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Quality Indicators and Educational Research publications: which publications count?

by Olivier Rey

For several months, part of the debate about universities has been focused on the question of evaluating scientific activities and particularly on assessing the work of researchers according what they have published. Classifications of journals, bibliometrics, citation indexes, ranking, quality indicators: the controversy, which is both national and international, hinges on notions that are often poorly understood in social sciences and humanities research.

The heart of the controversy is mainly to be found in the idea that one can use quantitative measurements made on publications to assess scientific output activity through statistics on academic publications. While academics tend to be attached to peer review methods, evaluation using figures always fascinates decision-makers and laymen anxious to have references that are simple to understand and handle.

In this number we would like to consider the subject within the framework of university evaluation, but also to define a number of detailed benchmarks concerning research in education, to help clear up the issues involved in the debate. The reader will find a summary of sources essential for understanding the arguments used, together with recent bibliographical references for further reading.

Warning to readers

- *Most of the links correspond to the relevant files in our bibliographic database, which includes complete references and, where applicable, access to the articles quoted (some offer free access and some require payment, depending on the article and the electronic subscription taken out by your institution);*
- *You can inform us of your reactions to this Newsletter, suggest relevant themes or ask for more specific details by leaving a comment beneath the corresponding post in our blog: "Écrans de veille en éducation".*

Universities in the new rounds of evaluation

An imposition of globalisation?

For many laymen, the question of the evaluation of university outputs emerged through the results of the Academic ranking of Shanghai. It would seem that the upheavals of globalisation or the globalisation of higher education have imposed on our governments, our universities and our academics the requirements of evaluation, the latest manifestation of the "new public management" (Rey, 2007).

It was then discovered or rediscovered that, in certain countries or certain regions, the ranking of research departments or universities is part and parcel of the everyday running of higher education.

Classifications and rankings are generally drawn up by private media or organizations. They are seen first of all as a source of information for the general public (especially students) but are used, in a way that is more or less acknowledged, by public authorities and the world of business and are not without effect on funding.

While certain rankings, like that of Shanghai, which has received much media coverage, are easy to criticize from the standpoint of their criteria (the number of Nobel Prizes, for example), other analysis methods, using a rigorous approach, have been developed, such as the CHE University Ranking, produced by the *Centre for Higher Education*, in Germany.

Quality assesment of scientific activities, at least at individual level, is not, however, an innovation in the academic world. As David Bridges (2008) notes, "academics have on the whole learned to live with the practice of quality assessment, notwithstanding evidence of its unreliability and poor predictive validity. It is perhaps made more tolerable because in none of them does progress depend on a single source of judgement". So a paper refused in one conference may be accepted in another or be transformed into an article accepted in a review; a project that fails to gain funding in one invitation to tender may find grants within the framework of another programme. The fact that there exist alternatives in the event of refusal, and that the academic field accepts a diversity of criteria of judgment, is essential in the eyes of academics. When, in contrast, a single assessment method directs core institutional funding, it becomes a powerful policy tool in the hands of decision-makers, guides how academic research is constructed and is a source of concern for researchers.

Taking into account the stagnation of public funds allocated to research, many countries are wondering whether it is to better distribute funding fairly throughout the system, at the risk of there being only a scattering for everybody, or whether to concentrate resources on certain university departments to ensure that the expenditure is used to greater effect. In this latter case, the question obviously arises of choosing the best indicator to direct this selective distribution of funding.

Recent decades have seen an increasing amount of competition between researchers, universities and journals to obtain the best ranking, an obsession which is gaining ground over dealing with the questions that matter most to society (Adler & Harzing, 2009). "Rather than genuinely fostering relevant knowledge, the emphasis on ranking seems to be driven by a desire to identify winners and losers in a game of academic prestige" (p.3).

A delegation of the French Senate is looking at the question, and in July 2008 produced a bulky paper on the *challenge of ranking in higher education* (Bourdin, 2008). The report goes on to point out the information gaps in the system and higher education institutions, thereby contributing "*to focus attention on rankings of the Shanghai type which, as interesting as they may be, reflect reality only partially and imperfectly*".

As many authors recognise, "*the intensified battle around the production and dissemination of knowledge has the effect of increasing the success and the reputation of rankings and other classifications*" (Hazelkorn, 2007) of universities and research institutions, no matter how much they are criticised.

In spite of "rational" criticisms of these rankings, about which those in charge in universities are in agreement, institutions whose ranking improves waste no time in making use of this "recognition", whatever its doubtful academic value and, in so doing, reinforce the impact of the ranking.

Admittedly, all rankings do not use the same criteria and weighting coefficients (with greater or lesser importance attached to research, teaching, etc), but a comparative study in English-speaking countries noted that the various rankings ultimately define the concept of quality in virtually identical terms (Dill & Soo, 2005), with research work weighing predominantly in the analysis.

In this context, the number of publications and citation indexes are used in the majority of these rankings. Sometimes fairly rapidly qualified as "bibliometric", these assessment indicators put the question of academic reviews and researchers' publications centre stage so as to assess their scientific scope, which explains the extreme sensitivity of the academic world to anything connected with institutional ratification of the ranking of reviews. Classifying a review as "A" "B" or "C", is to infer that there is also a ranking of the articles published in that review and, by extension, of the researcher who produced them.

