President's column

Peter Hall*

Ranking journals

Journal ranking, and more generally the potential for assessing the excellence of mathematical work in terms of where it is published, has become an important issue in connection with the Research Quality Framework (RQF). The Society enjoys a diversity of views on this subject. Some members are reasonably enthusiastic about the concept of journal-ranking (or placing of journals into bands), believing (as do more than a few people outside the mathematics profession) that the journal where a research paper is published can be used very effectively to benchmark the paper's excellence. At the other end of the spectrum there are concerns that the 'standing' of the journals where we publish is not directly or simply related to the 'standard' of individual research papers, and that suggesting the existence of a strong connection could cause serious problems for the profession.

In the middle, somewhere between these two viewpoints, a number of members of the Society see journal ranking as a necessary evil — as something which we might not strongly support but which we should nevertheless embrace, because we can rank our journals better than anyone else (for example, better than DEST — the Department of Education, Science and Training). This concern — that we should become actively involved in mathematics and statistics journal ranking, or otherwise it will be done by non-mathematicians and imposed on us from outside — has attracted some of my attention during the last few months.

The issue of journal ranking has been touched on by Society members in recent articles in the *Gazette* [1], [2]. John Ewing, the Executive Director of the American Mathematical Society, wrote in the AMS's *Notices* last October on the subject of journal impact factors, which have been suggested to the Society as a means by which we might tackle the journal ranking exercise. Ewing [3] commented:

> We should regard the impact factor as a way to measure the average quality of articles within a journal and nothing more. We should remember that measuring the quality of each article or even the entire journal itself requires much more information... The main conclusion is that we must stop seeking simplistic answers to complicated questions of judgment.

I particularly enjoyed the quotation, attributed to Einstein, that prefaced Ewing's paper: 'Not everything that can be counted counts, and not everything that counts can be counted.'

Journal ranking was also the subject of a recent article in *The Australian* [4], reporting on a ranking of marketing journals undertaken at the University of Technology, Sydney. The conclusion reached there was about as different as it

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is possible to be from the one expressed by Ewing (and Einstein). According to *The Australian*, the UTS researchers came up with "a scale — 'like feet and inches' — that allowed meaningful comparisons of relative quality within...73 [marketing] journals". One of the authors of the UTS study reported that these findings 'should end the familiar spectacle of academics disputing the merits of publication in various journals'. Ominously, *The Australian* suggested that 'the method could find wider use with the research quality framework'.

Academic statisticians, too, have addressed these issues. Perhaps surprisingly, statisticians generally share a healthy scepticism of the extent to which it is feasible to extract accurate, meaningful information from numbers. In this regard they are different from marketers, and (in my experience) also from some mathematicians, who tend to place greater faith in the capacity of noisy data to divulge absolute truths. Writing in *The American Statistician* four years ago, Vasilis Theoharakis and Mary Skordia [5] pointed to major differences in the way applied and mathematical statisticians rank statistical journals, and to the significant impact which geographic location also has on perceptions of excellence. Theoharakis and Skordia's results show that four of the statistics and probability journals that were ranked in the top 10 (out of 110 journals) by theoretical statisticians, were given the much lower ranks of 21, 22, 33 and below 40 by applied statisticians. Of course, journal rankings by probabilists differed even more markedly from those by applied statisticians. The study included 273 applied statisticians, 169 mathematical statisticians and 119 researchers in probability or stochastic processes.

If there are such major differences in perceptions among statisticians and probabilists, it is not easy to see how we could gain meaningful information using journal rankings for much broader areas of the mathematical sciences, such as pure mathematics. Statisticians explain these difficulties by noting that each journal can be considered as a point in d-dimensional space, where d is very large and the various components represent the many different pieces of information we have acquired by reading journal papers. A ranking of n journals is obtained by projecting each member of a d-variate cloud of n points onto a line, L say, in d-space. Conceptually, there are different versions of L for applied statistics, theoretical statistics, probability theory, etc, and they have quite different orientations.

John Ewing [3] noted that in preparation for the UK's Research Assessment Exercise, on which Australia's RQF is loosely based, universities typically advise academic staff to put forward publications in high-impact journals. Despite this recommendation, the guidelines for the RAE explicitly exclude the 'formulaic' use of journal rankings or impact factors, as the following two points in the guidelines indicate:

> (19) In assessing excellence, the sub-panel will look for originality, innovation, significance, depth, rigour, influence on the discipline and wider fields and, where appropriate, relevance to users. In assessing publications the sub-panel will use the criteria in normal use for acceptance by internationally recognised journals. The sub-panel will not use a rigid or formulaic method of assessing research quality. It will not use a formal ranked list of outlets, nor impact factors, nor will it use citation indices in a formulaic way.

