Establishing a Publication Outlet Rating for GIScience

Werner Kuhn, Christoph Brox

Institute for Geoinformatics, University of Münster
kuhn@uni-muenster.de, broxc@uni-muenster.de

ABSTRACT

The evaluation of the productivity of researchers, laboratories, and larger institutions has become a crucial part of academic performance measurement, influencing the distribution of resources. Key instruments for measuring and weighing scientific output are citation indices and impact factors. These instruments, apart from having their inherent limitations, privilege larger and well established research communities with high-circulation publication outlets. The top publication outlets of small and distributed communities like Geographic Information Science (GIScience) have necessarily lower impact factors compared to those in more traditional fields. This becomes a problem when research productivity is being assessed across disciplines, which is typically the case for interdisciplinary fields. In order to achieve a better, yet still transparent, basis for evaluations of scientific output in GIScience, we suggest a process to lead to an adaptable GIScience publication rating system.

INTRODUCTION

More and more universities and laboratories undergo external evaluations. The criteria and their weighting vary, but publications are normally considered the most important outcome of research, and consequently the most important evaluation criterion for researchers and institutions. As an interdisciplinary, young, and small community, GIScience suffers from several disadvantages in such evaluation processes:

- External evaluations are often conducted by evaluators from other disciplines (such as geography, earth sciences, computer science, information systems, civil engineering, etc., who are not necessarily aware of the relative quality of publication outlets in GIScience;
- Impact factors of GIScience publication outlets are significantly lower (peeking at 2.3 for a five year period[1]) than in larger and more established disciplines;
- Some excellent and reputed outlets, including internationally peer-reviewed conference proceedings and journals, are not listed in popular citation indices, such as the Science Citation Index of the Institute for Scientific Information (formerly ISI, today Thomson Reuters)[2]
- Bibliometric measures, such as the Hirsch index[3], are based on absolute numbers of citations, which is good for big communities, but may not adequately reflect the value and quality of an author's publications in smaller and younger communities.

As a consequence, our field risks to be marginalized in evaluation processes, even if its researchers perform well and their publications have a high impact. This paper proposes a remedy to this situation in the form of a community-driven rating scheme, and the process to revise it, for GIScience publication outlets.

TOWARD A GISCIENCE PUBLICATION OUTLET RATING

Establishing a GIScience publication outlet rating requires resources for establishing, implement-

[1] http://www.tandf.co.uk/journals/tf/13658816.html
[2] http://thomsonreuters.com/products_services/science/science_products/a-z/science_citation_index
[3] h-index http://www.loreto.unican.es/h-index.pdf (Hirsch, 2005)

ing, revising, and maintaining it. We have gathered feedback at an AGILE 2010 plenary session on the following questions:

1. Are there evaluation problems of the kinds listed above in several AGILE member labs?
2. Would a publication outlet rating in GIScience be useful in addressing these problems?
3. Is a publication outlet rating in GIScience feasible in terms of organization and resources?

A clear "yes" on the first and second questions encouraged us to proceed over the past year with the third question of how to establish and maintain a GIScience publication outlet rating. This rating is intended to be used as a standard to evaluate, measure, and compare scientific output of researchers and institutions in our field, both internally and in comparison with other fields. Its primary mechanism is to introduce GIScience-specific classes, rather than absolute impact factors, as a basis for evaluations. These classes can then be mapped to similar classification systems in other fields.

The proposed GIScience publication rating consists of three parts:

I. A draft *listing of GIScience publication outlets* and their *classification* into three levels A, B, and C (see section 2).
II. Recognizing that GIScience is an interdisciplinary field whose scientists also publish in publication outlets of other fields (e.g., Computer Science, Geography, Ecology, Engineering, Economics, etc.), a GIScience publication rating cannot only consist of *GIScience* publication outlets. Since the GIScience community cannot establish standards for other research areas, the rating has to *map* between its classification of GIScience outlets and existing or evolving other ratings and indices (section 3).
III. Seeing the rating as a process rather than as a fixed classification system, we propose a *process model* for establishing and maintaining the rating. In particular, we describe how to validate and potentially revise on a regular basis the draft rating, using an online Delphi method (section 4).

GISCIENCE PUBLICATION OUTLETS – DRAFT LIST AND CLASSIFICATION

There have been surprisingly few attempts so far at establishing consensus on what counts as a "GIScience publication outlet", not to mention ratings of such outlets. For journals, Caron et al. (2008) followed a similar approach as we propose here, but left out conferences, made a one-time effort instead of establishing a continual process, and did not link to other fields. Still, their results provide input to a first draft list of journal outlets.