How assessment has taken hold of French universities

It would nevertheless be inaccurate to conclude that it is via an "international" detour that the topic of assessment has made its presence felt in French academic debate. Admittedly, the controversy on assessment has been spreading with some vehemence since the launch of the loi relative aux libertés et responsabilités des universités (LRU – law on the freedom and responsibilities of universities) and the concomitant setting-up of the Agence d'évaluation de la recherche et de l'enseignement supérieur (AERES – agency for the assessment of research and of higher education). But the question of assessment was introduced in the nineteen-eighties, initially in academic debate (Mérindol, 2008), then through the creation of the national committee for assessment of universities in 2004.

According to Jean-Yves Mérindol, assessment has long been the main topic absent from all debates: from the conference of Caen (1956) to that of Amiens (1968) via the reforms which followed the events of May 1968. At that time, the assessment of teacher-researchers was carried out primarily on an individual basis, during recruitment or promotion procedures, with the notable exception of assessment by the CNRS of its "unités associées" created in universities in 1965 (these have since become "unités mixtes de recherche" or UMR).

In the early eighties, Laurent Schwartz, the famous mathematician, initially promoted the idea of assessment of universities in the report ordered by the Prime Minister, Pierre Mauroy, and later through a manifesto published in 1983 with the title *Pour sauver l'université* (To save the university). He was behind the creation of the national committee for university assessment (CNE: Internet archives available here), and became its first president in 1985. Two strong features of the CNE, which not everyone then was in agreement about, have to do with the independent nature of this administrative authority, accountable to the President of the Republic, and with its being able to publish public reports rather than "reports for the attention of the minister", in the best tradition of French administration.

In parallel, Pierre Bourdieu was asked to pass on the proposals on teaching made by the Collège de France to President François Mitterrand. This report, published in 1985, also evoked the need for continuing to allow universities a great deal of independence (with the management of a global budget), assessment being the condition for controlled competition between universities, which is what the sociologist wanted.

To assess France's scientific output, the l'Observatoire des Sciences et Techniques was created in 1990, in the form of a public interest group bringing together those involved in public research (ministries and research organizations). It produced quantitative studies (which did not until then exist in France), mainly based on the use of the data banks of the ISI-Web of Science, marketed by Thomson-Reuters (cf *supra*), which explains why its sphere of activity did not include the social sciences. As regards the CNRS, it should be noted that laboratories have, for several years, been asked to provide the citation indexes of their researchers, calculated using the software *Publish or perish* (cf *supra*). This bears witness to the increasingly frequent recourse to indicators to produce assessments of scientific quality which are as objective, as rapid and as economical as possible.

In this context, the setting-up in 2007 of the new assessment agency (AERES), which centralizes assessments formerly carried out separately (assessment of institutions, research teams, training and qualifications, etc), rekindled controversy about the best way to assess university activities.

The decision to endow a single agency with assessment missions relating to scientific output, research teams and the strategies of institutions has also led to debate. "*Concentrating assessment within a single agency is contestable because it implicitly leads to a confusion between missions which it is essential to distinguish*", argues Jean-François Méla, a former director of the university scientific mission (Méla, 2008). The fact of asking AERES to make an assessment of all institutions over a four-year period (i.e. at the same four-year rate as for contracts defining objectives between the ministry and universities and schools) provides grounds for fearing an industrialisation of the assessment process, hardly conducive to a detailed understanding of universities (Mérindol, 2008).

In the context of the dispute surrounding the LRU, particularly within humanities and social sciences universities, opposition mainly focuses on the question of scientific output indicators. In an environment that is already little enough comfortable with the requirement for performance indicators made systematic by the LOLF (the incorporating act on financial laws), the partial reworking by AERES of the ranking of reviews in the field of social sciences produced by the European Science Foundation (ERIH Initial Lists) carries with it the threat of switching over from a primarily qualitative peer assessment to a quantitative assessment based on indicators considered to be arbitrary.

❑ See also

- CAVET Agnès (2009). "In the footsteps of the world education market". *Dossier d'actualité de la VST*, n° 42, February, <http://www.inrp.fr/vst/LettreVST/english/42_february2009_en.htm>.
- PERELLON Juan-Francisco (2003). *La qualité dans l'enseignement supérieur*. Lausanne : Presses polytechniques et universitaires romandes.

Controversy surrounding the ranking of scientific journals: the example of educational research

The ranking of scientific journals is a bitterly debated issue everywhere in the world, even if bibliometric use of data banks is more widespread in the English-speaking world. From this point of view, one may usefully consult the work of the Centre for the Study of Research Training and Impact at the University of Newcastle in Australia, which developed and analysed a database of 1,042 English-language journals in the field of education (Fairbairn *et al.*, 2009).

Even in France, following the example of what the CNRS does when giving a "label" to certain social science journals (outside the field of education, since the discipline does not exist in this organization), it is usual to draw up lists of scientific journals in which the researchers are likely to publish. The question became even more of an issue a couple of years ago, when AERES explicitly wanted to rank scientific journals to improve the assessment of those publishing.

From the ESF ranking (ERIH Initials Lists)…

The European Science Foundation in collaboration with the European commission undertook in 2007 to count and rank scientific journals by main social science fields, with the acknowledged aim of obtaining a ranking of "good" European research journals in the international context. It is not only a question of encouraging the calibration of each journal in line with the quality standards of the scientific community but also of contributing to bringing out European centres of excellence in each field. The European Reference Index for the Humanities (ERIH) project quickly produced a series of eleven lists by disciplinary field, classified as "A", "B" or "C". This ranking did not at that time lead to much discussion in France. In September 2007, the VST published an article on its blog announcing the results of the ranking in the field of Pedagogical and Educational Research without causing any reaction.

