



Interlending & Document Supply

A practical line in bibliometrics

Jack Meadows,

Article information:

To cite this document:

Jack Meadows, (2005) "A practical line in bibliometrics", Interlending & Document Supply, Vol. 33 Issue: 2, pp.90-94, <https://doi.org/10.1108/02641610510602628>

Permanent link to this document:

<https://doi.org/10.1108/02641610510602628>

Downloaded on: 10 May 2018, At: 01:40 (PT)

References: this document contains references to 34 other documents.

To copy this document: permissions@emeraldinsight.com

The fulltext of this document has been downloaded 1235 times since 2006*

Users who downloaded this article also downloaded:

(2012), "Bibliometric practices and activities at the University of Vienna", Library Management, Vol. 33 Iss 3 pp. 174-183 https://doi.org/10.1108/01435121211217199

(2004), "Introduction to bibliometrics for construction and maintenance of thesauri: Methodical considerations", Journal of Documentation, Vol. 60 Iss 5 pp. 524-549 https://doi.org/10.1108/00220410410560609

Access to this document was granted through an Emerald subscription provided by emerald-srm:395687 []

For Authors

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

Emerald is a global publisher linking research and practice to the benefit of society. The company manages a portfolio of more than 290 journals and over 2,350 books and book series volumes, as well as providing an extensive range of online products and additional customer resources and services.

Emerald is both COUNTER 4 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.

A practical line in bibliometrics

Jack Meadows

Loughborough University, Loughborough, UK

Abstract

Purpose – The purpose of this article is to describe Maurice Line's continuing interest in bibliometrics and in its possible application to library problems since the 1970s. He has especially emphasized two strands. One is the concept of obsolescence and how it applies in practice. The other is citation studies of the social sciences, which tend to have been ignored in comparison with the sciences. He has particularly explored the limitations that need to be taken into account when trying to apply bibliometric ideas in practical contexts.

Design/methodology/approach – An analysis of Line's publications on bibliometrics led to a selection of major themes in his writings. A subsequent study of the publications of others who wrote on this topic over the same period provided a framework for assessing his work.

Findings – Maurice Line played an important role in the development of this area of bibliometrics, though he slightly modified some of his early ideas as time has passed.

Originality/value – Provides a background to Maurice Line's interest in bibliometrics since the 1970s.

Keywords Obsolescence, Information science

Paper type General review

Background

Throughout much of the twentieth century librarians worried about how they could find space for their precious, but ever-expanding collections. Some hardy spirits tried to do quantitative assessments of future space requirements. The most detailed early attempt was based on an analysis of the growth of material in American college and university libraries up to the Second World War. It is worth quoting the author's comments:

Although it had been known for a long time that American research libraries were growing at a very rapid rate, it was not realised until a few years ago that they were, on the average, actually doubling in size every sixteen years When a library has ten thousand volumes, it may double itself in sixteen years without creating for itself any special difficulties; but when it has four million volumes, and still goes right on doubling every sixteen years, a situation very quickly develops which cannot easily be brushed aside or ignored (Rider, 1944).

The question of space was particularly pressing for larger or specialist research collections. For example, a study of the Chemical Society of London just before the Second World War noted that:

In 1938 the situation seemed so desperate that plans were under consideration for adapting the Meeting Room to library use, which would have made it impossible for the Society to hold any of its meetings in its own rooms (Moore and Philip, 1947).

Smaller libraries were more concerned with the problem of limited funding. The question for them was what material should be purchased from the increasing amounts being published. It was recognised early on that, in the sciences, this

question related particularly to journals. In the 1920s, Gross and Gross (1927) tried to obtain a quantitative answer for chemistry by analysing the journals mentioned in the references attached to papers in chemistry. This approach of ranking the importance of journals in terms of the references they received became quite popular in subsequent years, but was attacked by Brodman in the 1940s (Brodman, 1944). She pointed out that the method was based on a number of assumptions – such as that the value of a journal to a researcher was directly proportional to the number of times it was cited – which had never been tested. Her own study of physiology journals found little correlation between a ranking list based on citations and a preference list drawn up by a group of physiologists.

