Editorial: Reviewer Merits and Review Control in an Age of Electronic Manuscript Management Systems

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Peer review is an important resource of scholarly communities and must be managed and nurtured carefully. Electronic manuscript management systems have begun to improve some aspects of workflow for conferences and journals but also raise issues related to reviewer roles and reputations and the control of reviews over time. Professional societies should make their policies related to reviews and reviewer histories clear to authors and reviewers, develop strategies and tools to facilitate good and timely reviews, and facilitate the training of new reviewers.

Categories and Subject Descriptors: I.7.4 [Document and Text Processing]: Electronic Publishing

General Terms: Documentation

Additional Key Words and Phrases: Peer review, manuscript management systems

ACM Reference Format:

Marchionini, G. 2008. Editorial: Reviewer merits and review control in an age of electronic manuscript management systems. *ACM Trans. Inform. Syst.* 26, 4, Article 25 (September 2008), 6 pages. DOI = 10.1145/1402256.1402264 <http://doi.acm.org/10.1145/1402256.1402264>

1. INTRODUCTION

The ways that papers are produced, submitted, reviewed, and published continue to evolve with each generation of information technology. Word processing changed the authoring process years ago and the Web is rapidly changing publication and distribution. For example, the ACM Digital Library rather than hardcopy is the primary means of distribution for conference proceedings and journals, and ACM Transactions journals have stopped using continuous page numbering per issue or volume. Grudin [2004] provides an excellent overview of the changes electronic publishing brings and the implications of those changes for journals. The changes that have come most slowly, however,

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© 2008 ACM 1046-8188/2008/09-ART25 \$5.00 DOI 10.1145/1402256.1402264 <http://doi.acm.org/10.1145/1402256.1402264>

ACM Transactions on Information Systems, Vol. 26, No. 4, Article 25, Publication date: September 2008.

are in the manuscript management and review phases of scholarly publication. Most commercial and non-profit journals have created or are adopting commercial manuscript management systems (MMS) that in turn are beginning to affect workflow and, arguably, author and reviewer behavior. Some of these changes are obvious and others are more subtle. This note is particularly focused on the evolution of peer review, especially the roles of and effects on reviewers. It assumes that peer review adds significant value to the quality of new knowledge and will continue in some form for the foreseeable future.

Three premises and their associated implications are outlined: reviewers, reviews, and tools to support reviewers and editors.

2. REVIEWERS ARE A SCARCE AND VALUABLE RESOURCE

Ask any editor of a peer-review journal what their greatest challenge is and the response will probably be related to finding expert reviewers for manuscripts and to encouraging the reviewers to return high-quality reviews in a timely fashion and subsequently to agree to review revisions. That reviewers are the linchpins in scientific publishing was articulated by then *Science* editor, Donald Kennedy: “the process of scientific publication depends on the volunteer services of thousands of experts all over the world who willingly provide, without compensation, confidential and candid evaluations of the work of others [Kennedy 2008, p. 1009].”

As such, reviewers deserve credit for their contributions to the production of new knowledge. Many reviewers add to their vitae the names of conferences and journals for which they review, thus providing self-documentation for their efforts at a very general level. Some universities and companies take these efforts into account when assessing employee merit. Conferences and some journals publish honor roles of reviewers to provide some recognition. In some cases, authors give acknowledgments to the anonymous reviewers, and perhaps authors can be encouraged to point to specific improvements or insights provided by anonymous reviewers. This does not bring personal credit to the individual reviewer but does reinforce the contributions of reviewers at large. This is a small additional burden, but already authors in some journals are asked to provide assurances of independence from financial support and to provide breakdowns of relative author contributions for articles with many co-authors. These are trends toward bolstering quality assurance as well as making the social nature of scientific progress more transparent. Linking ideas to a faceless review community is another possible step in this direction.