In theory, from rank A to rank C, the ranking is supposed to reflect the degree of international impact of the journal. In practice, it would seem that the fact of being published in English ensures a place in A or B, independently of the level of the journal, while category C is mainly reserved for scientific journals of the countries which publish in their national language. A report that is confirmed, if confirmation were need, by the label A allotted to many American journals whose international character is more than doubtful. This is the case with the *Harvard Educational Review*, reserved for American authors selected by an exclusively American editorial committee and which generally tackles only subjects concerning education in the United States.

Severe judgments, in particular on this aspect of the ranking, have often been expressed more or less throughout Europe, including in English-speaking countries, as a report from the British Academy testifies: it concludes that the ERIH ranking is not currently a reliable source for building measurement indicators for journals with a reading panel (Weale, 2007).

Concerning the French-speaking field, three journals have obtained an A ranking:

- *Revue française de pédagogie* ;
- *Histoire de l'éducation* ;
- *Enfance*.

Seven journals have a B ranking:

- *Éducation et sociétés* ;
- *Éducation permanente* ;
- *Formation Emploi* ;
- *Penser l'éducation* ;
- *« Perspectives en éducation »* ;
- *Repères* ;
- *Revue internationale d'éducation*.

Seven journals have a C ranking:

- *Aster* ;
- *Carrefours de l'éducation* ;
- *Didaskalia* ;
- *Éducation et formation* ;
- *L'orientation scolaire et professionnelle* ;
- *Les sciences de l'éducation pour l'ère nouvelle* ;
- *Le Télémaque* ;
- *Recherche et formation*.

It can be seen that no recent journals appear in the list, but neither do certain journals like *Distances et savoirs* (published since January 2003) or *Les dossiers des sciences de l'éducation* (published since 1999). On the other hand, the journal *Enfance*, in the field of psychology rather than that of educational research , is one of the three journals to obtain an A ranking, while *"Perspectives en éducation"*, which may, one wonders, be the late INRP journal *Perspectives documentaires en éducation,* the last issue of which goes back to 2005, gets a B ranking.

… to the AERES ranking

It was not until summer 2008 that the rankings published by the European Science Foundation attracted violent criticism in France, when AERES decided to draw on these to produce, in its turn, a "list of scientific journals in the field of social sciences". From then on, there have been a number of controversies, petitions and stances taken in various disciplines to criticize the institution of these lists, calling into question the very principle of ranking and/or the inclusion and ranking criteria, considered to be insufficiently clear (cf. an example in the field of political science).

In the field of education, a ranking of French-speaking journals was published under a joint declaration by AERES and the president and vice-president of the 70th section of the CNU (educational research).

This ranking, available on line, is substantially different from that of the ESF.
In rank A, it quite logically cuts out *Enfance*, but promotes *Formation-Emploi*, *Recherche et formation*, the *Revue des Sciences de l'Éducation* and, oddly, "*Raisons éducatives*", which is a collection by De Boeck (piloted by the educational research department of Geneva university) and not a journal in the usual sense of the term.
In rank B, it promotes almost all of the journals that were given a C ranking by the ESF and adds others (such as the *Dossiers des sciences de l'éducation*, *Éducation et didactique* or *Spirale*), including journals which no longer exist (*Année de la recherche en sciences de l'éducation*). Nothing remains in rank C more but 4 journals, including *Éducations et Formations*, the review of the ministry which is the only one to be "demoted" from B to C.
Lastly, a rank D was created by AERES for "professional" journals or those for the general public, in which not only are *Sciences humaines*, *Cahiers pédagogiques* and *Questions vives*, classified, but also the *Revue internationale d'éducation de Sèvres*, published by the CIEP, which was classified in rank B by the ESF.

An inexhaustible debate?

Merely juxtaposing these two rankings shows just how fragile the criteria used are, providing, as they sometimes do, more information on the stance taken by the experts behind the rankings than on the position of the journals themselves.

Moreover, Philippe Jeannin pursued this approach to the end, by producing an assessment of the scientificness of research in social sciences for the research department (Jeannin, 2003). The first thing was to ensure "a *solid basis for an assessment of social science research published in scientific journals*", by adopting a method of "reasoned sorting" of the databases used in each discipline to draw up a list of journals which are then subjected to the opinion of the researchers. According to him, "*a review is scientific if it is deemed to be so by the community*".

In the field of educational research, the result of the survey (based on 108 responses from 411 academics) gives a rather scrambled image of the scientific community.
On the one hand, the answers seem to form a strange "hierarchy", in which at the top of the list, and right behind the *Revue française de pédagogie*, the *Revue française de sociologie* and the *Actes de la recherche en sciences sociales*, feature two sociology journals whose contents deal only seldom with education. Out of what is presented as "the top 69 educational research journals", are also to be found ten psychology journals, 5 sociology journals (not specialising in education), a political science review, and a number of general (*Esprit*) or, conversely, specialized journals (*Pour*, *Communications*, *Langage et Société*, etc) on the fringes of education.
On the other hand, a general lack of awareness of non-French-speaking journals is to be observed: all the English-speaking titles, except one, have a majority of responses of the "*don't know*" type and certain reference titles are curiously absent (like the *British Educational Research Journal*). Finally, as a general rule, the titles cited and their popularity with researchers show that this is more a bringing-together of schools, networks or disciplinary sub-fields that have been artificially aggregated than a scientific community structured around common referents.

