NCMS News

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Journal Rankings?

Imagine you are being judged on your research. How would a colleague make this judgment? On what basis does a promotion or appointment committee in your department make this judgment? What about your University or Employer Organisation? How does the competitive granting body in your country judge your track record? You may like to believe that the truth of your research results makes an irrefutable case for you at each stage. I write this article to remind you that 'truth' varies with the eye of the beholder.

Judgment of quality in mathematical sciences relies on many elements. One element used in many scientific areas is *production rate*, i.e. the number of papers published by an author each year. Lower production rates are common in more abstract or theoretical areas of mathematics, but in areas directly related to applications, a larger production rate may be more common. While we can cite studies which show that the average production rate across all mathematical sciences is much less than one, the boundary between fields where they are much higher or lower is not easy to define. Many mathematicians would say that one paper that makes a huge impact across mathematics is much more important than production rate. At the same time, mathematical referees have been known to say a higher production rate in high-quality journals is a hallmark of research leadership. Such changeable criteria, expressed in different fields and by different people within the mathematical sciences, make our judgment of research quality appear subjective and, therefore, opaque to others.

To counter variable, apparently subjective criteria, Faculties, Universities, Research Funding Bodies seem to prefer what they call 'objective' measures. These are usually based on bibliometric measures, including citations, h-index, impact factor, MCQ, SciImago and Eigenfactor. The flaws and constraints of each of these measures are evident to anyone who has analysed them. A famous article showing the unreliability of the impact factor is *Nefarious Numbers* by Doug Arnold and Kristine Fowler, reproduced in the *Gazette* of the AustMS **38**(1) (2011) 9–16. The IMU/ICIAM/IMS publication *Citation Statistics*[1] by R. Adler, J. Ewing and Peter Taylor, describes the usage of citations in mathematics as 'naïve' and 'losing crucial information that is essential for the assessment of research'. The IMU report observes that most citations in mathematics are 'rhetorical', i.e. acknowledging an explanation or conversation rather than seminal invention of an idea.

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[1]http://www.mathunion.org/fileadmin/IMU/Report/CitationStatistics.pdf

For these reasons, as well as the lower numbers of papers published, we have been allowed to use peer review as a criterion for judging the quality of research in the 0101 Pure Mathematics Field of Research code in the ERA in Australia. But in the remaining mathematical fields of research codes, citation analysis was used, leading to results that do not appear to correspond to what most people in the mathematical sciences believe to be appropriate. AustMS has recommended to the ARC that citation analysis be used in combination with peer review for all 01 Mathematics Field of Research Codes.

To overcome some of the flaws of bibliometric measures, the IMU/ICIAM Working Group on the feasibility of ranking journals in mathematics[2] recommended that the IMU and ICIAM should implement a scheme to produce journal rankings that would be overseen by mathematicians around the world. The working group's report was published in *Gazette of the AustMS* **38**(5), November 2011, 241–250[3]. Unfortunately, the emotive nature of the responses ensured that the recommendations never got off the ground.

But, people and organisations around the world continue to use journal rankings, whether based on bibliometric data or peer review, whether we like it or not. The AustMS journal rankings (produced in 2009 for the first ERA) are still being used to judge the quality of mathematical output around the world. Individual journals use it to promote their quality, e.g. take a look at the website of the South East Asian Bulletin of Mathematics[4]. It is rare to see a case for promotion (or appointment) in Australia that does not include an enumeration of the AustMS ranking of journals in which the candidate published. People proudly proclaim their number of publications in A* or A journals and silently hope that those in B and C rated journals are ignored. The report of the IMU/ICIAM Working Group referred to above describes ranked lists of journals used in several countries around the world. I also recently learnt about the journal rankings in Chile[5].

Google Scholar, which has reported citations of scholarly references for a long time, now makes available lists of 'top publications' by research area. There are 26 subcategories under the heading Physics and Mathematics. Amongst these are categories such as Algebra, Geometry, Mathematical Analysis, Mathematical Physics, Pure and Applied Mathematics[6]. Unlike many of the other sources of bibliometric data, for which subscriptions are needed, these sources are freely available to anyone. Many use Google Scholar in addition to subscription-based services such as ISI Thompson to provide evidence for the impact of their research in applications for ARC grants.

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[2]The group consisted of eight people from six countries and was chaired by the writer of this column.

[3]See also http://www.mathunion.org/Publications/reports-recommendations.

[4]http://www.seams-math.org/index.php?option=com_content&view=article&id=13&Itemid=46, accessed 26 January 2014.

[5]http://www.conicyt.cl/fondecyt/grupos-de-estudios/matematicas/criterios-de-evaluacion-curricular-concurso-regular-2013-matematicas/

[6]Click on Metrics at http://scholar.google.com and choose Physics & Mathematics. Subcategories are available below this category.

Whether you agree with these mechanisms or not, mathematical scientists in Australia are being ranked. Faculties now ask departments and discipline areas to provide criteria by which their staff members' research can be judged. Where departments make the case for research quality when low citation numbers may skew the argument, guess what they are providing to back up their judgments? Yes, you guessed it: the 2009 AustMS journal rankings. Journal rankings is a contentious issue. But it is not going to go away.

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