These two strands – the size of the journal literature and the use of citations – were brought together by Fussler (1949). He suggested that the problem in trying to apply quantitative methods of prediction was that too little was known about the characteristics of the scientific literature. He therefore carried out a painstaking study of the physics and chemistry literature using citation analysis as a basis. He concluded that, though such a study left several questions unanswered, it could provide general help to librarians. In particular, he pointed to the guidance it could give on the decline in the use of literature as it aged. This point was subsequently followed up quantitatively by Burton and Kebler (1960), who used citation analysis to determine the “half-life” of the literature in a number of branches of science. The idea of a “half-life” came from the world of physics, where radioactive substances decayed exponentially with time. It was thought that, since the amount of literature available was increasing more or less exponentially with time, the references to it might be expected correspondingly to decrease exponentially into the past. (It was recognised, of course, that the analogy was only partial: radioactive substances are transmuted into something else, whereas papers in old journals are still available to be cited.)

The interest in quantitative studies of the literature grew after the Second World War. However, such studies were still often sporadic and isolated, rather than forming a continuing

The Emerald Research Register for this journal is available at

www.emeraldinsight.com/researchregister

The current issue and full text archive of this journal is available at

www.emeraldinsight.com/0264-1615.htm



Interlending & Document Supply
33/2 (2005) 90–94
© Emerald Group Publishing Limited [ISSN 0264-1615]
[DOI 10.1108/02641610510602628]

and coherent sequence. This situation began to change in the 1960s, when Derek Price (1963) published *Little Science, Big Science*, and followed this up with a number of papers on the same topic. Price's interest was as an historian of science: he wanted to examine the structure of science in quantitative terms. His influential discussion of the growth rate of scientific periodicals and of the uses of citation analysis helped spark off an expansion of research in this field that has continued ever since. Such studies of the literature were labelled "bibliometrics", though nowadays the more general term "scientometrics" seems to predominate. Price's main concern was with the sciences, but, as will be described later, the 1960s also saw an enhanced interest in citation studies of the social sciences.

Citations and obsolescence

This background sets the stage for Maurice Line's entry into world of citations. His particular interest from the beginning has been in the value of citation studies for a practical understanding of library and information work. In his initial paper (Line, 1970), he pointed out that measuring the half-life of a literature mainly reflected the growth of the literature, rather than decreases in usage of the literature with age. To determine the latter it was necessary to correct for the growth rate. Brookes (1970) published an immediate rejoinder, pointing out the need to distinguish between a diachronous view and a synchronous view (see below). Line's other major point – that the growth rate of a library was not always the same as the growth rate of the literature that fell within its remit – was not disputed. Nor was his conclusion that half-lives derived from the literature need not apply to any specific library.

Line followed this up with a paper on the sources that could be used for citation studies (Line and Brittain, 1973). The paper begins with a listing of the uses to which citation studies could be put. These are divided into "primary analyses", which collect the basic data, and the "applications" to which these data could be put. The various sources of citations – abstracting and indexing journals, bibliographies, primary publications and reviews – are looked at, in turn, and their advantages and disadvantages for different types of use assessed. Like most of his papers in this field, this one demonstrates a concern with a logical approach to classification and definition.

The following year, he returned to the topic that has retained his long-term interest – the concept of "obsolescence". He combined with Sandison to write what has often been seen as the first definitive paper on the subject. It was meant to be a general review – one of the series that the *Journal of Documentation* then ran under the heading "Progress in documentation" – but he, typically, saw the need to be clear about definitions first:

The term "obsolescence" occurs frequently in the literature of librarianship and information science. In numerous papers we are told how most published literature becomes obsolete within a measurable time, and that an item receives half the uses it will ever receive ("half-life") in a few years. "Obsolescence" is however very rarely defined, and its validity, interest, and practical value are often assumed rather than explained. Before reviewing studies on "obsolescence", therefore, it is necessary to look at the concept and to identify the reasons why it should be of interest, (Line and Sandison, 1974).

