Citation counting
Choy Fatt Cheong :: Librarian@ntu.edu.sg
University Librarian

Publications, particularly journal articles, are important output in all kinds of scholarly work. Through publications, researchers and scholars make known their research, contribute to the collective knowledge store, and at the same time stake claims and establish academic reputations. Naturally, there is great interest in assessing the standing and influence of individual publications and by inference, their authors.

The most common method is by counting the number of times a paper is cited by others. In general, the more times a publication is cited, the more influential it is within its research community. The simple idea of counting citations has led to the formulation of a number of widely used measures of quality and excellence, not only for publications, but also for authors and institutions. Some of these, like “impact factor” are highly controversial when applied to rating the latter. How do we know how many times a paper is cited by others?

It all began about 50 years ago, when Dr Eugene Garfield (who earned a Master of Library Science from Columbia University) proposed the idea of creating a citation index in a paper published in the July 1955 issue of “Science”. The proposed citation index was to “offer a new approach to subject control of the literature of science” (p 108) and would be “useful in historical research, when one is trying to evaluate the significance of a particular work and its impact on the literature and thinking of the period” (p 109). Regular publication of the Science Citation Index (SCI) only began in 1964 under Garfield’s company, Institute of Scientific Information (ISI). Today, SCI together with its other sister products, Social Science Citation Index (SSCI) and Arts & Humanities Citation Index (AHCI) plus other analysis and reporting tools, are offered by Thompson Corp in its “Web of Knowledge” service.

In addition, many other major publishers have also started to offer citation indexes in recent years. For example, one of the other major competitors to “Web of Knowledge” is “Scopus” from Elsevier Corp, launched in 2005. Other databases providing citation information includes Scifinder, Ebscohost, IEEE Explore, and even Google Scholar. All these databases are available in our Library’s Electronic Resource Collection < http://www.ntu.edu.sg/Library/Collections/Databases/>. 

>> continued on page 8
Students have their say about the Library

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Circulation Services Division

Ms Nguyen Thi Thuy Linh is a Third Year undergraduate at the School of Computer Engineering while Mr Foo Heng Aik is a Second Year undergraduate at the School of Civil and Environmental Engineering. Both of them are now working as Student Assistants in the Bibliographic Services Division of the Library. The Library Xpress editorial team asked them some questions about the Library and here’s what they said:

Do you feel motivated to maximise your use of the Library’s resources after having worked in the Library?

Thi Thuy Linh: Yes. Before working in the Library, I did not know that there are so many different kinds of books and journals purchased by the Library. I will try to use them for my future research.

Heng Aik: Yes, I am more aware of the different genres of books available in the collection and will use them more.

Come and work with us!

Mrs Wong-Yip Chin Choo Jacqueline :: ccwong@ntu.edu.sg
Deputy University Librarian

Over the years, many undergraduate students have helped the Library to provide quality services and resources by working part-time with us. Many job opportunities are available for the coming year. Students may check them out in the Work Study Scheme Online System. At any one time, the Library employs about 50 students. They are deployed to the various library divisions and are engaged in different tasks such as check in and check out of books, shelving, data entry, update of web pages, digitisation, maintenance of computers, maintenance of security, design of posters, etc. Remuneration is hourly rated, starting from $7.00 per hour. Payment is on a weekly basis.

If you are interested in improving your customer service skills and research skills, which are abilities prized by employers, do consider taking up a part-time job at the Library. Priority will be given to students who need financial assistance.

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What do you like about working in the Library?

Thi Thuy Linh: I like the librarians here because they are friendly. I also get the first chance to borrow new books when they arrive.

Heng Aik: I like working in the Library as the staff here are friendly and approachable. They are also very patient and willing to answer questions.

What have you learned when you are working at the Library?

Thi Thuy Linh: I have learned how to use the classification system to find books. I am also more aware of the different Library resources, and these include databases and books.

Heng Aik: I have learned more about the different books in the Library collection and the different electronic databases. I now have a better understanding of the classification system which we use to shelve the books. As for databases, I am particularly interested in using economic databases for my research in non-core modules.

What does the Library mean to you?

Thi Thuy Linh: For me, the Library is a place to conduct my research and also a place to revise and study.

Heng Aik: To me, the Library is a place to do research, search for books, and also a place to relax in between classes.

Do you have a favourite NTU Library book which you particularly enjoyed?

Heng Aik: I particularly enjoyed reading books on Chinese history for my non-core module. There are many books on Chinese history in the Humanities and Social Sciences Library.