(20) The sub-panel will use its professional judgement (and external advice if necessary) to assess pedagogic and historical research, or teaching material embodying research outcomes, in mathematics[1].

Some of us would have reservations about the recommendations of UK universities that their research-active staff avoid submitting for the RAE any papers that are not from leading-edge journals. For example, that approach would have excluded the pioneering work of Australian Nobel Laureates Barry Marshall and Robin Warren, whose paper on the role of bacteria in gastritis and peptic ulcer disease was famously rejected by all high-impact journals in its field. Likewise, some (but not all) members of the Society would applaud the advice given to RAE panels that they eschew any formulaic attempt to assess excellence using journal rankings, impact factors or other metric-based methods.

Although I appreciate that not everyone in the Society would agree, in my view it would be helpful if RAE guidelines 19 and 20, quoted above, were incorporated into the RQF advice. At present the Society is coming under pressure from some quarters to produce agreed journal rankings that could be used by RQF panels to assess RQF submissions in the mathematical sciences. It has been suggested that we should produce a ranking (or 'banding') that would place all mathematics journals that have impact factors into one of four bands, or tiers: band 1, containing the top 5% of journals; band 2, the next 15%; band 3, the next 30%; and band 4, the bottom 50%. Journals for which impact factors are not assigned by Thomson Scientific should, it has been argued, be excluded altogether.

I have strong personal reservations about this proposal. I fear that, as an approach to assessing the research of an individual, it is flawed. If we endorse it then it will probably be institutionalised, and (for example) it will likely be used to assess future 'tenure' and promotion cases in Australian universities. I'm aware that some Society members have already been counselled over their failure to earn sufficient grant income (the current way in which DEST measures a university's research performance) or to produce four papers in five years (as required by the current RQF rules). The Society members to whom I'm referring here are internationally known mathematical scientists, and have received recent awards for their research, but do not meet certain rather arbitrary and pedantic criteria. The RQF, and the rules and criteria that govern it, will motivate further new, and narrow, ways for Australian universities to assess their academic staff.

Of course, mathematics, and the Australian Mathematical Society, are not the only field or professional society feeling the pressure to respond to calls to rank journals. If a ranking of mathematics and statistics journals that we suggest turns out to be more rigorous than those proposed in other fields, then the mathematical sciences will likely be penalised for that rigour. In particular, mathematicians and statisticians in our universities may have less access than they deserve to research funding that flows to universities in consequence of the RQF. And, for the reasons given earlier, promotions in the mathematical sciences will likely be impeded relative to those in other fields.

[1]These numbered points come from the current 'Template for Draft Criteria and Working Methods' in Applied Mathematics: http://www.rae.ac.uk/pubs/2006/01/docs/f21.pdf (accessed 17 June 2007). The template for Pure Mathematics is virtually identical; see: http://www.rae.ac.uk/pubs/2006/01/docs/f20.pdf (accessed 17 June 2007).

If we don't rank journals, will somebody else do it for us? The Society is keeping a close eye on this. There is no clear sign at present of a pressing need for a universal ranking, although some universities are actively second-guessing the Government's future requirements. However, there are also signs that other universities want to do things their own way, and either do not wish to use journal rankings or, if they do, would prefer to employ their own rankings, designed to reflect the research areas in mathematics and statistics where they are most active.

University managers differ widely too. One Deputy Vice-Cancellor (Research) to whom I've spoken said that he would find it very hard to accept a mathematical sciences journal ranking that was not based directly on impact factors. On the other hand, another implied that he felt that impact factors and journal rankings are not particularly informative when it comes to assessing the performances of individual scientists.

In April I circulated a message to both our Steering Committee and Council on the subject. The main response has been more of a non-response. I'm inclined to think that there will not, ultimately, be irresistible pressure for a uniform (i.e. used by all universities) ranking of mathematics journals, and that there will be no broad attempt by non-mathematicians (e.g. by DEST) to produce a ranking. If the Society had to propose a ranking then, on the basis of suggestions made by the Steering Committee, we would wish to depart substantially from the 5%-15%-30%-50% bands that have been suggested. We would prefer to use much wider bands at the first and second levels, and possibly reduce the number of bands. Narrower bands might be appropriate for a single institution, where they could be chosen adaptively to reflect local research strengths, but there seems to be agreement on Steering Committee that, in a national context, narrow bands allow too little variation in research areas.

In the meantime the Society will continue to monitor the situation closely.

References

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