In some cases, editors are asked to write letters verifying the scientific contributions of reviewers for purposes of immigration documentation or scholarly productivity, thus explicitly rewarding good reviewer contributions. But the rewards of reviewing sit on the inherent satisfaction of knowing one has contributed to the advance of science, on the new knowledge gained by reading cutting edge work, and in the social capital that grows in the research community. Experienced reviewers learn that they earn reputation capital with their reviews, and this capital becomes part of the research community's rich

experience base, though electronic systems are beginning to affect this experience base and possibly reviewer behavior.

The adoption of electronic MMSs by all major journals and conferences today has the potential of making reviewer reward much more tractable and may therefore make review activity more explicit in the record of individual scholarship. In the case of journal MMSs, there are simple rating scales for review timeliness and quality. These ratings can be used by editors at their discretion and at present offer fairly simplistic scales. The critical element of these systems is that the reviews themselves as well as these ratings are persistent, outliving the terms and memories of individual editors, thus reducing community memory to simple scales that persist beyond the memories and perceptions of individuals in a community. As they become more uniformly adopted and more sophisticated in scaling review contribution, the ratings and the reviews themselves become the basis for evaluation of scholarly productivity. Thus, editors may be increasingly called upon to provide letters assessing reviewer productivity for a variety of purposes, including promotion and tenure in academic settings. Reviewers themselves must be aware of such possibilities and redouble their efforts to produce timely and high-quality reviews (this point was raised in editorials in several journals over the past several years, e.g., Marchionini et al. [2007]). Raising this issue drew strong responses from some scholars who objected to the grading of their reviews and wanting to know what their grades were. At present, there is no clear evidence about how such ratings are being used or policies about how they can be used, nor are there consistent mechanisms for reviewers to access their grades or address perceived injustice. The main point is that reviewers must be aware of the importance of their evaluative responsibilities and the possibilities for how their evaluations in turn reflect upon their own scholarship.

3. REVIEWS ARE PART OF THE SCHOLARLY RECORD

An important element of scholarly articles is that the published version reflects the insights of the authors as well as a set of peers who reviewed it. Although electronic publication and dissemination blurs some of the boundaries between the authoritative published version and Web-based preprints or subsequent annotated versions, the journal (or conference) version preserved in the organization's publication repository (e.g., the ACM Digital Library) includes insights made by reviewers. In effect, scientific publishing is increasingly recognized as a social process that not only includes larger numbers of authors but also contributions from reviewers and editors, and, as electronic publishing becomes the norm, contributions from readers and annotators. The electronic MMSs in use raise new kinds of questions for reviews in particular and foreshadow issues for Web-based annotations of published papers in the future.

Two kinds of questions arise. Who controls reviews and how will they be used in data mining applications? Who controls reviewing histories and how can reviewing performance be systematically appraised and rewarded?

On one hand, mining of reviews can provide valuable data for professional organizations and historians of science. For example, ACM might want to

examine all ACM reviews across journals or examine how ACM reviews differ from IEEE or other field reviewers; a scholar might study different review patterns across disciplines. Moreover, as we all know, many good ideas come out of the reviews and a history of science investigation might track the development of key ideas in a field by examining reviews. In email discussions with associate editors in several journals, good suggestions included allowing authors and editors to nominate exemplary reviews for inclusion in a review repository that would be publicly available and establishing a 50-year archive of all reviews that could be made available to future generations to mine and study. Both of these approaches would also provide exemplars for students and young scholars to learn how to write good reviews. The key issue at present is one of control over review databases. Commercial systems serve many journals and editors should understand the contractual agreements regarding who controls use and access to reviews.