The authors go on to point out that a decrease in the use of documents can arise from a variety of causes. Perhaps the

information the documents contain is incorporated into later work, or is no longer considered valid, and so on. In practical terms, obsolescence involves studying changes in the use of documents over time. The initial question is the obvious one – how much is older material used? But there is also a supplementary question – to what extent does this use truly reflect the value or relevance of the documents concerned? What must be avoided, they say, is the assumption that obsolescence is a given, and that the sole question is the rate at which it occurs. There follows a typical Line footnote. He refers to a paper that speaks of articles "achieving obsolescence", and comments: "Some are born obsolete, some achieve obsolescence, and some have obsolescence thrust upon 'em".

If the meaning of obsolescence requires careful consideration, so, too, does the way it is measured. Line and Sandison emphasized the distinction between synchronous obsolescence and diachronous obsolescence. Synchronous studies compare use at a particular point in time with the age of the items involved. For example, measuring the age distribution of the references attached to papers in a single issue of a journal is a synchronous study. So is an examination of the publication dates of books borrowed from a library over a restricted period of time. A diachronous study is concerned with the history of specific items over an extended period of time. For example, how often is a particular research paper cited from year to year, or how often is a particular book borrowed. In principle, the latter is the kind of knowledge a librarian needs in order to implement a weeding policy. Unfortunately, it is much easier in practice to carry synchronous studies. The fundamental question, therefore, is whether synchronous and diachronous studies come up with appreciably different estimates of the rate of obsolescence.

This proved to be a difficult question to answer. There is first of all the problem mentioned previously of allowing for the growth of the literature. This affects diachronous studies, as well as synchronous studies of citations, since it means that the number of opportunities to cite an older item is increasing with time. Add to this the amount of labour involved in making a full comparative study, and it is hardly surprising that the question has been more often discussed than investigated. Line, himself, investigated sociology journals and found a difference between the synchronous and diachronous data (Line and Carter, 1974). But subsequent studies have gone either way. For example, an examination of citations in the genetics literature suggested that, if the first two years of data were omitted, the rates of obsolescence measured synchronously and diachronously became statistically equivalent (Stinson and Lancaster, 1987).

Not long after Line moved to Boston Spa, he worked with one of his colleagues to make a detailed comparison of data on requests for journal articles from Boston Spa for the latter part of the 1960s with citation data for the same period collected at ISI (Scales, 1976). The conclusion was that there was little significant correlation between the two in terms of journal rankings. When Line reviewed progress in work on the general question some 20 years after his initial study, he noted that both theoretical analyses and practical exercises in data collection continued to come up with different answers. He concluded:

The more citation studies appear, the more apparent have become differences between subjects and types of articles as well as between

studies in what appear to be the same or similar fields. The great dangers of generalization are confirmed (Line, 1993).

In a note published in the latter part of the 1970s, Line (1977) concluded that many citation studies were drawing conclusions as regards library practice which were not justified by the evidence. (Needless to say, this was disputed by some of the authors.) He pointed out that it was not simply a question of journal usage. Librarians needed to know cost per use (allowing for the subscription price, processing, binding and storage) and the amount of shelf space occupied by each journal. He had already followed up the first point himself. He used data from a citation study of biochemical journals (Sengupta, 1973) as the basis for looking at the financial aspect of journal usage. He concluded that rankings of journals based on number of citations differed appreciably from those for the same journals based on cost per citation – a finding that is generally accepted. Line and Sandison (1975) also emphasized the question of usage relative to the amount of shelf space required. In the previous year Sandison (1974) had examined data for a number of physics journals, and had found that usage per metre of shelf space was effectively constant over the previous decade or more. In other words, later volumes of the journals were referred to more often, but also took up more space. So in terms of shelf space occupied, the earlier volumes were as valuable to readers as more recent ones. However, as with work on synchronous and asynchronous citation decay, different studies of this question have come up with differing results. For example, an in-house study of journal usage in a biomedical library concluded that use-density (the number of uses of each volume divided by its thickness) declined exponentially with age like the citations (Sullivan *et al.*, 1980). A recent investigation of the journals in a medical library has compared the results of an in-house usage survey with a citation analysis of the same journals. The half-life for usage by library readers was found to be half that found for the citation half-life. Other evidence seems to support the contention that journal reading concentrates on even more recent material than citations – certainly more than the current growth of the literature would predict.