Comparison of the three rankings which we have just examined consequently makes it improbable that a list of scientific journals dealt with on a hierarchical basis upon which researchers in education can reach a consensus might exist. Even the distinction between journals with a reading panel and other journals seems to pose a problem since, according to the rankings, it can easily be seen that a review such as that of the CIEP (*Revue internationale d'éducation*) is regarded as a good quality review (rank B) in the ERIH list but is treated as a review for the general public by AERES and the CNU!

For those who profess to evaluate the scientific output of academics and research units, a list of reference journals is, however, extremely useful, not only to make the assessment as objective as possible but also to make it quite simply possible to achieve within a reasonable time frame (i.e. without having to read all the articles in order to judge their scientific status).

❑ See also

- Biblio SHS, the CNRS's social sciences information portal: <http://biblioshs.inist.fr/>.
- Assessment of social science research blog: <http://evaluation.hypotheses.org/>.
- Jean-François Méla's blog ("assessment" category): <http://jfmela.free.fr/jfmblog/?cat=8>.
- UMR Spirit, a blog on the quantitative assessment of social science research: <http://bibliometrie.wordpress.com/>.

Peer assessment *vs* figure-based assessment

Is it really possible and necessary to "read everything"? Peer assessment and its limits

Peer assessment, i.e. in the reading of the scientific output of the candidate or his institution by academics from the same disciplinary field, is the traditional mode of assessment, in particular in social sciences. This process is similar to that of the "reading panel" of a scientific journal, which chooses the articles to be published after an "anonymous" reading of the papers submitted by other research colleagues. In the eyes of academics, this

principle provides a guarantee both of quality and of scientific independence against any other "non-scientific" criterion.

In France, for example, the recruitment and promotion of academics are based explicitly on this type of process, although candidates sometimes wonder how the recruitment panel can seriously read in depth documents containing thousands of pages in a few days.

In fact, a large part of the peer assessment system is based on the prior existence of a scientific community in which "appraiser" researchers are already familiar with the main trends of scientific output in their field and are able to deliver a swift judgment on a piece of work produced or on a candidate. It is less a question of appraising "new" work than of measuring the relative value of publications with regard to a set of academic writings or other comparable productions.

It can also be understood that this method, very appropriate for a modestly-sized, discipline-based, national scientific community, or one highly structured at international level (e.g. physicists), poses a problem when it is a question of appraising the scientific output of a poorly-structured disciplinary field, organized in a primarily national way.

This principle of in-depth peer examination of scientific output can also be used on a larger scale, as was done during the sessions of the *Research Assessment Exercise (RAE)*, a method used to assess, classify and define a basis for allocating resources for all British research units.

The RAE involved panels of several hundred experts, who were asked to read and systematically analyse the publications and output of university research centres (Bence & Oppenheim, 2005 ; Evidence Ltd, 2007). In the field of education, 2,000 researchers from 86 institutions were assessed by a panel of about sixty experts (in 2008 this panel was grouped together with psychology and sport sciences to provide a comparison of quality standards). Nearly 8,000 pieces of work (articles, books, chapters of books, papers, reports, educational software, etc.) were examined in this way.

It is easy to understand that this represents a huge work load for the appraisers, as much for collecting the data and preparing the assessment files as for actually reading and appraising the scientific output.
Nevertheless, certain studies have pointed out the limits of peer assessment and have shown that this kind of assessment produces results that are comparable with those obtained by applying bibliometric criteria.

In the field of political science, Australian political economists (Butler & Mc Lister, 2009) examined the 4,400 pieces of academic work submitted to the political science panel of the RAE 2001. From the 28,128 citations generated (cf *supra* in connection with bibliometrics), they concluded that citations are by far the most important factor for predicting the result of the assessment by the RAE! The only other important factor correlated with the results was the presence of a member of the department on the RAE assessment panel, which allows the department in question to have more detailed knowledge and understanding as to the best way of showing themselves to advantage for the assessment procedure.

In their opinion, an assessment model based on quantitative indicators would have the advantage of avoiding this bias, for results substantially close to those obtained by peer assessment, while limiting costs in terms of time and energy in the universities.

A British researcher in cognitive science reached the same conclusion by defending the need for measuring the validity of metric indicators by comparing them with the best external criterion available: that of the peer review (Harnad, 2008). He considers that if metric indicators (some more than others) are closely correlated with the peer rankings, then these indicators can be regarded as sufficiently solid and independent tools for judging the quality of scientific output.

The full-scale base of the RAE therefore makes it possible to compare the results of peer assessment and those which could have been deduced from quantitative indicators, using correlation calculations (with regression analysis). In other words, all that is needed is to compare the rankings deriving from the RAE and those deriving from calculating the number of citations and articles written by the researchers in the teams. As it turns out, various studies quoted by Harnad have actually shown that peer rankings are strongly correlated with citation measurements in all fields, including those for which peer assessment would not resort to citations (certain disciplinary panels already used citation indicators).

This type of analysis explains why, after a major parallel assessment session in 2008, in which peer assessment and assessment by metric indicators were used simultaneously, it was decided that the RAE would subsequently be carried out on the basis of metric indicators only, with, for social and human sciences, an extra, "lighter" peer review process. The new method *Research Excellence Framework* was launched by the Higher Education Funding Council for England (HEFCE) and is currently under development, on the basis of a number of studies available for consultation on the programme website

Independently of the RAE example, the question is therefore posed of moving from peer assessment to assessment that mainly gets its information from, or is based on, metric indicators.

Bibliometrics: assessment by numbers?