While the interdisciplinary nature of our field makes the category of "GIScience publication outlet" somewhat fuzzy, it is clear that some outlets definitely belong to it (and only to it) and others do not. If one adopts a pragmatic definition of the field, such as the one David Mark formulated for the UCGIS by-laws[4], it appears possible to determine for any outlet whether it is "definitely in" or "definitely out" or "possibly in". Since the point of this exercise is to be inclusive rather than erecting boundaries, it will not hurt to include the "possibly in" liberally. The litmus test for inclusion of an outlet, however, must be whether GIScientists are interested and qualified to rate its quality for GIScience publications.

Choosing the criteria to classify journals and conferences within the category is the harder part. Given the role that Thomson Reuters indices play in many institutions world-wide, a first (though unsatisfactory) choice for class A outlets is for an outlet (journal or conference) to be listed in them. This can provide a draft listing, but is likely to require refinement as part of the Delphi process, with additions and deletions at the level of individual outlets. Many scientists in the GIScience community (as well as elsewhere) find that a private organization in the publishing business should not be the basis of a minimal-bias rating system and that the already overblown role of it should not be strengthened further. Community rankings and ratings, established and maintained through online (web 2.0) methods are becoming a promising alternative, if they are broad enough in scope, transparent, and

[4] GIScience is "the development and use of theories, methods, technology, and data for understanding geographic processes, relationships, and patterns" http://www.ucgis.org/fByLaws.html

resistant to abuse. For an interesting example, see Mendeley and its reader meter[5].

Regarding rankings (without classifications), the number of interesting and open approaches is growing as well. First, there is the dominating Google Scholar index and its younger (and in some ways cleverer) sister, Microsoft Academia. Another computational approach is provided by SCImago Journal Rank[6]. Its SJR indicator is not merely counting the number of citations, but also includes the relevance and reputation of journals (SJR 2010, Gonzales-Pereira et al. 2009). The Article Influence measure[7] follows a similar approach. Yet, all these ranking systems are both more than we need, because they provide numeric results and rankings, but also less, because they do not easily lead to classifications. Note that our goal here is *not* a ranking of outlets, but a rating in terms of more stable and more easily achievable classes.

In choosing classification criteria, delimiting the secondary classes (B and C) is even harder. Some number crunching based on impact factors for journals and acceptance rates for conferences appear the most pragmatic choices at the moment. The break points between classes B and C could be established, for example, by quantiles on the population of all rated outlets. Using the median for the B-C break would mean that a B publication is "above average" (in the sense of among the better half of outlets in terms of impact factor or acceptance rate). Class C outlets could then be all others that still fulfill certain criteria, such as

- reviewing full papers;
- giving each paper at least two reviews;
- having published international reviewer boards;
- having published rules on how conflicts of interest are handled.

Impact factors as well as acceptance rates have their flaws and are overrated in today's world of science. Yet, any criteria and indeed rankings and ratings as such will always be flawed. Also, going from numeric indices (implying a doubtful exactness) to classes removes some of the biggest objections, though it adds one regarding sharp and arbitrary breaks between the classes. The point here, in any case, is to be aware of all these limitations and to use the whole outcome of evaluations based on them with care, rather than throwing away useful information altogether.

MAPPING TO OTHER STANDARDS

GIScience researchers publish not only in GIScience outlets, but in those of many other fields as well, including computer science, geography, ecology, economics, and engineering. In order to measure research output within a larger unit than just a research lab, or to compare researcher productivity across fields, it is thus necessary to map any GIScience publication outlet rating to comparable ratings in other fields. Furthermore, the number and importance of GIScience papers in the humanities and social sciences is currently growing, which adds the problem of comparing across the boundaries of science and technology on the one side and humanities and social sciences on the other. In fact, crossing these various boundaries is the major challenge in the exercise undertaken here, because it ultimately affects how GIScience labs fare in their various environments.