The problem with all these studies is that investigations of library usage are as open to question as investigations of citation decay. One detailed study in the mid-1970s compared different ways of collecting usage data in order to decide weeding policy for a library (Taylor, 1976). It found that all approaches had their problems. For example, data derived from an examination of reshelving in the library only identified about a quarter of the actual usage by readers. It follows that both citation studies and usage studies produce a somewhat fuzzy picture of what is happening. This not only makes their application difficult, it also hinders comparison of results from different surveys. Line (1978) observed in one of his papers that: “No measure of journal use other than one derived locally from a local-use study is of any significant practical value to libraries”. The problem was that results from local-use studies could themselves be queried – a point that he came to accept.

Bibliometric data in the social sciences

Much of the earlier work on citations was aimed at the sciences and medicine. There were a variety of reasons for

this, ranging from the needs of science policy to the central importance of journals in science. But some valuable surveys relating to the literature of the social sciences (especially psychology) appeared. For example, Louttit (1957) examined how the psychology literature had grown and changed in the first half of the twentieth century. It was subsequently noted that the number of references attached to papers in American psychology journals during the 1950s had increased considerably more than the growth rate of the psychology literature (Xhignesse and Osgood, 1967). In the 1960s, it was found that half of the references attached to social science papers were to material no more than five years old, and that the references to non-serial material were not too different in this respect (Broadus, 1967). A major study of citation decay in the social sciences was carried out in the UK by Earle and Vickery (1969). The mean citation age they found of six years could be compared with the results of a study of requests for social science serials received by the then National Lending Library, which was carried out at about the same time (Wood and Bower, 1969). The latter study found a fall-off in loan demand which was only slightly longer than the mean age derived by Earle and Vickery. Data from these and other studies suggested that the more quantitative and theoretical areas of the social sciences were tending towards the sciences in terms of their literature characteristics.

During the first half of the 1970s, Maurice Line supervised a major research project on the design of information systems in the social sciences (DISISS). This involved an investigation of the social science literature which was both extensive in coverage and detailed in terms of analysis. Line (1979) subsequently brought together the information that had been unearthed regarding the nature and role of citations in the social sciences into one report. He explained that data from citation studies had their uses for designing information systems, more particularly in establishing the needs of different groups of readers in terms of subject coverage and language. He also emphasized the importance of using wide coverage of the literature in order to obtain meaningful results. In this case, the investigation covered 140 serials and nearly 300 monographs as sources of references, nearly 59,000 of which were collected (48,000 from journals and 11,000 from monographs). The report reflects the thinking on citation studies that Line had developed during the 1970s. It devotes attention to definition of the technical terminology and to the need to be clear what the analysis is doing (for example, in distinguishing between synchronous and diachronous studies).

The study provides a solid basis for distinguishing between the characteristics (sometimes widely differing) of the different subjects that fall within the overall field of the social sciences. Line notes, for example, that the spread of citations across the subject literature can differ greatly. In psychology, 30 per cent of the serial titles received 90 per cent of the citations, whereas in political science 80 per cent of the titles received 90 per cent of the citations. So far as citation decay was concerned, even when a correction was made for the growth rate of the literature, older material in the social sciences was found typically to be cited less than more recent material. In other words, there was a genuine decrease in usage of older material. Perhaps the most innovative aspect of the report was the comparison between different categories of source. Librarians have always had a gut feeling that researchers in the sciences read journals while researchers in

the humanities read books. The social sciences lie in between, using both forms of publication extensively. Indeed, the survey carried out by Line and his colleagues pointed to significant use of additional types of material, such as official publications and newspapers.

