

The Misuse of the Impact Factor

The Impact Factor, as published by the Institute of Scientific Information (ISI) in Philadelphia in its Journal Citation Reports (JCR), is used by some department heads in some countries in faculty assessments. But nowhere in the world is the Impact Factor used as a criterion for rating and ranking scientists across the board nationally, as has been done in Pakistan.

ISI's website has this to say of its JCR: "The ISI Journal Citation Report is a unique multidisciplinary database, ideal for a broad range of practical applications by a variety of information professionals. It presents quantifiable statistical data that provides a systematic, objective way to determine the relative importance of journals within their subject categories." The website also mentions some possible uses of the JCR Impact Factor, including that it "enables a variety of information professionals to access key journal data, including librarians, publishers, editors, authors, and information analysts." But nowhere does it mention that the JCR should be used to determine the worth of scientists, least of all to rank them nationally in order of merit.

In Pakistan the rationale for the use of the Impact Factor is to "help the administrators of science to evaluate the quality and output of scientists who seek key positions." The National Commission on Science has made it a part of its policy to rate scientists and their work on the basis of impact factors of their research papers in accordance with the list of Impact Factors published by the ISI. However, ISI's Impact Factor puts mathematicians in a disadvantageous position, because the index is not suitable for research in mathematics.

Journals of physics and engineering for instance have much greater Impact Factors than mathematical journals, not because they are qualitatively better, but because they have a wider readership and the time spent from acceptance of a paper to its publication is much shorter. The ISI has listed 321 journals under the subject of mathematics, and only 15.58 percent of mathematics journals have impact factors greater than 1. Only four journals have impact factors greater than 2, the highest being 2.75.

The list produced by the ISI itself is defective. For instance, there are a number of high-standard journals which are not mentioned in the list. The *Mathematical Reviews* of the AMS reviews papers every month published in some 1,800 mathematical journals. There are many well-respected journals which are not included in the list.

One critical study of the ISI has revealed that there are 63 journals directly related to chemistry, 5 journals directly related to mathematics, 34 journals directly related to physics, and 430 journals directly related to biology which have an Impact Factor higher than 2. The highest Impact Factor of a sole journal in mathematics is of *Differentiation* (4.0). One notes that in medical sciences,

one journal has the Impact Factor 38.854. This means that if one publishes one paper in this journal, one gets an Impact Factor equal to 38.854, whereas if a mathematician publishes 40 research papers in the best journals of mathematics, he or she will get a cumulative Impact Factor equal to only 19.844. Young Pakistani mathematicians are now reluctant to do research in mathematics, as they feel that publishing papers in top mathematical journals is not only difficult but receives no recognition or appreciation due to low Impact Factors and citations. This trend is thus damaging for mathematics.

It is unfair to rate mathematicians on the basis of Impact Factors of their research papers. It is bizarre that one's status could be determined by the arbitrary assignments of numbers to the journals in which one happened to publish. Most intelligent scientists and administrators are well aware of two facts: one, that we do not yet have reliable bibliographic measures for comparing or making absolute ratings of the value of the work done by research workers; two, that in any event, bibliographic measures appropriate in one field are inappropriate in others. An impact value based on the simple measurement of how many times a journal is cited makes no sense as a measure of the quality of the papers published in it, let alone the quality of the mathematicians publishing there. Such use of management-type figures which claim to enable comparisons to be made can be utterly misleading and damaging. Figures are only as good as the premises on which the figures are based, and often the premises of many widely touted management figures are seriously flawed, as in the case of Impact Factors. The only real criterion for an individual's scholarship is quality of work, and that does not admit of simple numerical assessment.

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