and it really should be clear by now that this is a poor model. We need materials much better adapted to individual use. Real success will also require sophisticated adjustments in the content. My belief is that this is a job for mathematicians, not educators.[1]

Summary

Stroyan suggests a kinder, gentler calculus with extended projects on physical applications. I propose a more rigorous course with fewer physical applications. How can I see these as basically similar?

Both of us are concerned that traditional calculus courses do not serve students particularly well. We both feel—for rather different reasons—that calculus is a good setting and that the real problem is the traditional format. In particular, calculus is not the main learning goal even in a calculus course. We both believe that better goals should reflect student needs; the differences in specific approaches reflect different student populations. We have both concluded that serving students well will require activity—again different in detail—outside traditional classroom settings.

A final similarity is that wide implementation of either approach is seriously limited by resource constraints. They might be seen as examples of enrichments and student-specific variations that would be possible with high-quality computer-based courses.

References

[1] KEITH STROYAN, *Doceamus:* Why do so many students take calculus?*, Notices Amer. Math. Soc.* **58** (2011), no. 8, 1122–1123.

[1] *See the essays at* http://www.math.vt.edu/people/quinn/education/ *for extensive discussion of these issues.*

SCRIPTA MANENT

...written words endure

Shifting Editorial Boards

Susan Hezlet

With the launch of the Elsevier boycott, the example of the new *Journal of Topology* has come up several times. Some scientists are proposing that other journal boards resign and move to new publishers. It is not that simple. In recent years the London Mathematical Society (LMS) has taken on three journal projects whose different stories illustrate the problems along with the benefits to be gained if you get it right. What follows is a personal account of the journal moves.

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Case 1. Compositio Mathematica

The journal, founded by Brouwer in the 1930s, is owned by a Dutch foundation, Compositio Mathematica. It was published for many years by Kluwer (now a part of Springer), but in reaction to increasingly higher prices, the foundation looked for an alternative cooperation with a learned society, and agreement was reached with the LMS. The LMS negotiated a separate agreement with Cambridge University Press that they would print, host online, and sell the journal.

Kluwer did not own the journal and handed over the subscription data along with archives for

a small fee. At the time, the foundation received none of the journal profits, so the LMS had to bear any financial risk in the move. However, because the foundation had ownership and rights, the risks were minor, and the LMS was very proud to be chosen above a number of strong contenders.

Together with the foundation, we redesigned the journal format, increased the content of the journal to remove an inherited backlog of papers, and dropped the price by a third. The drop in price had no effect on the subscriptions, which actually fell during the move. We even received some negative reactions, including a claim by a well-known topologist that the journal had increased in price! He had not checked the increase in page size or the number of pages per volume. The lesson we learned was that libraries do not reward good behavior through subscriptions, even though the mathematical community later acknowledged and appreciated the change.

Since then the journal price increases have been very modest, and the journal has grown in size. A few years ago the French project NUMDAM offered to retrodigitize the early volumes and make them freely available. The foundation also requires us to provide a five-year moving wall so that all the content older than five years is free. This is not something we do on our own journals; however, *Compositio Mathematica* makes a healthy profit, and the LMS is happy to comply. The journal revenue has not grown at the same rate as for our core journals, but this is not necessarily due to the broader access policy; it could be due to many factors. The "healthy profit" is fed back to LMS society activities and to the foundation, which now supports meetings, and most notably the European Math Society prizes to ten young researchers (a total of 50,000 euros), which will be awarded this summer.

In recent years, publishers have provided librarians with their institution's annual usage statistics by journal title, and, knowing how much they have paid for the annual subscription, they calculate the "cost-per-download". A worrying recent trend is that this data is given as the primary reason for cancellation. Mathematicians do not necessarily read the older *Compositio* articles via the "virtual library corridor" of access because the articles are freely available. This reduces the usage statistic that the librarian relies on to calculate the cost-per-download. Math journals generally have low usage in comparison with the "big sciences", but their historic content is read almost as frequently as the newer material; this helps our LMS journals, particularly the *Proceedings*, to be well used. For *Compositio*, even if we could put all the usage of the free articles back into the librarians' data, they would reasonably argue that they are not paying for free articles, so it should not count towards the calculation of the cost-per-download.

Case 2. The Journal of Topology

Once upon a time there was a distinguished board of an Elsevier journal who were unhappy with the large price increases and found they were unable to persuade Elsevier to make the changes they wanted. After many years of unsuccessful negotiations, the board approached the LMS, and we agreed to launch a brand new journal. We took legal advice and were very careful to make it clear that the *Journal of Topology* is a new journal, wholly owned by the London Mathematical Society, which does not lay claim to any benefit that Elsevier may have given to the community through the publication of its journal *Topology*. It is easy for us to do this, because we have shown that the major benefit comes from the community, not the publisher. A journal is not just an editorial board; it requires authors, referees, and readers to support its existence. We received the support of excellent authors, and the whole community moved behind the launch of the new journal.

