The Future of Mathematical Publishing

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Where are mathematics journals going? As an editor of an Australian Mathematical Society journal, I have serious concerns about the future. Many national mathematical societies derive most of their income from publishing and spend it on supporting mathematics, including activities that cannot be funded by research grants but are important to the long-term future of the discipline, such as promoting mathematics in schools. Research mathematicians therefore need to understand the trends, if not to fight the battles.

Journal prices are rising for several reasons, including production costs, and affect us all. Increasingly, national mathematical societies are handing over their inexpensive journals to commercial publishers, who raise prices. In part, this happens because libraries prefer to subscribe to packages of journals, and journals published by small organizations see their subscriptions drop to the point where they become uneconomical; further, there are efficiencies of scale in merging publishing operations. A ray of hope here is that a number of editorial boards of well-known journals have resigned in the past few years in protest at the pricing policies of the publisher and have set up alternative, less expensive journals. The blogosphere is full of information about these resignations (see, e.g., [1]). But the cost problem remains, and commercial publishers do not want us to discuss it. Indeed, one publisher sued the American Mathematical Society some years ago because the Society published figures on journal costs that the publisher found unflattering.

My biggest current concern is the trend to tie funding to "publication quality", often measured by "impact". The Excellence for Research in Australia evaluation looked at "research outputs" from departments across the country using (in many cases) impact factors to make decisions about quality; in a number of European countries, universities are girding their loins, or have already done so, for similar processes.

I present two of my worries about ranking journals. First, rankings are often used by libraries to decide which subscriptions to cancel when times are tough and so help determine which journals fail. As I have already pointed out, national mathematical societies derive much of their income from publishing and spend it on supporting mathematics. Inevitably, not all these journals can be in the top tiers, so mathematical society journals will fail and support for mathematics will decrease where this happens. Many mathematicians have a conflict of interest here: the best papers in national mathematical society journals are often by local mathematicians, so mathematicians in countries with lower ranked journals are torn between publishing in other journals, to support their personal interests, and at home, to support national interests.

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Next, impact factors can be and are manipulated in various well-documented ways. But we are all caught up in the citation game. In two randomly chosen issues of *Annals of Mathematics*, the average number of references per paper (omitting appendices and corrections) in 1985 was 16.5, and in 2005 it was 32.2.

Let me now discuss some more mundane editorial problems.

For many editors, plagiarism is a worsening problem. There are a few egregious plagiarists in mathematics, about whom readers can find information elsewhere (see, e.g., [2]). But there are more subtle problems, such as "trivial generalization", where very minor modifications lead to notionally different articles. Another is "self-plagiarism" (which I do here, see [3]). For example, some authors publish essentially the same article in two different languages; sometimes authors find a new technique, turn it into a number of almost identical papers, and submit them simultaneously to different journals; many papers have introductions that are almost identical to introductions of previous papers by the same authors. What is legitimate? In any case, when many institutions reward their staff according to the number of papers produced, it is hardly surprising that some mathematicians cut corners to produce more.

The first step in tackling plagiarism must be a clear statement of what it is because different cultures have different ideas about this. The American Mathematical Society website includes some ethical guidelines, but these appear in English only, and some non-English-speaking mathematicians may have trouble understanding them; further, they do not treat self-plagiarism. I would argue that the International Mathematical Union should draw up definitions of plagiarism and self-plagiarism and translate them into many languages so that we have an agreed statement of what is not acceptable. Mathematics is such that dictionary definitions are not adequate.

Timeliness is a major issue for authors. We all agree (in principle) that it is important to referee papers punctually, but delays between submission and publication are also caused by backlogs. In an ideal world, all journals would provide this information on their webpages, with backlog information by area when they have quotas for different areas.

Although refereeing is an important part of our responsibilities, as we move into the brave new world of Research Assessment Exercises, it seems that "the system" does not give credit for refereeing. If we believe that refereeing (and other editorial work) is important to upholding standards in the research community, we should argue this point.

Refereeing is a job without rewards, which brings growing frustrations. Many referees report that "this is the *n*th time that I have seen this paper." The report then continues in one of two ways: in one case, the authors have already received a rejection and a referee's report elsewhere but have not even considered the corrections suggested by the referee; rather, they have simply resubmitted the paper to another journal. In the other case, the referee continues: "I have made suggestions to improve the paper *m* times before, and finally it seems that another few iterations will produce something publishable." In other words, some authors rely on referees to correct their mathematics and proofread the text; the final paper owes as much to referees as to the author. This is also plagiarism, but it goes unpunished. What can be done about it?

My final editorial lament is that TEX has not reduced the cost of producing journals because many authors use it horribly. To cope with this, some journals retype all papers that are sent to them: this is as expensive as dealing with a traditional typescript, but, in this globalized era, it is often done by people with limited mathematics and English; the corrections for the worst proofs I ever received (from a commercial publisher) took six pages because of confusion between *w* and ω. The other solution is to adapt the TEX file—this is easy when the authors are competent, but it is more time-consuming than retyping ab initio otherwise. The mathematical community itself is to blame for this: we rarely teach mathematics students good TEX (or LATEX).

If the international mathematical community wants to make use of the savings that TEX could offer, then journals should reintroduce page charges for poorly written papers: there is good free information about TEX available online (see, e.g., [4]). According to the economic rationalists, financial incentives are the most effective way to get people to do things properly.

Surely the long-term health of mathematics relies at least in part on inexpensive journals, and so getting the mathematical community to educate itself would be a good step in this direction.

This article is based on an earlier article [3] in which I expand on some of the points here.

References

[1] T. BERGSTROM, `http://www.econ.ucsb.edu/~tedb/Journals/alternatives.html` (website on journal pricing).

[2] D. BOUYSSOU, S. MARTELLO, and F. PLASTRIA, Plagiarism again: Sreenivas and Srinivas, with an update on Marcu, *4OR* **7** (2009), no. 1, 17–20.

[3] M. G. COWLING, A critique of "Best Current Practices for Journals", *Gazette Aust. Math. Soc.* **38** (2011), no. 2, 75–78.

[4] TEX Users Group, `www.tug.org` (website on all aspects of TEX).