On the other hand, journals must protect the review authority and confidentiality if peer review is to continue to be effective. The recent judicial rulings on the Pfizer lawsuits against the *New England Journal of Medicine* and the *Journal of the American Medical Association* affirm the importance of reviewer confidentiality but this is likely to be only the first of many issues that professional societies and journals will face. In these cases, Pfizer argued that the articles in the journals were used in lawsuits against two of the company's products and that it should have access to the peer reviews of those articles as well as reviews of rejected articles on the topic in order to argue its case. Courts in Illinois and Massachusetts both upheld the journals' rights to protect the confidentiality of the reviews (e.g., see Curfman et al. [2009]). ACM and other professional organizations must be similarly vigilant to protect the confidentiality of reviews and reviewers. Likewise, clear guidelines for how reviews might be aggregated (either anonymously or not) and used for commercial or scholarly purposes must be established in the system contracts that publishers sign, and these guidelines must be clearly specified to the entire scholarly community.

The question of reviewer history is likewise double-edged. If reviewers have access to their histories, they can use them as evidence of their contributions or challenge the ratings that become associated with their reviews. Publisher and editor workloads will likely increase on either count as editors are called upon to support or refute reviewer claims. Insuring the confidentiality of reviewer history seems as important as insuring the confidentiality of individual reviews.

4. WE NEED BETTER TOOLS AND MODELS FOR REVIEWING

Email and electronic MMSs have made distribution of manuscripts and reviews more efficient. However, the workflow bottlenecks continue to lie in editor and reviewer reading and writing time. The IT community is developing better tools to support specific subtasks but there is a long way to go to find effective techniques and develop tools that can assist the review process. A variety of immediate challenges arise for designers and developers.

Better user interfaces for review systems are needed. Today's MMSs are monolithic because they must serve a variety of journals or conferences each of which has its own cultures and policies. Editors and program chairs are left to develop workarounds for different defaults. Fundamental policies vary widely across different journals and conferences (e.g., review tiers, review discussion and rebuttal, reminder frequencies, and scope decisions). Customizable user interfaces can flatten the learning curve and reduce the need for workarounds.

Plagiarism and self-plagiarism are significant issues today as text can be retrieved and reused so easily. Assessing both outright plagiarism and the more slippery reuse of one's own text consume considerable editorial time. ACM has well-publicized policies on plagiarism and self-plagiarism and these help reviewers and editors make such assessments. Additionally, many publishers are testing automatic plagiarism detection systems, and it is likely that authors will be required to agree to have their papers scanned against the published and perhaps open Web text corpuses. Plagiarism detection systems that are effective and efficient while protecting intellectual rights and minimizing abuse will help both reviewers and editors in expediting reviews.

Less well-defined are editing tools or widgets that authors, reviewers, and editors can use while reading and writing. For authors, support for terminology and structure patterns that help retrieval of the final product would be useful. For reviewers and editors, widgets that parse text and link to cited work and related work would save much of the ad hoc Web searching used to compare and verify claims. Simple English-language copyediting tools beyond spell checking would be especially welcome given the globalized research community. Better media handling tools will also be important as papers increasingly include multimedia and code-based components.

Reviewing is a learned and highly demanding activity and better models for preparing young scholars are needed. Some conferences and journals allow reviewers to use secondary reviewers (with acknowledgement and assurance that the reviews have been checked) who are often students. Databases of exemplary reviews as noted previously are one approach that could benefit newbies as well as give credit to reviewers who wrote the reviews. Perhaps a book of readings in information retrieval with not only papers but the reviews would be a good contribution.

SUMMARY

Peer review is not without its flaws, but it has served science well for much of the last century and is worth preserving and improving. Peer review depends on high-quality reviews and every effort must be made to encourage and support reviewing excellence. Such support ranges from finding ways to provide credit, while preserving blind review, creating better tools to support the review process, protecting reviewer and review confidentiality, and helping new scholars develop excellent review skills. Electronic systems are disruptive to scholarly publishing, and peer review will also be affected. However this plays out in the coming decades, it is crucial that scientific progress be open and credible. For reviews and reviewer histories, confidentiality is crucial to the credibility

and should be preserved. What must be open are the policies associated with reviewers, reviews, and the persistent histories they accrue.

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Received June 2008; accepted June 2008