Thi Thuy Linh: I prefer reading non-fiction books.

Do you have any library tips for the incoming freshmen?

Thi Thuy Linh: Just ask the Library staff if you are not sure of how to use the Library’s facilities or how to locate materials.

Heng Aik: Don’t hesitate to ask the Information Desk if you have any queries. The Librarians are very helpful.

More shelves for new tomes at HSS Library

Chia Yew Boon :: ybchia@ntu.edu.sg
Head, HSS Library

By next semester, the capacity of the Humanities and Social Sciences (HSS) Library would have grown by 50 percent! The current bulging bookshelf situation prompted an urgent review of the space requirements for the library over the next few years. While the library is expanding its digital resources, it continues to work closely with the faculty to develop its collection of printed books and serials to meet their research needs. The acute shelving situation is compounded by the need to quickly ramp up resources to support new subjects offered by the School of Humanities and Social Sciences.

We extended the existing rows of bookshelves, created a new section to house reference materials, and moved low-demand books to the closed stacks. Valuable shelf space is hence created. This allows the library to reconfigure the reading rooms and learning spaces for information skills teaching and learning, small-group meetings, and library-student consultations.

Insights into citation rates

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Instructional Services Division

Recently, the Library conducted seven successful workshops for academic staff on citation analysis. We discussed a number of caveats that needed to be taken into consideration when using the citation count numbers. One of these is that the average citation count varies considerably across disciplines. Thus, a typical Biochemistry or Molecular Biology paper draws higher count on average compared to a paper published in the field of Computer Science, Mathematics or Social Sciences. This is due to different scholarly communication behaviour and characteristics in each discipline.
Therefore it does not make sense to compare the citation count of a paper in Mathematics with that in Biochemistry. If citation count is to be used to assess the research impact of a paper, it should compare its citation count with the average citation count in its own discipline, and not across other disciplines.

The average citation rates for 22 broad fields (reproduced below) can be found in Essential Science Indicators, a subscription service provided by Thomson Corp, the publisher of Web of Knowledge. The table displays the average citation rates of papers within the scientific fields over each of the past 10 years. The average citation count of each discipline for 10 years is shown in the last column. For example, a value of 9.05 for Physics in year 2000 means that on average, a paper published in 2000 have been cited 9.05 times to date (i.e. 2006), and the average citation rate for Physics in the last 10 years is 6.98.

A glance at the table will show that for this snapshot (generated in July 2006), the highest average citation count for the last 10 years belongs to Molecular Biology & Genetics (23.46), followed by Immunology (18.67), and Neuroscience & Behaviour (15.79). The lowest is from Computer Science (2.40), followed by Mathematics (2.54), and Engineering (3.09).

Average Citation Rates for papers published by field, 1996 – 2006

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This table is only available in the print version of the bulletin.
Since July 2005, Chinese books, together with the Japanese and Korean Collections were relocated to the Humanities & Social Sciences (HSS) Library. The collection in the Library comprises of books and journals on Psychology, Sociology, the Social Sciences and Humanities, and Chinese and English literature.

The HSS Library’s operating hours are:
Mon - Fri 8:30am – 9.30pm (during term)
Mon - Fri 8:30am – 7.00pm (during vacation)
Sat 8:30am – 5.00pm

For general inquiries, you may contact the Loan Counter or call them at 6316 8951. For reference inquiries, you may contact the HSS Subject Specialists at the Information Desk or call them at 6316 8952.

Library members who have items on hold may request to pick them up from another library. Materials may be sent to and from three libraries only:
• Humanities & Social Sciences Library (HSS Library)
• Asian Communication Resource Centre (ACRC)
• Library 2

RBR titles, current periodicals (unaccessioned), AV materials, and theses are excluded.

To have a book transferred to a more convenient library of your choice, forward your “hold pick-up notice” to circulation@ntu.edu.sg and indicate your preferred library.

For full details, go to http://www.ntu.edu.sg/Library/Services/transfer.htm.

Some books have moved!
The Library has relocated some of its collections as a result of space constraint and its expanding collection. These include the science books, reference materials, annual reports and standards.

Science Collection
All science books [call numbers beginning with Q, R, and S] are now at the 4th floor of Lee Wee Nam Library.

Reference and Annual Reports
Selected reference collection and annual reports are at the 2nd floor of Lee Wee Nam Library. Older and outdated reference books have been moved to Closed Stacks.