The use of quantitative indicators in order to evaluate a scientific activity is often summarised under the term of "bibliometrics". In actual fact, bibliometrics is the application of mathematical and statistical methods to the

output of scientific literature, but it is not primarily designed as a means for assessing a researcher or his team. While the purpose of bibliometrics is to describe science and to measure the production of knowledge through scientific literature, it is not the same thing as a method for judging and allocating research resources.

As the director of the Montreal Interuniversity Research Center on Science and Technology (CIRST) warns, one should not confuse assessment and bibliometrics, even if, as he recognises "*the success of unofficial indicators (such as the h index for example) and of rankings (such as Shanghai for example) is based on the social law which says that any number beats no number*". This is why he believes that "the point of including the properties of bibliometric indicators has to do with the fact that it is impossible to escape assessment and that it is therefore more effective first to rigorously criticize poorly constructed indicators, the use of which may lead to perverse effects, and to then show that it is possible to construct useful indicators that are constructed in a controlled way" (Gingras, 2008).

To summarise, bibliometric indicators are often constructed by taking into account various statistics relating to the number of publications and especially the frequency and the sources that cite these publications. The basic idea is that the number of citations is a significant index of the utility and scientific value of the article or author cited, which may seem to be a quick short cut, but in the end not much more so than peer judgement which is often also based on reputation.

These studies were begun in the field of psychology in the early twentieth century (Godin, 2006), and than spread to the exact sciences which, for the majority, mainly use articles as a way to disseminate the results of research. Taking into account journal articles quickly became the preferred method, making it possible to establish the number of citations per author and, as a ricochet effect, the "value" of a journal. The number of citations per author makes it possible to establish the impact coefficient of a journal, which bears witness to the size of its readership and its capacity to accommodate the most cited authors.

Several specialized journals deal regularly with these questions (*Scientometrics*, *Journal of Information Science*, *Journal of Infometrics*, etc) and most institutional research methods, at least in the exact sciences, have official recourse to bibliometric indicators. For a comprehensive and recent approach to this question, the reader may refer to a fairly in-depth report by the INRIA assessment commission (Merlet, 2007).

From the monopoly of the Web of Science to contestation of it

The majority of bibliometric methods are based on large commercial databases, which, starting out from a selection of scientific journals considered as being relevant, systematically index all the articles with their authors and bibliographies (initially, indexing was limited to bibliographies, from which the authors and titles of publications were extracted). The value of these databases is obviously the possibility of calculating the number of citations very quickly.

Three main databases are today available on the internet.

The Web of Science (WOS)

The oldest and best known is the *Web of Science (WOS)*, thought up by Eugene Garfield in the nineteen-fifties, which met with the desire to have an index of scientific publication citations by subject specialization (something that a conventional human indexation system by librarians could not achieve). The objective was to highlight the networks of scientific references by counting the sources quoted in an article but also the correlated references after publication.

This base, initially entitled Current Contents (CC), in 1964 became the source of the Science Citation Index, which makes its extractions from the scientific journals indexed in the CC. The whole is managed commercially by the International scientific Institute (ISI), today the property of the Thomson Reuters group. The review of the number of citations in mainly English-speaking scientific journals, used by the *Science Citation Index* gradually came to be seen as a major dimension of assessment in the exact sciences and allowed the WOS to practically acquire a monopoly in its field.

Within the framework of the ISI-Web of Science, Thomson also markets *Science Social Citation Index* (SSCI) and the *Arts and Humanities Citation index*, whose scope is limited to certain disciplinary areas (especially those in which English is the language of communication, such as psychology and economics) and above all in areas where English or American culture predominates.

It should be noted that the SSCI takes into account only citations concerning the scientific journals which it has already selected. In other words, the citation of an author in a review which is not in the current corpus of the WOS (for example, a French-speaking review) is quite simply not taken into account, even if this citation comes from a WOS review with a high "*impact factor*"!

Scopus

The Scopus base, in conjunction with the Scirus engine, was set up in 2004 by the Elsevier group. It has indexed articles from approximately 15,000 journals since 1996, the only condition being that the review is accredited by a scientific institution (no assessment commission, unlike Current Contents). Scopus claims millions of "scientific" Web pages and 33 million summaries since 1966. It positions itself as a serious competitor to the WOS.

The geographical source of the titles of scientific journals is varied, since 60% are not based in the United States. It has many more social science titles (2,850), but over a limited period of eleven years (Kosmopoulos & Pumain, 2008).

It should be noted that Scopus publishes a monthly bulletin on line, *Research trends*, which deals with bibliometrics issues.

Google Scholar

Google Scholar (GS), launched in 2004, is a search engine specialising in scientific literature.

It makes available a free search area within a corpus of articles, books and grey literature that is constantly expanding. While the perimeter of the corpus remains uncertain (which is the main criticism aimed at GS) and fairly contemporary (there is a relative prevalence of references published after 1990), it has already harvested many academic catalogues, including, for example in France, INIST-CNRS and SUDOC data banks or those of open archives, including in the field of social sciences (HAL-SHS), and monographs, thanks to agreements made concerning the digitalisation of books (Google Books) with many private editors.

Various studies have compared Google Scholar with the Web of Sciences or with Scopus, concluding that Google Scholar makes it possible to take into account a much more significant amount of scientific work for a given author, in particular because it takes into account proceedings and papers from conferences, theses, monographs and chapters of books (Harzing & van der Val, 2008). This effect proves all the more significant for the field of social sciences, where the literature goes through more diversified channels than academic journals with a reading panel alone. A.W. Harzing has developed software that is freely available on Internet, called *Publish or Perish*, which can be used to produce a number of bibliometric statistics for oneself, on the basis of Google Scholar. The CNRS calls for various bibliometric indicators from its various UMRs, which can be obtained via this software, explicitly cited by the organization in its assessment documents.

