



Searching for Information: Techniques and Logical Operators

Suppose you have an assignment to write a research paper, or simply want more information on a topic. For this example the question is:

“How are environmental policies affected by state and national politics?”

A computer database will not understand this natural language sentence, at least not very well. Web search engines such as Google or Dogpile will rank the words you have entered and retrieve results based upon ignoring some words and re-assembling others using various algorithms, including Boolean logic.

Search engines in the VIVA (Virtual Library of Virginia) and other paid databases, although accessed via the Web, are not the same as searching “The Web.” First, if you search the Web using a search engine like Google you will not retrieve the data found in VIVA. That is because VIVA is part the *Invisible Web* or *Deep Web*, sometimes called the *Private Web* in the case of paid databases. VIVA resources are only available to those who have paid for them—which you have by being a student at VHCC. Second, the Library paid databases for the most part *will not* recognize a natural language sentence if entered into their search engine, so it is necessary to restructure the search into something the computer can understand.

The *first step* is to break your topic down into fundamental concepts. In this example, the concepts are: ■ **environmental policies** ■ **national politics** ■ **state politics** “Affected” and “How” are indistinct types of concepts that cannot be expressed well in a computerized database search—your search statement should only include the tangible terms.

The *next step* is to put these concepts together into a statement that will be understood by database search engine. This is done by using Boolean operators, truncation, and possibly subject headings, which are explained below.

In this example, your search would be put together conceptually in a basic Boolean logic statement as follows:

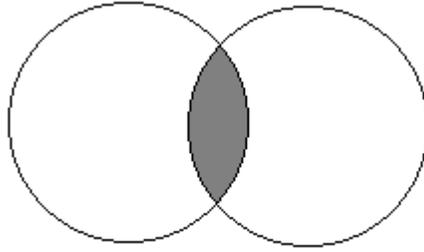
- environmental policies **AND** (national politics **OR** state politics)

Boolean Operators - A Brief Explanation

The Boolean operators AND, OR, NOT (or AND NOT) tell search engines which concepts you want your results to include or exclude.

They’re named after George Boole, an Englishman, who invented them as part of a system of logic in the mid-1800s. They are basically *algebraic operations* involving variables with two values, such as Value 1 *and* Value 2; Value 1 *or* Value 2; and Value 1 *but not* Value 2.

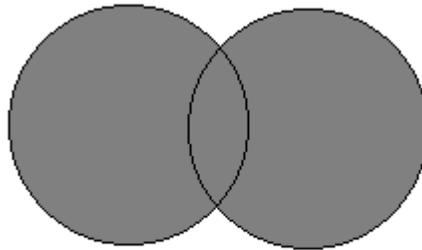
AND



environment AND policy

This type of search will result in entries that must contain both words. You may use “AND” to narrow a search.

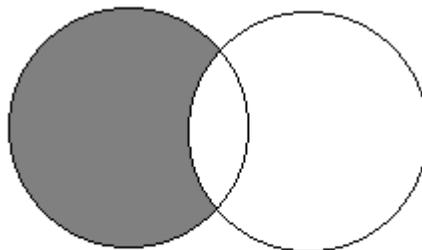
OR



global warming OR climate change

This type of search will result in entries that contain either of the words. Use “OR” to broaden a search. Use this especially with synonyms, or terms that have similar meanings.

NOT



virginia NOT west virginia

This type of search will eliminate false hits. Use “NOT” to clarify a search.

Glossary – Boolean Logic

AND

When terms are connected by this logical operator, only those entries containing **all** of the connected search terms will be selected. May be used to narrow a search. Many search engines (and almost all Internet searches) default to an “assumed” AND unless otherwise specified when terms are entered.

Example: religion AND politics

NOT (AND NOT, BUT NOT)

When terms are connected by this logical operator, entries that contain a particular term are excluded. May be used to narrow a search or eliminate false hits.

Example: virginia NOT west virginia

OR

When terms are joined by this logical operator, entries containing **any** of the connected search terms will be selected. Commonly used to link together synonyms. May be used to broaden a search.

Example: dogs OR canines

NESTING

Using parentheses () to enclose terms to be combined with an operator when more than one type of Boolean operator appears in the same search statement.

Example: (infant OR infants OR baby OR babies) AND (drug or drugs OR alcohol) AND abuse

NOTE: *With “Advanced Search” functions now available in most search engines, nesting is no longer required, but still useful*

TRUNCATION

Also called wildcards. A method of retrieving various forms of words sharing common roots or stems by using a symbol to represent additional letters or characters. May be used at the end of a stem or internally. The database documentation (help screens) will indicate which symbols are used in that particular database. Examples: organi?ed ; union* ; adolescen\$

FALSE HITS

Search results that do not correspond to the searcher’s question. Computers locate terms that have multiple meanings, but cannot distinguish between the meanings that the user seeks and those that are not wanted. Even Google will sometime return numerous “false hits.”

Phrase and Advanced Searching

Most search engines that use Boolean operators also support using quotation marks to designate a phrase. Google, Yahoo, other Internet search engines use an assumed “AND.” This means that if you enter the phrase *climate change*, without quotation marks, you are not searching those two words together but *climate AND change*. To get the exact phrase, enter “*climate change*”. Google and most other search engines also have an *Advanced Search* function which will allow searching for phrases without the quotes, as well as interface that functions as Boolean logic (*all of the words* is an **AND** statement, *with at least one of the words* is an **OR** statement, *without the words* is a **NOT** statement.)

Keyword searching

This searches any word(s) or term(s) anywhere in any indexed field within database records. This is the broadest method of searching because all of the record is being searched. However, if you want to search for all the various ways a concept could be expressed (for example *guns*, which can also be called *firearms*, *rifles*, *pistols*, *shotguns*, etc), you will miss some valid records if you only enter one term. Also, sometimes words or terms can have various definitions that may not occur to you. For example, if you enter the word *traffic* and only expect to retrieve information about car traffic, you will discover that you will also retrieve drug traffic, internet traffic, etc. So while keyword searching is a valid and valuable method of searching, some databases, with subject headings assigned to records, offer a way to have improved results.

Subject Headings or Descriptors

Many, if not most, literature indexing databases use a controlled vocabulary to categorize and index together articles on the same topic. These terms are usually called *subject headings* or *descriptors*. All records on a particular topic will be grouped and linked to that heading. One example is the topic *global warming*. Climate change and global warming are often both used as subject headings.

Examples of controlled subject headings include the Library of Congress Subject Headings (what we use for finding books in the VHCC Library), the thesaurus for the American Psychological Association, and ERIC descriptors.

The traditional way to identify descriptors/subject headings used to be through printed subject heading listings. However, now with databases, there are other ways. Many databases have a *browsable subject heading or descriptor list*. If the term typed is not the correct heading, a *cross-reference to the correct heading will usually be given*. In both of these cases, the term is usually searchable by clicking on it. Another way to identify the subject heading or descriptor is to conduct a keyword literature search, browse the list of resultant titles, and when a reference is located that is of interest, look at the full indexing for that record. Usually there will be subject headings or descriptors assigned to it and these headings then used to refine your search.