Standards
With the availability of online access, British Standards and IEEE Standards are now kept in Closed Stacks. Other standards are relocated to the 2nd floor of Lee Wee Nam Library.
There are two databases, CAMIO™ and Grove Art Online, which contain a wealth of digital images for Art Design and Media students. CAMIO™ is an online catalogue of 90,000 art museum images. It contains about 90,000 works of fine and decorative art from leading museums around the world. Its images, text, and multimedia represent a broad range of works of art from the collections of prominent museums. They highlight the creative output of cultures around the world, from prehistoric to contemporary times, and cover the complete range of expressive forms. CAMIO™ covers areas like photographs, prints, sculpture, paintings, decorative arts and utilitarian objects, drawings and watercolors, costume and jewellery, textiles, and architecture. Its subject strengths are in Anthropology, Archaeology, Art History, Classics, Culture, and Religion.

All content is rights-cleared for educational use in the classroom and to illustrate papers, Web projects and other assignments.

Grove Art Online covers all aspects of visual art from prehistory to the present day. It also offers online access to the entire text of the 34-volume Dictionary of Art, plus a vast range of additional material. This includes over 45,000 articles, 20,000 biographies, and extensive links to images. Recently, nearly 400 new images of major works of art from the British Museum collection have been added.

To access CAMIO™ or Grove Art Online, go to the Subject listing and Choose Arts & Social Sciences and scroll down to the databases: http://www.ntu.edu.sg/Library/collections/databases/.

For more information, kindly contact the subject librarians for Art Design & Media:
Kasthuri Anandasivam :: anandasivam@ntu.edu.sg
Mrs Hazel Loh :: ktvoo@ntu.edu.sg
Joy Wheeler :: jwheeler@ntu.edu.sg

Listed below are the various URLs and the services they provide.

**Local Resources**
- Intellectual Property Office of Singapore (IPOS) (www.ipos.gov.sg)

**EZ-IP: IPOS online flagship**

With EZ-IP, intellectual property has never been made easier. EZ-IP (pronounced as ‘easy IP’) is the house brand for IPOS’ suite of online services comprising of SurfIP, ePatents, eTrademarks and edesigns all specially designed to meet your intellectual property transaction needs.

**Online Intellectual Property databases**
Mr Baharudin Bin Nordin :: baharudin@ntu.edu.sg
Senior Digital Resource Librarian

There are various online databases covering intellectual property-accessible from our Library website. With the growing interest in global protection of intellectual property, such as patents, trademarks in both the commercial and academic applications, you can now refer to various patent databases available locally and overseas such as IPOS, WIPO, USPTO, UKPO and JPO.

From our NTU Library portal, you can access the ‘Subject Guides’ [Business] Patents & Trademarks for the list of useful patent databases. http://www.ntu.edu.sg/lib/eng/patent.htm
**SurfIP** (http://www.surfip.gov.sg/)

**SURFIP - THE ONE-STOP FIRST-STOP IP PORTAL**

SurfIP is a special project by the Intellectual Property Office of Singapore (IPOS). As an IP portal that offers a comprehensive suite of services supporting both the layman as well as the professional user, you can:

- Research IP Information
- Search for Prior Art
- Gather Business Intelligence
- Monitor Technology
- License Your IP

**ePatents**
http://www.epatents.gov.sg/

Your one-stop website for electronic filing of patent transactions and patent search.

**eTrademarks**

is your One-Stop solution providing electronic filing of Trademark transactions (through IPOS).

**edesigns**

is the One-Stop solution for all your online Registered Designs transactions and searches (through IPOS).

The following are commonly used overseas online databases.

**Overseas**

**Worldwide**

- Delphion Research intellectual property network

  Delphion is part of the Thomson Corporation and — along with other Thomson information solutions like Derwent and the Web of Science — is one of the world’s most popular online destinations for intellectual property and scientific research. Many of the original developers of the Intellectual Property Network (IPN) are still leading innovation on Delphion today. Delphion gives you the patent collections & searching options you need to see inside the world’s important patent databases.

- esp@cenet (European Patent Office)

  More than 50 million patent documents from around the world, most of which are patent applications, not granted patents. Patent applications are usually the first publication of a new idea, appearing before journal articles are published or new products reach the market.

- Patent families tell you if very similar patents have been claimed in other countries.
- Legal status information help you find out if the patent is in force or not and in what countries.
- Bibliographic data of non-patent literature (“XP” documents).