It seems, however, that bibliometric calculations using Google Scholar do not lead to relative “rankings” that are basically different from those resulting from calculations from the Web of Sciences or from Scopus: the added-value of GS lies in the amount of work listed, in the fact that documents from non-English-speaking areas are taken into account, from disciplinary fields that are less standardized than hard sciences, and in the inclusion of work by young researchers who can have their work - still under-represented in the scientific journals included in the citation databases - recognized.

Limits of indicators based on citations

The system of citations has often been criticized for different reasons. For example, the total number of citations measures the impact of researcher’s work, but the appraisal of the latter may be biased by a small number of highly cited articles, which is not really representative of the whole of the scientific work of a researcher, and this is all the more true if he is a joint author of these articles.

More recently, Jorge E. Hirsch, a physicist from California, suggested improving the measurement of the scientific output of a researcher by putting forward the h (for Hirsch) index, which is the number of articles by a given researcher that have received at least this number of citations. For example, a researcher with an h of 30 has published 30 articles each of which has been cited at least 30 times. All the other articles by this researcher, no matter how many, have therefore received fewer than 30 citations. A score of h = 0 shows the lack of scientific impact of a researcher, his articles never being cited (Ferrand, 2007). One of the advantages of this index is that it takes into account the impact of all of the articles by a researcher throughout his career, which explains why the h index has since 2006 been included in the results published by Thomson/ISI. Certain authors have already pointed out the failings of this index or suggested “technical” corrections (Costas & Bordons, 2007).

But the main criticism today lies in the very question of the quantitative use of citations for the purposes of assessment of researchers and research

The idea of using the number of citations as an indicator of scientific quality is considered to be unrealistic, in view of what actually happens with citations: arbitrary bibliographies of the authors containing gaps, biased practices, deliberate lapses of memory, back-scratching and complimentary citations of the most influential members of such and such a review, etc. To such an extent that Denise Pumain and Christine Kosmopoulos were able to write that “*citations are a combat sport*” (Kosmopoulos & Pumain, 2008)!

A paradoxical use of citations is also worth noting: when a reference is frequently cited for its provocative or paroxysmal point of view … which leads it to acquire a “metric” popularity notwithstanding its marginal scientific interest.

One thing that is certain is that setting up an assessment system overwhelmingly based on publications which obey certain “international” standards (in other words English language publications marketed by major publishers) inevitably directs researchers’ activity towards the production of articles tailored to be accepted in these international journals, to the detriment of other work (Bridges, 2008).

But when the citation, initially used as a measuring instrument, becomes an objective in itself, it can no longer be used as a measurement: “*Once an indicator is made a target for policy, it starts to lose the information content that originally qualified it to play such a role*” (Evidence Ltd, 2007).

So it is that more and more articles and stances appear against the race to publish: a factor leading to alienation for researchers but also one leading to distortion, or even to the deterioration of scientific quality (Lawrence, 2008), in particular when, in order to measure the impact of an author according to the statistics of his publications, it is the coverage or circulation of a journal which is taken into account rather than the quality of the article (Roth, 2005).

Segalla noted that "*Many of these articles would be better appreciated, published more quickly, and perhaps have more impact if they were published in specialised journals. However, because these journals tend to have lower citation impact, or are less well known, they are avoided by young researchers trying to build an impressive promotion file. This is an understandable strategy, but one that ultimately slows the diffusion of ideas into the research literature and stifles academic dialogue*" (Segalla, 2008).

The open scientific publication revolution

Towards the exhaustion of the commercial model of printed journals?

The function of scientific journals has changed, moving from a communication medium to an instrument of career management, observes Kingsley, who wonders how long the "journal" format will last in the years to come. With the widespread use of electronic communication, what does it mean exactly to be "published" for an article which can be downloaded hundreds of times at pre-publication stage or whose summary has already been read thousands of times? Won't it be necessary one day to count the number of times an article has been downloaded, rather than the number of times it has been cited? Already, researchers are exploring the internet more and more to find a particular article rather than systematically leafing through such and such a "prestigious" review: they are no longer satisfied with trusting the "recognized" journals to be kept informed of the latest research in their field. Authors are focused on journals, usually particular journals: while, as readers, the same researchers are focused on large collections of articles and journals that they wished to browse (Kingsley, 2007).

This is understandable when one considers the variety of university publishers, with on one side privately held companies who show enormous profits and are part of major publishing empires, like Elsevier and, on the other, a multitude of university or learned society presses. Out of the 1,042 education journals analysed by the Australian team SORTI, 52% (540) are published by major publishers, including Routledge (11%), Sage (5%) and Springer (4%). Now at the start of the 21st century, major publishers such as Springer, Kluwer, Thomson scientific, Blackwell and Taylor & Francis account for 52% of the global market of scientific and technical publishing (or 9.2 billion dollars in 2005), reckons Steele Colin (2006).