However, it is not easy to find standards in other fields. One option are rankings by governmental organizations. For example, the Australian Research Council has published a ranking of scientific journals and conferences for most disciplines[8]. The advantage in comparison to some other systems is the inclusion of expert reviews in the process vs. mere citation counting. A similar approach has been provided by the French National Committee for Scientific Research for the field of economics and management[9]. If some such standards established acceptable criteria for class boundaries in impact

[5] http://www.mendeley.com, http://readermeter.org
[6] http://www.scimagojr.com/
[7] http://eigenfactor.org
[8] http://www.arc.gov.au/era/era_2010.htm

[9] Comité National de la Recherche Scientifique, 2008: Categorization of Journals in Economics and Management. Version 2.1, June 2008, Section 37 (Économie / Gestion) http://www.gate.cnrs.fr/IMG/pdf/RankingCNRS_2008.pdf

factor or other rankings, these could be adopted for a GIScience standard as well.

The following table provides an example mapping across classifications. Neither the scientific areas nor the classification are meant to be actual elements of the proposed GIScience standard, but will be subject to discussion in the Delphi process (described in the next section). Classifications in other fields may have an ISI bias built in. A mapping allows our field to avoiding this bias for our own outlets, while necessarily accepting it for publications we place in other outlets.

Index or standard	**Field and types**	**Category**	**Category**	**Category**
GIScience publication outlets	*GIScience*	*A*	*B*	*C*
Comité National de la Recherche Scientifique	Economics and management journals	1*, 1	2, 3	4
Australian Research Council	Geography and Ecology journals and conferences	A/A+	B	C

Table 1: An exemplary mapping of a GIScience outlet classification to others

A PROCESS TO ESTABLISH AND MAINTAIN THE RATING

There are two requirements for establishing the GIScience publication rating:

- One or several organizations have to adopt the rating as a standard.
- The rating has to be updated annually.

A first step could be to adopt a GIScience publication rating within AGILE. Since the GIScience community is too small to be further subdivided into Europe and other regions of the world, the goal should be a worldwide standard and we suggest the early involvement of non-European organizations like UCGIS and others.

The annual update has to be organized by the participating organizations. Decisions can take into account the suggestions produced by members through an online tool and discussion platform.

An established method to reach consensus is the Delphi method. A group of experts, in this case senior GIScience researchers, decide on the outlets listed, the ratings, and the mapping criteria. We intend to present the results of a first Delphi process at AGILE 2011. The Delphi method could be used again in all or some future revisions.

As usual for such initiatives, the process should not be based on earning money, but on voluntary work with immediate benefits for all. AGILE member labs (and members of other organizations) will be able to use the rating for internal as well as external evaluations. Even if official evaluations impose other standards, an official European standard from AGILE (or a world-wide standard) would strongly support the cause and growth of GIScience and be of help in evaluations. Furthermore, the rating would be a valuable guide for junior researchers to decide where to publish.

SUMMARY AND OUTLOOK

We are proposing a method to establish and maintain a GIScience publication rating, to be used as a standard to evaluate scientific output of GIScience researchers, laboratories, and larger organizations. It consists of three parts:

1. A list and rating by classification of GIScience publication outlets;
2. A method to map this classification to other ratings;
3. A process for implementing and maintaining the rating.

Clearly, some methodological questions require further study and discussion. For example:

- do the senior GIScience researchers asked introduce a bias of some sort and how can this be

corrected?
- does the number of classes matter much and why?
- how can we avoid building a niche for research of lower quality through the use of a rating scheme admitting outlets of lower impact?
- how can we avoid reinforcing the general and harmful trend to assess research by citation numbers rather than by its ideas?

In a pragmatic spirit and in order to generate data for these kinds of discussions, applying the Delphi method will lead to a ready-to-use version of the publication rating shortly after the AGILE 2011 conference, where preliminary results will be presented and discussed. Our medium term goal is to make the rating a world-wide standard, involving sister organizations like UCGIS, in order to support the evaluation of the scientific output in our field in a fair comparison with other fields.

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BIBLIOGRAPHY

Caron, Claude et al., 2008: GIScience Journals Ranking and Evaluation: An International Delphi study. Transactions in GIS, 2008, 12(3): 293–321

Gonzales-Pereira, Borja; Guerrero-Bote, Vicente; Moya-Anegon, Felix, 2009: The SJR indicator: A new indicator of journals' scientific prestige. http://arxiv.org/ftp/arxiv/papers/0912/0912.4141.pdf

Hirsch, J. E., 2005: An index to quantify an individual's scientific research output. Proceedings of the National Academy of Sciences of the United States of America, Vol. 102, no. 46, http://www.loreto.unican.es/h-index.pdf