  - **MicroPatent (Registration is required)**
    http://www.micropat.com
  - **PCT - Patent Cooperation Treaty**
  - **PatentScope – to search international patent applications**
  - **Service provided by WIPO**

- **WIPO - World Intellectual Property Organisation**
  http://www.wipo.int

  The World Intellectual Property Organization (WIPO) is an international organisation dedicated to promoting the use and protection of works of the human spirit. These works — intellectual property — are expanding the bounds of science and technology and enriching the world of the arts. Through its work, WIPO plays an important role in enhancing the quality and enjoyment of life, as well as creating real wealth for nations.

**USA**

- **United States Patent and Trademark Office (USPTO)**
  http://www.uspto.gov/

  For over 200 years, the basic role of the United States Patent and Trademark Office (USPTO) has remained the same: to promote the progress of science and the useful arts by securing for limited times to inventors the exclusive right to their respective discoveries.

- **USPTO Web Patent Databases**
  http://www.uspto.gov/patft/index.html

**UK**

- **UK Patent Office**
  http://www.patent.gov.uk/

  The Patent Office is responsible for developing and carrying out UK policy on all aspects of intellectual property. The Intellectual Property & Innovation Directorate (IPID) deals with the policy for patents, copyright (and related rights), trademarks, designs and geographical indications of origin, and co-ordinates on issues affecting both copyright and industrial property matters.

**Japan**

- **Japan Patent Office**
  http://www.jpo.go.jp/

  The Japan Patent Office (JPO) consists of the General Affairs Department, the Examination Department, the Appeals Department, and other sections and departments. The main functions of these departments include:

  - granting adequate rights for patents, etc.
  - drafting plans for IP policies.
  - international exchange and cooperation.
  - review of the IP system.
  - dissemination of information on IP.
The way citation indexes work is quite simple. In a database (or printed index in the old days), one is able to find documents by searching author, title, subject and other document characteristics. How does it work? Typically, the database producer or indexer scans through every document in the database and assigns the appropriate terms for author, subject description and other characteristics describing the document. The index terms are then collated together in various indexes for searching by users.

In citation indexing, instead of indexing the author, title and other typical fields, it indexes the list of references in the document. Thus if Author A lists other publications by authors, B, C and D in its Reference list (i.e. A cites B, C and D), then the citation index will enter the publication by B, C and D in its cited reference index. As a result, one can search the publication by B, which will then point to paper A, i.e. one now knows that B is cited by A.

This simple method of establishing links between publications provides a rich source of data for the study of scholarly communication patterns, research trends, development of disciplines, and other interesting phenomena in the research and academic world. Citation indexes are particularly useful for discovering and finding highly related publications and research work, though it is not often used this way. The availability of quantitative data from citation indexes led to the generation of numerous statistics and rankings, which are then used by administrators for measuring and assessing scholarly output and “quality”. Very often, this has strong impact on decisions in research funding and policies, hiring and promotion of academics and other aspects of the academic reward system. However, as pointed out in most of the literature on citation analysis, it is important to be aware of the pitfalls and limitations of citation analysis when used in evaluation and assessment of research and academic performance.

I will mention just a few common concerns.

• Firstly, the value of citation analysis is based on the assumption that an author cites works in their references for valid reasons, e.g. in support of their arguments or findings, acknowledgment of previous research that contribute to their work, etc. However there may be other “wrong” motives that lead to over citing (e.g. citing superiors out of courtesy) or under citing (e.g. not citing competitor’s work), both of which distort the actual citation count.

• Secondly, the tools used in gathering the citation data are neither comprehensive nor totally accurate. These are not inconsiderable errors in indexing, some of which are clerical (e.g. wrong transcription of author’s name) while others are inherent in the documents indexed (e.g. when an author cites a work wrongly). Also, there is no one comprehensive source of citation information. The coverage in all the databases with citation information is different even for those that cover the same discipline areas.

• Thirdly, scholarly communication practice and citation behaviour varies across disciplines and fields of specialisation. Therefore citation analysis citation count should not be used as an absolute number for comparison of research impact across different academic fields (see related article and table inside this issue). It is well known that citation counting favours the sciences and fast moving fields (i.e. they get much higher citation counts on the average) whereas the humanities focus less on journal articles (the main source of citation information) as the currency of scholarly communication.

In conclusion, the availability of more than 40 years of citation data from scholarly publications has given researchers a valuable web of links and relationships in scholarly publications, particularly in the scientific fields, which lead us to a better understanding of the patterns and trends in scholarly communication. The numbers and statistics from citation analysis also provide an attractive means of assessing research work in a highly competition environment, though one should use them with caution and understanding.

To learn more about citation analysis, please look out for future workshops that the Library will be conducting for academic staff.

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