In this context, he observes that publishers' profits are primarily based on the sales of packages to university libraries and research organizations (publishers force libraries to buy subscriptions and not just single issues of journals). This system of packages makes it possible to sell, side by side with the titles most in demand, additional publications, even if these are not really read. The arrival of digital publishing in the nineties led to subscription rates doubling (a rate for the paper version + a rate for the digital version), which, as packages became more widespread made it possible for large publishers to monopolize an increasing percentage of library budgets. Generally, this increase in the costs in the field of sciences and technologies took place to the detriment of expenditure on social sciences in general and on monographs in particular. Many social science authors consequently saw a progressive decline in sales of their monographs as well as a lack of adequate outlets for disseminating their research.

The scientific stakes of "Open Access"

One solution would be to use electronic publication but, according to Colin, current analyses show that the conservatism of a large sector of the academic community is the main factor holding back online publishing of specialized monographs. The monograph printed on paper still occupies a central place in the processes of granting tenure and promotion. And yet publishers who provide copyright-free content on the Web note that free online access to a book tended rather to stimulate sales of its paper version.

The institutional open archives of universities have a potentially greater effect on the dissemination of scientific knowledge and promotion in social sciences than on sciences and technology, which already have a well established distribution system (even though the latter also generates high costs).

"*Over the last few years a power struggle has been raging between commercial publishers, who sell researchers/authors their publications for which they have acquired the rights, and the international Open Access movement (OA), officialised by the call from Budapest in December 2001, which asserts the right to free access to all scientific documents*" (Kosmopoulos & Pumain, 2008, p. 9).

The movement towards free access for scientific publications in several top universities (such as Harvard) poses a serious threat to the lucrative system of academic scientific journal publication. This partly explains, as Adler & Harzing (2009) suggest, resistance from the academic world. Certain academics have reached the top of the academic ladder on the strength of criteria resulting from the citation indices of commercial journals. They are often now responsible for, or organizers of, the editorial committees of these journals. They therefore do not look favourably upon the development of a free access system of publication which would sap the scientific journal market … and the academic and financial power which results from this!

But the two researchers are categorical: "*no ranking which chooses to be unaware of work published on the Web will remain significant. No academic will be able to remain apposite if he works on the basis of publications which, even if they are from the best journals, are structurally two or three years behind the real state of research"* (Adler & Harzing, 2009, p. 6).

Even if researchers in education are not particularly up to date in this field, the amount of work in social sciences which has been digitized and put on line has unquestionably grown exponentially over the last four to five years.

This work is published in scientific journals on line (cf. for example via the portals revues.org or cairn.info in France), in the institutional open archives of institutions, disciplines or research networks (HAL SHS for example), on public sites (cf. Persée) or even on the personal pages of researchers and academics.

While the outcome of these more or less muffled combats between the large commercial publishers and the partisans of free access is not yet known, the growing success of open archives and the convergence towards common and transferable meta-data (OAI-PMH, a protocol respected by the largest of public and university library catalogues) is undeniable (Kosmopoulos & Pumain, 2008).

The prospect of "harvesters" able to question all of these of scientific document warehouses voids a large number of arguments against bibliometrics as it was practised in the ISI Web (in particular everything to do with the restriction to periodicals alone, which comes more from the English-speaking world).

Several analyses have also shown that scientific publications enjoy a better rate of scientific citation than those only available in the closed circuit of journals that have to be purchased (Hajjem, Harnad & Gingras, 2005 ; Brody, Harnad & Carr, 2006). Free-access articles would benefit from various factors: access in advance (via preprints), quality bias (articles of better quality are more likely to be put on line and these are the most in demand), more spontaneous use (accessibility) and finally a differential advantage (as long as all articles are not "Open Access").

Today improved computers, and progress in software and digitalization make it possible to index the complete text of a document in natural language and even to suggest some initial approaches to analysing the corpus. One of these approaches is currently being explored by the European project EERQI, aiming at finding new quality indicators for scientific output (Botte & Vorndran, 2008).

❑ See also

- Campbell Phillip (2008). "Escape from the impact factor". *Ethics in Science and Environmental Politics*, vol. 8, n° 1. En ligne: <http://www.int-res.com/abstracts/esep/v8/n1/p5-7/>.
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How can quality in social sciences be assessed?

Whatever the relevance of citation statistics, transposing the methods of assessment of scientific output from the exact sciences to the social sciences turns out to be problematic, as one might have guessed from examining the issue of journal ranking.

The shift is less great between the main disciplinary areas of exact sciences and social sciences than between disciplines and sub-disciplines. Several studies have shown, for example, that mathematics is similar to social sciences from the point of view of certain practices, while psychology (which sometimes enters into a special relationship with education) or economics are more at ease with the protocols of "hard" sciences.

After this reminder, if one more specifically examines the other social sciences and educational research, major differences are to be noted, which are as much due to the scientific practices of publications (journals are less important than books, for example) as to the very position of certain disciplines engaged in social practices, whose quality standards cannot be exclusively academic.

More diversified publication practices

A study has analyzed citation practices to measure the importance of periodicals, in exact sciences ("*Natural Sciences and Engineering"*) and in social sciences, from the corpus of the data bases of the ISI web of knowledge by Thompson from 1981 to 2000 (Larivière, Archambault, Gingras & Vignola-Gagné, 2006). It clarified the fact that the proportion of citations which relate to articles in journals is half as great in social sciences (40%) as in exact sciences (82%), with an average of 44% for educational research. Given the fact that the survey was based on a corpus that is itself made up exclusively of article from journals (other than monographs, reports, papers and other grey literature), it can be estimated that the number of citations

concerning articles in journals is here a maximum rather than a minimum, which gives an indication of the citation practices in the field considered.