The comparison between journals and books in the social sciences showed a range of differences, some of them quite large, in terms of age distribution of citations, type of material cited, subject self-citation, citations to fields outside the social sciences, and the countries of publication cited. References to books were distributed across a wide range of titles: less than 1 per cent were cited five times or more. Besides being more widely scattered, book citations, on average, decayed more slowly with age than journal citations. However, the extent of the difference varied considerably from subject to subject within the social sciences. This led to the important point that mixing references to books and journals when doing a citation analysis could lead to significant errors. The journal v. book comparison was a valuable addition to knowledge of citations; though Line characteristically began his concluding section with the comment: "Few citation analyses produce major surprises, and if they do it is the analyses that tend to be challenged rather than the assumptions".

The DISISS project produced detailed information on the rate at which social science literature was growing. Growth rates of journals had come to be a topic of major debate by the 1970s both for theoretical reasons (for example, determining the shape of the growth-rate curve for different subjects) and for very practical reasons (the increasing funding and space that they required). As a part of their examination of the social science literature, Line's team examined the way in which it had grown with time. Particular emphasis, (Line and Roberts, 1976) was placed on exploring the methodological problems involved. For example, Price's original estimate of journal growth rates had been based on adding together new journal titles and previous ones. This implicitly assumed that journal titles did not die. As Line and his colleagues showed, the death rate of journals in the social sciences cannot be ignored. Taking this into account slowed the calculated growth rate which, nevertheless, appeared to be exponential up to 1970, the end date of the study. However, the estimated growth rate varied appreciably from subject to subject. Line pointed out how necessary it was to get the data right:

The importance of collecting data as accurately as possible is emphasized by [a recent influential report] ... which by using figures of doubtful validity and extrapolating on questionable assumptions predicts within a measurable period a volume of publication of vast dimensions.

Literature growth and an electronic environment

Fifteen years later, Line returned to the question of growth (Archibald and Line, 1991), this time looking at all fields of research. The number of articles published in nearly 200 journals that had been in existence from 1950 onwards was counted. The analysis confirmed that there had been a rapid expansion in most subjects up to 1970. The growth then decreased up to 1980, after which it became mainly slow, or even declined in some subject areas. From the time of Price's original proposal of an exponential growth rate, it had been realised that a slowdown must occur some time. This new work suggested that such a slowdown was actually beginning to occur.

A slowdown in growth might help librarians' space problems, but did not help their budgets, since journal prices continued to rise. In universities, what was to be purchased had traditionally been agreed with the academic staff. As Line had found previously, staff judgements were not necessarily accurate. One study he carried out showed that about one-third of the books bought by two academic libraries were not used in the two years immediately following their purchase (Line, 1986). Academic opinions regarding journal titles could also be unreliable. Line (2001) reminisced:

In my first few weeks as a university librarian many years ago I was berated by a professor of chemistry for ceasing to subscribe to a certain title, which he said he used all the time. Where he used it, or if he did at all, was not clear, since in fact the library had never taken the title in question!

Under these circumstances, the question of selection remained urgent. The difficulty with books was that usage could only be determined retrospectively, after the books had been purchased. Journals continued to offer the possibility of estimating future use, and so the likely benefit of retaining particular titles. Line noted that the idea of using citations for guidance seemed to have become much less popular by the latter part of the 1980s:

The fact that little has been written since may mean no more than that people grew tired of the issue, and went on doing what they had been doing before – which was probably relying on intelligent guesswork and the recommendations of researchers.

