

Web of Science: A Unique Method of Cited Reference Searching

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The number of times an article is acknowledged as a reference in another article reflects its scientific impact. Citation analysis is one of the parameters for assessing the quality of research published in scientific, technology and social science journals. Web of Science enables users to search current and retrospective multidisciplinary information. Parameters and practical applications evaluating journal and article citation characteristics available through the Science Citation Index are summarized.

Key words: Science Citation Index ■ Web of Science ■ Web ■ Internet ■ referencing

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INTRODUCTION

The idea of an “impact” was first mentioned by Dr. Garfield as a reference counting in 1955.¹ The term “impact factor” was coined with the publication in 1963 of the Science Citation Index (SCI) for 1961. Since that time, a database has been accrued from scientific citations that appear in the reference list of articles from a large number of scientific journals. This database is produced by the Institute for Scientific Information in Philadelphia. The references are listed to show how many times each article has been cited and by whom within a given period of time, and the results are published in the SCI. The annual citation rate of papers by a particular author can therefore be calculated from the author’s list of publications and the SCI.²

The development of the Internet has made the dissemination of scientific information almost instantaneous. In addition, several literature databases, including MEDLINE, are now easily accessible that are open for the public to search the medical literature. The electronic publishing system makes

available the full-text versions of many articles leading to an increase in the number of citations.

In addition to helping libraries decide which journals to purchase, journal impact factors are also used by authors to decide where to submit their articles. As a general rule, the journals with high-impact factors are among the most prestigious today.³

A Unique Method of Cited Reference Searching

Returning home after a three-week holiday, I entered my office anticipating the price I would have to pay after a vacation—and I was correct. A hundred or more e-mail messages awaited my “immediate” attention, and there were neatly organized stacks of journals and papers also awaiting disposition. In addition, I could sense the bustle of anxious patients waiting to see me. “Everywhere was in turmoil,” as Tolstoy described in *Anna Karenina*. I was, however, looking for one specific item—the “Web of Science”. This is a program that lists the number of times an author’s article has been cited by other readers. I noted then that a very recent contribution (letter to the editor) to *The Lancet*⁴ had been cited once—only two months after its publication—while I was having my nice vacation. My first feeling was a great pleasure, as citations are deemed the currency of science. Perhaps I was an important person, important enough to have my views read by others. My second feeling was one of curiosity to learn who had cited my contribution and the reason for the citation. My third emotion was one of shock, progressing to anger because of an unfair and unreasonable accusation⁵. The “lightness of being” should be that I imagined. I stopped everything that I was involved and felt that I should prepare an immediate reply. This I did by mailing my response to the editor of *The Lancet* the same day. My argument must have been a good one, for soon thereafter, I received a response indicating my reply was accepted for publication and that it would appear in print as soon as possible.⁶ This pleased me, for I knew now that my point of view would be presented to readers of this presti-

gious journal. I was also grateful to Web of Science for providing me such important information.

DISCUSSION

The Web of Science enables users to search current and retrospective literature from approximately 8,500 of the most prestigious, high-impact research journals in the world. It also provides a unique search method and cited reference searching. With it, users can navigate forward, backward, and through the literature, searching all disciplines and time spans to uncover information relevant to their research.⁷

The Internet has become an integral tool for modern physicians, and those not ready to embrace this new technology will be missing a valuable resource. Citation

analysis has evolved over the last 50 years as one parameter for assessing the quality of research published in scientific, technology, and social science journals. This is based on the assumption that influential research is widely cited by other scientists and clinicians. With the advent of the Internet, Journal Citation Reports from the Institute for Scientific Information (ISI-JCR) have become widely available to individuals and institutions. In an increasingly competitive research environment, aspects of citation analysis have been suggested as simple proxy, objective measures to evaluate the research quality of a journal, published articles, research institutions, and even individual researchers.⁸

The number of citations an article receives reflects its scientific impact. High-quality research

Figure 1. ISI introduction Page for Web of Science (reproduced with permission by Thomson ISI).