According to Botte (2007), out of the 1,700 social science journals (as against some 8,700 exact science journals) in the ISI web of knowledge, the selection of titles responding to the key words "*education*", "*special education*" and "*psychology, educational*" accounts for only 153 journals. 66% of these are American and 24% English. Only seven journals are not in English (three are multilingual, three are in German, and one is in Russian). A large percentage of the journals selected are related to psychology and medicine. If one considers the 20 education journals which have the best impact factor, only 4 are not devoted to psychology or medicine.

The SORTI study had pointed out that out of 1,042 education journals in English, 46% are published in the United States and, in spite of this, only 18.9% (197) were taken into account to calculate of the ISI impact factor in 2007, the majority being concerned with educational psychology.

Scopus counted 69 French social science scientific journals in October 2008, but none in the field of education. In addition to the less central role of journals in the field of social sciences, many have studies also shown that the corpus used is essentially American and written in English.

An Australian study noticed that in the field of management, a French academic from the university of Burgundy (Gérard Charreaux) had accumulated 30 citations in journals included in the ISI Web database whereas Google Scholar credited him with over 1,000 (Adler & Harzing, 2009). The only reason for the difference is due to the use of French, a criterion that is unrelated to the impact of the researcher in his field. In fact, the use of Google Scholar in conjunction with software such as Publish or Perish is currently the best existing bibliometric tool for social science disciplines.

Overall, it is noted that few bibliographical databanks are relevant for real bibliometric work in the field of social sciences, and particularly in education. For a census of existing databanks and their limits (including the Francis bank), the reader may consult the report produced for the Canadian Social Sciences and Humanities Research Council on the use of bibliometrics in the social sciences and **humanities** (Science Metrix, 2004).

These limits of usual quantitative methods partly explain the motivation behind a European project such as EERQI (European Educational Research Quality Indicators). This project, run by the university of Hamburg, brings together twenty or so partners (universities, research centres, associations of researchers, and university and commercial publishers), coordinated by Ingrid Gogolin, who is also president of the European Educational Research Association (EERA). EERQI aims to define and implement new indicators and new methodologies for assessing the quality of research publications in the field of education, in order to provide a European alternative to current citation impact measurements (the *Social citation index*, for example), poorly suited to research in social sciences. This project is funded by the Seventh European Research Framework Programme, and illustrates the political determination of the European commission to deal with these issues of multilingual scientific assessment, in opposition to commercial indexing data bases and rankings.

EERQI should lead to the setting up of a prototype resorting largely to the semantic analysis of texts, to provide an assessment of research output in the broad sense (journals, monographs, grey literature, open archives, electronic documents, etc.), from a multilingual standpoint (English, German, French and Swedish to begin with).

The scope of a piece of research is not limited to its academic impact

The very idea of judging the quality of a piece of research according only to considerations about how it is produced or published also appears a tricky one in the social sciences and humanities.

In this field, there is little international collaboration from team to team and little normative consensus about the methods of publication: the importance of social and cultural contexts for the very essence of these disciplines still implies more local and more diversified scientific agendas, which makes the idea of standardizing the means of production problematic (Science Metrix, 2004).

In disciplines related to a professional field, the impact should not only be assessed among researchers, but also within professional communities (Adler & Harzing, 2008).

But the impact of a piece of educational research may be important for a national education system but of little interest for an international publication, whereas on the contrary, an article which meets with all the academic standards may have certain repercussions in a major international review but have no impact on the local education system: the oft-invoked "international level" of research is not strictly equivalent to its social importance. What would be left of a piece of educational research that completely turns aside from its involvement in educational issues and practices?

In Great Britain, the authors of a report for the Economic and Social Research Council (Furlong & Oncea, 2005) argued in favour of a new framework of assessment for research in education which is "*explicitly conducted in, with, and/or for practice*".

The importance or the scope of a piece of educational research can be evaluated in different ways according to whether it addresses a public of academics (scientific and academic impact), education experts ("social utility") or political and administrative decision-makers (Rey, 2006).

Moreover, the importance that a given piece of research may have might depend on other factors than its "internal" scientific quality alone, given that the vagaries of fashion may mean that one piece of work may be immediately valued by the general public or taken up by the authorities to legitimate policy, whereas its scientific value will be appreciated over the long term.

❑ See also

- "Towards a bibliometric database for the social sciences and the humanities: a European scoping project". En ligne : <http://www.sussex.ac.uk/Units/spru/esf/index.php> (consulted on July 1st, 2009).

Conclusion

It is probable that, in spite of the attractiveness of quantified quality indicators, assessment of scientific output in social sciences and the humanities will remain broadly related to the practice of peer assessment, at least for the individual assessment of researchers.

On the other hand, the increasing demand for transparent and comparable indicators, in particular for the assessment of research institutions (staff, departments, universities, etc.), which are incompatible with a systematic and thorough examination of the output, will probably mean that simple, quick and automated criteria for assessing the quantity and quality of scientific activities and output will be sought.

From this point of view, the challenge for certain social science disciplines such as educational research is at one and the same time symbolic, financial, institutional and epistemological: how is it possible to continue to exist independently and in a recognized way if one refuses the existing standardized indicators, if not by proposing other assessment indicators better suited to the field?

The quarrel surrounding the ranking of journals is, as it turns out, symptomatic of the inadequacy of solutions currently put forward by public institutions, but also of the fragmentation and lack of control of its journals by the scientific community, at least in French-speaking countries: the mere fact of listing and ordering existing research journals in the field of education raises tricky problems and reveals an ignorance of the existing situation which is at the very least disconcerting.

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