It was just at this time that a re-evaluation was made of the comparative study published by Scales in 1976. This had been criticised at the time from various viewpoints, but most cogently by Brookes (1976) who objected – as was his wont – to what he saw as an incorrect application of statistics (the Spearman test had been used to compare rankings). Bensman (2001) reworked the data and showed that there was actually a reasonable correlation between the use data and the citation data. What this demonstrated was that the usage in a very large library with many users could parallel citation data. Line (2001) was prepared to accept this, as he was the idea that a study of the citations in the work published by library users might partially reflect the literature available locally. Neither conclusion negated the point he had been making for some time: that general citations study were usually not applicable locally and that really useful local studies took a great deal of time and effort. However, hanging over all this – as he recognised – was the question of the transition to electric journals. How would this affect librarians (assuming that they were still involved) in terms of the selection and discarding of material? To put it another way, to what extent is all the work put in by Line and others on bibliometric studies of printed journals applicable to an electronic environment? Maybe Maurice can be persuaded to write one more article on that!

References

- Archibald, G. and Line, M.B. (1991), "The size and growth of serial literature 1950-1987, in terms of the number of articles per serials", *Scientometrics*, No. 20, pp. 173-96.
- Bensman, S.J. (2001), "Urquhart's and Garfield's laws: the British controversy over their validity", *Journal of the American Society for Information Science and Technology*, No. 52, pp. 714-24.
- Broadus, R.N. (1967), "A citation study for sociology", *American Sociologist*, No. 1, pp. 19-20.

- Brodman, E. (1944), "Choosing physiology journals", *Bulletin of the Medical Library Association*, No. 32, pp. 479-83.
- Brookes, B.C. (1970), "The growth, utility, and obsolescence of scientific periodical literature", *Journal of Documentation*, No. 26, pp. 283-94.
- Brookes, B.C. (1976), "Citation v. usage of serials", *Journal of Documentation*, No. 32, pp. 320-32.
- Burton, R.E. and Kebler, R.W. (1960), "The half-life of some scientific and technical literature", *American Documentation*, No. 11, pp. 18-22.
- Earle, P. and Vickery, B. (1969), "Social science literature use in the UK as indicated by citations", *Journal of Documentation*, No. 25, pp. 123-41.
- Fussler, H.H. (1949), "Characteristics of the research literature used by chemists and physicists in the United States", *Library Quarterly*, No. 19, p. 19-35, 119-145.
- Gross, P.L.K. and Gross, E.M. (1927), "College libraries and chemical education", *Science*, No. 66, pp. 385-9.
- Line, M.B. (1970), "The 'half-life' of periodical literature: apparent and real obsolescence", *Journal of Documentation*, No. 26, pp. 46-54.
- Line, M.B. (1977), "Citation analysis: a note", *International Library Review*, No. 9, p. 429.
- Line, M.B. (1978), "Rank lists based on citations and library uses as indicators of journal usage in individual libraries", *Collection Management*, No. 2, pp. 313-6.
- Line, M.B. (1979), *The Structure of Social Science Literature as Shown by Citations*, DISISS Research Reports, Series A, No. 3, University of Bath, Bath.
- Line, M.B. (1986), "Can book selection be improved?", *British Journal of Academic Librarianship*, No. 1, pp. 160-6.
- Line, M.B. (1993), "Changes in the use of literature with time - obsolescence revisited", *Library Trends*, Vol. 41, pp. 665-83.
- Line, M.B. (2001), "The use of citation and other statistics in stock management", *IFLA Journal*, Vol. 27, pp. 247-52.
- Line, M.B. and Brittain, J.M. (1973), "Sources of citations and references for analysis purposes: a comparative assessment", *Journal of Documentation*, No. 29, pp. 72-80.
- Line, M.B. and Carter, B. (1974), "Changes in the use of sociological articles with time: a comparison of diachronous and synchronous data", *BLL Review*, Vol. 2, pp. 125-30.
- Line, M.B. and Roberts, S. (1976), "The size, growth and composition of social science literature", *International Social Science Journal*, Vol. 28, pp. 122-59.
- Line, M.B. and Sandison, A. (1974), "'Obsolescence' and changes in the use of the literature with time", *Journal of Documentation*, Vol. 30, pp. 283-350.

