that any of the terms it is combined with can be present in the document to be retrieved. In other words, OR is used to
broaden a search by linking together a number of synonyms. The **OR** operator links two terms and finds matching documents if either or both of the terms exist in the database (Nwachukwu and Ogwo, 2014). For instance, if a searcher is looking for either pretty or beautiful, the search retrieves resources on either pretty or beautiful, or that compares both terms.

![Venn diagram showing OR](image)

**3.2.3.3 The NOT operator:** This is also called the ‘exclusion operator’ – used to exclude unwanted search terms from a query. If you want to obtain information on all kinds of pets excluding dogs, then your query would be: *pets NOT dogs.*

![Venn diagram showing NOT](image)

[Credit: Oregon School Library Information System]
3.2.3.4 Search Queries: In a bid to satisfy one’s information needs, a user enters a query into the web search engine box. Search engines allow users to enter search terms such as keywords, which can either be words or phrases. The act of conducting a keyword search is called a search query. For instance, imagine you are looking for information on ‘Chinua Achebe’; you can type his name into the search field of one of the search engines. The search engine will scan the database for the keywords Chinua Achebe and locate all Web pages that contain these words. Then the search engine will compile the relevant pages and generate a list of their URLs (Uniform Resource Locators) which is likened to the web addresses.

3.2.3.5 Search Results: A search engine results page, or SERP, is the listing of web pages returned by a search engine in response to a keyword query. The results normally include a list of web pages with titles, a link to the page, and a short description showing where the keywords have matched content within the page.

It is important to note, that not all search engines deliver the same results.

- First of all, different engines search different databases for the information you specify in your search query. Some databases are more sophisticated and more detailed than others.
- Secondly, the organization of search results varies, depending on the search engine you are using. Generally, the results at the top of the page are what the search engine interprets as the most relevant to your search. However, not all search engines measure relevancy in the same way. For example, with many search engines, a Web page will have a higher ranking in the list of results if your keywords appear many times throughout the
Web page – in the title, near the beginning, or close together on the page. For these reasons, you should NEVER rely on just one search engine when you are conducting research on the Web. Try using more than one search engine; doing so will likely yield better, richer results!

3.2.4 Refine your search: The Boolean Operators are mostly utilized during Advanced searches wherein searches are refined in order to retrieve precise/relevant resources needed (see fig. 5). In refining your search, you are bound to specify:

a. The type of materials you want (e.g. Journals, books, conference proceedings, reports, etc.)

b. The date range

c. The limitation (e.g. Full text, peer reviewed, scholarly journals)

d. The document type (e.g. Blog, book, business case, book chapter, commentary, etc.)

e. The Language (English, Ibo, Hausa, Yoruba, French, etc).

f. The number of items per page (e.g. 50, 100).

[Fig. 5: Proquest interface]
Conclusion

E-Resources have contributed a lot to research and development in the society. Students and academics should not be left behind. Maximum use should be made, of these resources especially this period when most of the materials we need are not readily available in the physical format. As researchers and students in the third world countries where less importance is attached to the procurement of educational facilities, we should always explore the web and harness the information resources that are available.
References


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http://www.wikipedia.org