From the business side, of course, we had no initial subscriber list to work with, and we agreed to a contract with Oxford University Press (OUP) to print, host, and sell the journal on our behalf. They also sell our three core journals, and that is why we decided to make a special discount to any library that takes all four journals; so, yes, we are also guilty of "bundling"! Growing a brand new journal from scratch is not easy. If you put it into large-scale library consortia deals, it has no basic subscriber list, and its sole income comes from the premium which does not grow as the journal grows. OUP added the journal to consortia deals for three years, but we asked them to remove the journal when we found the net income per library was £19.

Now the hard fact is that the journal is not covering all its costs, and unless more libraries take subscriptions, we cannot reduce the price per page without losing even more money. We know from the *Compositio* example that libraries take little notice of price, but it is very difficult to persuade a library to pay for a new journal outside of their bundle deals. Despite the support that the new journal has received from authors, referees, and editors, we also need readers to persuade their libraries to support these projects. I find it depressing that some of our best-endowed libraries in universities whose mathematicians are clamoring for change do not subscribe to the journal. (You know who you are, and if you don't, why not check with your librarian!)

While authors appreciate the benefits of being published, many topologists would say that they rarely bother to read the published article when they have already read the math arXiv version. However, published mathematics papers have a long life, and the good ones are both cited and read for many years. I showed some evidence for

this at a meeting held last year at MSRI, Berkeley.[1] It may be that, while the arXiv version is read more frequently in the first few years, the published version takes over in later years as the cited version of record becomes better known. As with the five-year moving wall, it is too early for us to have decent data from which to draw conclusions, but we should be careful about accepting short-term solutions when we[2] have a responsibility for the long-term preservation and cataloguing of the mathematics literature.

It is inevitable that journals whose readership relies heavily on the arXiv have lower usage and unfavorable "cost-per-download" data. Of course, not all math journals suffer equally; we know that barely 50 percent of the papers published in our general LMS journals are to be found on the arXiv, but for *Compositio* and the *Journal of Topology*, the figure is closer to 90 percent. There is very little we can do about this; discouraging authors from placing their preacceptance versions on the arXiv would clearly be unacceptable to the topology community! However, until the *Journal of Topology* builds up its back volumes, there are relatively few published articles to be read, and the cost-per-download is high in comparison with journals that publish a large number of papers each year or have built up historic archives.

Finally, despite the large amount of unpaid work contributed to journal publishing, journals are not cost free and some money has to go into the system somewhere. If mathematicians don't support a journal through subscriptions, the alternative is paid open access. Most mathematicians have no access to grant funding on the scale of "big science" and prefer the subscription model to open access fees.

Case 3. Mathematika

This journal was founded by Davenport in the 1950s and is owned by the maths department at University College London (UCL). The department was responsible for the choice of editorial board and the publication of the issues and sales—they did everything! Despite an uncertain production schedule and no attempt at marketing, the journal retained many traditional subscriptions because its price was so low that it kept below the radar of many library cuts. UCL asked us if we could take on the management of the journal, from providing an article management service to finding a large publisher to host and sell the journal to libraries in all the ways they expect, i.e., pay-per-view, traditional subscriptions, and consortia agreements. We agreed to a contract with Cambridge University Press, and both the LMS and CUP took the financial risk that moving the journal would lead to cancellations, as happened with *Compositio Mathematica*.

The managing editor, Alex Sobolev, and the editorial board put in extra hours to solicit good papers for the "relaunch". In several cases they volunteered papers that would have found homes in more distinguished journals to help the journal get back on its feet. This has worked; the journal is still small but receives sufficient papers to put out regular issues, and it is slowly growing.

We recognized the value of the early volumes; some very good papers were published in the early years and are only available in print. We retrodigitized the archive, and this is available to subscribers who hold a current subscription as an incentive to keep the subscriptions alive. Why not make it freely available? Because it is the value of the archive as well as the new research being published that puts the journal on a secure financial footing; i.e., the income we receive covers the costs and gives a small return to the LMS. As in the other cases, the "small return" gets put back into supporting mathematical activities.

[1] http://www.msri.org/attachments/workshops/587/MSRIfinalreport.pdf.

[2] *In writing this statement, it struck me that libraries used to be the repositories, but many now require publishers to grant "perpetual access" licenses, and the burden of responsibility has shifted with the digital age. It's something we should consider when dreaming up new publishing models: will our mathematical grandchildren thank us?*