- Line, M.B. and Sandison, A. (1975), "Practical interpretation of citation and library use studies", *College and Research Libraries*, Vol. 36, pp. 393-6.
- Louttit, C.M. (1957), "Publication trends in psychology", *American Psychologist*, No. 12, pp. 14-21.
- Moore, T.S. and Philip, J.C. (1947), *The Chemical Society 1841-1941*, Chemical Society, London, p. 171.
- Price, D. (1963), *Little Science, Big Science*, Columbia University Press, New York, NY.
- Rider, F. (1944), *The Scholar and the Future of the Research Library: A Problem and its Solution*, Hadham Press, New York, NY, p. 3.
- Sandison, A. (1974), "Densities of use, and absence of obsolescence, in physics journals at MIT", *Journal of the American Society for Information Science*, No. 25, pp. 172-82.
- Scales, P.A. (1976), "Citation analyses as indicators of the use of serials: a comparison of ranked lists produced by citation counting and from use data", *Journal of Documentation*, No. 32, pp. 17-25.
- Sengupta, I.N. (1973), "Recent growth of the literature of biochemistry and changes in ranking of periodicals", *Journal of Documentation*, No. 29, pp. 192-211.
- Stinson, E.R. and Lancaster, F.W. (1987), "Synchronous versus diachronous methods in the measurement of obsolescence by citation studies", *Journal of Information Science*, No. 13, pp. 65-74.
- Sullivan, M.V., Vadeboncoeur, B., Shiotani, N. and Stangl, P. (1980), "Obsolescence in biomedical journals: not an artifact of literature growth", *Library Research*, No. 2, pp. 29-46.
- Taylor, C.R. (1976), "A practical solution to weeding university library collections", *Collection Management*, No. 1, pp. 27-45.
- Wood, D.N. and Bower, C.A. (1969), "The use of social science periodical literature", *Journal of Documentation*, No. 25, pp. 108-22.
- Xhignesse, L.V. and Osgood, C.E. (1967), "Bibliographical citation characteristics of the psychological journal network in 1950 and 1960", *American Psychologist*, No. 22, pp. 778-91.

About the author



Jack Meadows is Emeritus Professor of Library and Information Studies at Loughborough University, Loughborough, UK.

This article has been cited by:

1. Dion Curry, Steven Van de Walle. 2018. A Bibliometrics Approach to Understanding Conceptual Breadth, Depth and Development: The Case of New Public Management. *Political Studies Review* 16:2, 113-124. [[Crossref](#)]
2. Derek R. Smith. 2010. A longitudinal analysis of bibliometric and impact factor trends among the core international journals of nursing, 1977–2008. *International Journal of Nursing Studies* 47:12, 1491-1499. [[Crossref](#)]
3. Michael J. Kurtz, Johan Bollen. 2010. Usage bibliometrics. *Annual Review of Information Science and Technology* 44:1, 1-64. [[Crossref](#)]
4. David Nicholas, Ian Rowlands, Paul Huntington, Hamid R. Jamali. Information Obsolescence 2475-2482. [[Crossref](#)]
5. Derek R. Smith, Michael Hazelton. 2008. Bibliometrics, citation indexing, and the journals of nursing. *Nursing & Health Sciences* 10:4, 260-265. [[Crossref](#)]
6. Kim Hong Yeoh, Kiran Kaur. 2008. Subject support in collection development: using the bibliometric tool. *Collection Building* 27:4, 157-166. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
7. Judit Bar-Ilan. 2008. Informetrics at the beginning of the 21st century—A review. *Journal of Informetrics* 2:1, 1-52. [[Crossref](#)]
8. Christine Urquhart. 2006. From epistemic origins to journal impact factors: What do citations tell us?. *International Journal of Nursing Studies* 43:1, 1-2. [[Crossref](#)]
9. Mike McGrath. 2005. Interlending and document supply: a review of the recent literature – 52. *Interlending & Document Supply* 33:3, 162-171. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]