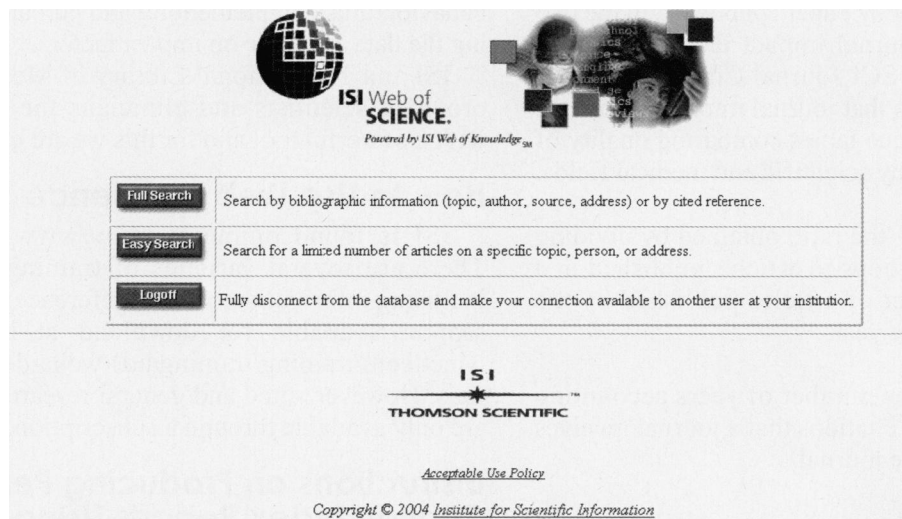
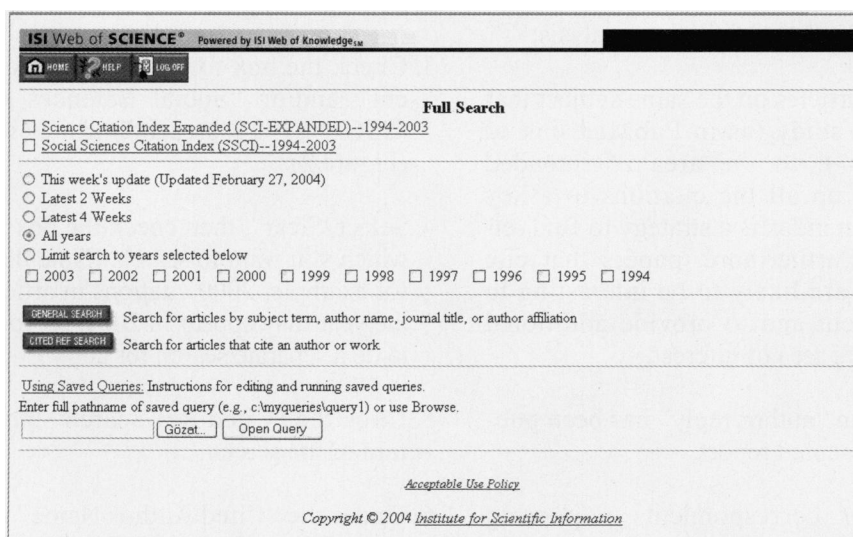


Figure 2. Index and Period Search (reproduced with permission by Thomson ISI).



will have a high impact on its target audience and will, therefore, become an important source of reference for other researchers. Theoretically, such articles will subsequently be cited more frequently than papers of lesser importance and quality.⁹

Web of Science—But Why?

Parameters evaluating journal and article citation characteristics available through the SCI include⁸:

A. Information available through citation analysis;

1. To obtain citation analysis for journals and individual articles—the frequency with which articles published in a journal are cited in other articles.
2. To have information about Journal Impact Factors—the ratio obtained from dividing citations received in one year by papers published in the two previous years. Journal impact factors are published annually in SCI Journal Citation Reports. The consequence is that journal impact factors are widely used as league tables comparing quality of journals within many scientific and medical fields.
3. Immediacy index—the ratio obtained by dividing the number of citations to articles published in a year by the number of articles published by the journal in that same year.
4. Cited half-life—the number of years accounting for 50% of current citations that a journal receives (i.e., citations to the journal).
5. Citing half-life—the number of publication years that account for 50% of the citations published by a journal in the reference section of articles (i.e., citations from the journal).

B. The practical applications of citation analysis:

1. To investigate for articles on the same subject that cited the relevant study (as in PubMed link to “Related Articles”). In the area of intended research, looking up all the citations to a key paper in the citation index is a strategy to find relevant literature. Furthermore, papers that cite one’s own papers are likely to be interesting to read for the content and to provide additional information of one’s area of interest.
2. To learn whether an “author reply” has been published as in the presented report.
3. To learn whether correspondents requesting reprints are truly interested in the author’s work or

merely submitting a routine request. A year or two after sending the reprints, the author can compare the names of persons who requested reprints with those who actually used them in subsequent citations of his work by Web of Science.¹⁰

Papers that achieve rapid impact are cited within months and certainly within a few years. This pattern of immediacy has enabled the ISI to identify “hot papers” in its bimonthly publication *Science Watch*. However, full confirmation of high impact is generally obtained two years later.³

In the future, there may be more sophisticated ways of assessing the quality of articles and journals. For example, Research Index is a software program that can build digital libraries of published scientific papers and produce automatic citation analyses of all the papers cited. It can also compile statistics on user behavior, thus complementing and perhaps superseding the data available on impact factors.¹¹

ISI and The National Library of Medicine have provided scientists and clinicians the world over with a powerful tool and for this we are grateful.

How to Use Web of Science

ISI is found online at <http://www.isinet.com>. There are several varieties of training materials, including information on cited reference and general search, available for download at <http://www.isinet.com/training/trainingaids/wokaid/wosmaterials>. However, cited and general research resources are only available through a subscription.

Instructions on Producing Personal Citation Index Reports Using Web of Science

1. Access ISI’s Web of Science through the URL.
2. Click on “Full Search” (Figure 1).
3. Check the box for “SCI Expanded—1994–present” and/or “Social Sciences Citation Index (SSCI)—1994–present”, whichever is applicable (Figure 2).
4. Select “Year”, then check the box for the year, for which you want to search. (Note that some of your, for example, 2000 citations in articles published in the year may appear in 2001, so you may also want to do a separate search for 2001.)
5. Click the “Cited Ref Search” button on the bottom of the screen.
6. Under the “Cited Author Name” field enter your name. Leave the “Cited Year” field blank.

7. Click the "Look up" button on either the top or the bottom of the screen.
8. What appears on this screen is a list of your work that has been cited at least once within 2001. If "... appears in front of your name under the "Cited Author" column, this indicates an article in which you were not the first author. Please note that the number given in the "Hits" column is not the number of citations this paper received in 2001 but the total number of citations since the article was published.
9. Click on the "Select Page" button on either the top or the bottom of the screen. This list may include papers in which you are not an author but which appear because there is an author with a similar name. So be sure to uncheck items in which you are not among the authors to avoid cluttering further output.
10. When the boxes in front of all the articles you want are marked with a check mark, click on the "Search" button which is just below the "Select Page" button.
11. From these lists, you can identify all citations to

your work. Please mark citations to your work and turn it in together with your annual faculty survey.

12. If you are among the authors of the citing paper, count that as a self-citation.

REFERENCES

1. Garfield E. Citation indexes to science: a new dimension in documentation through association of ideas. *Science*. 1955;122:108-111.
2. Whitehouse GH. Citation rates and impact factors: should they matter? *Br J Radiol*. 2001;74:1-3.
3. Garfield E. Journal impact factor: a brief review. *CMAJ*. 1999;161:979-800.
4. Sevinc A. Surgical treatment of a hysterical conversion reaction. *Lancet*. 2003;361:2162.
5. Kirk EP. Treatment by deception is bad medicine. *Lancet*. 2003;362:668.
6. Sevinc A. Deception or misinterpretation in case of a conversion disorder? *Lancet*. 2003;362:1679-1680.
7. ISI Web of Science. Available at: <http://www.isinet.com/isi/products/citation/wos/>. Accessed October 26, 2003.
8. Sims JL, McGhee CN. Citation analysis and journal impact factors in ophthalmology and vision science journals. *Clin Experiment Ophthalmol*. 2003; 31:14-22.
9. Gisvold SE. Citation analysis and journal impact factors—is the tail wagging the dog? *Acta Anaesthesiol Scand*. 1999;43:971-973.
10. Sevinc A, Ramanan SV. Obtaining journal reprints. The dos and don'ts. *J Natl Med Assoc*. 2002;94:934-936.
11. The future of the electronic scientific literature. *Nature*. 2001;413:1-3. ■

CAREER OPPORTUNITIES

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