Commentary

In My Opinion

Raise Salaries, Support Research

President Clinton's proposed federal budget for 2001 includes a substantial increase in funding for basic science research. As National Science Foundation (NSF) director Rita Colwell announced to the Society in her opening banquet address at the Joint Mathematics Meetings in January, the $700 million of new money will include a large increase in the Foundation's Division of Mathematical Sciences Program. The decision to start a major science policy initiative like this one, at this level, obviously depends on many factors, from finances to election cycles. But one component surely has to be the recent willingness of the major scientific societies to present a united front in the effort to educate political policymakers about science-funding needs. The AMS, through both its volunteer leadership and its Washington office and Providence staff, has been a leader in this movement. In addition to regular programs that expose congresspeople and their staffs to the central role of mathematics in modern science and society, the AMS has been a partner and a leader in coordinating joint statements from a wide range of, and widely credible, scientific research associations. AMS leaders and staff deserve credit for helping spark the president's initiative.

The Society has also put some serious resources into these policy education efforts: running that Washington office, for example, costs money for space and people. There is no question that a significant increase in NSF funding for mathematics research (increases of the order of 22 percent are being discussed) will greatly benefit mathematics. NSF should be able to significantly increase its support for initiatives, for pre- and postdoctoral fellowships, for meetings and conferences, for education, and for direct support to investigator-initiated core research. The funding, of course, is not yet in hand. Society members may want to contact their representatives to urge passage of the budget proposal: those represented by Democrats can urge the representative to vote for the president's plan; those represented by Republicans can urge raising the new money, say, to $1 billion. Nonetheless, I want to look beyond to another possible research funding intiative the Society could be engaged in.

About half of the AMS's 30,000 members are graduate students, emeritus members, or foreign associates who live abroad. Of the remainder—that is, the actively employed U.S.-resident mathematicians—a conservative estimate is that half, or 7,500, are currently engaged in mathematics research scholarship. Virtually all have enjoyed at least some indirect support from NSF programs, perhaps at a conference or through a fellowship or travel grant for themselves or their students. Again estimating conservatively, only about 1,500 of these enjoy direct research support for compensation from the NSF. Even if an NSF budget increase translated directly to a proportional increase in the number of mathematicians directly supported by NSF, there would still be considerably less than 2,000 directly compensated.

Now in fact most of the AMS members active in mathematics research (including those with federal research grant support) also have their research directly supported from another source, namely, their employer (usually a college or university), through the mathematician's salary. The Society could, as well, be working for increasing this sort of funding.

I assume that most Society members would be sympathetic to having the AMS invest resources in efforts designed to enhance support for mathematics research through raising mathematics faculty salaries. Identifying projects that would stand a chance of accomplishing this is much harder. Perhaps one place to start would be trying to reprise the Society's role in the federal funding initiative by trying to reach cooperative agreements on the importance of this sort of funding enhancement with other scientific societies.

In any event, the possible benefit to mathematics research from a concerted effort to raise faculty salaries and the large number of Society members whose research could be better served if they were better compensated suggest that this is an area where the AMS should be creating a presence.

—Andy Magid
Associate Editor

Letters to the Editor

Disposing of a Personal Mathematical Library

Recently retired, I now face the daunting task of disposing of a run of 25 years of *Mathematical Reviews* and a professional library numbering more than 1,000 volumes.

Does the Society have any thoughtful advice to help its aging members make rational choices about the disposition of their mathematical libraries? What are the alternatives, and what are the advantages and disadvantages, tax and otherwise, of each? This problem will eventually confront every responsible member of the Society, and competent profession-based advice would be most helpful.

—John E. Wetzel
University of Illinois, Urbana-Champaign

(Received March 31, 2000)

Editor's Note: The AMS cannot provide systematic advice to individuals about disposing of personal mathematics libraries, and the general advice here is from the editor as one person.

Some general alternatives are charitable gift, noncharitable gift, sale, and abandonment. The situation with charitable gifts is more complicated than is at first evident. Some factors that enter into the question are one's goals for the books, realization of money vs. good future use of the books, one's personal finances and estate plan, and the amount of any tax deduction taken on the books at the time of their purchase. Particularly in the case of a relatively large library, it is a good idea to consult attorneys or accountants who can provide the necessary expert advice.

Giving a personal library to a university library sounds like an attractive option, but mathematicians are sometimes disappointed by what happens to their gift. The end result may be a better use of the books if the books are made available for free to the faculty and students in one's department. For a department with available space and with a mathematics library at a fair distance, it may be possible to give a collection of books as a start toward a reading room within the department.

The Internet can provide help that was not readily available a few years ago. Some names of appraisers can be found by beginning with a Web search for "appraise books". There is a network of used-book dealers on the Web, and one can obtain preliminary information about some of these dealers by searching for "used books"; alternatively, one can find a number of used-book listing services at `http://www.bookfinder.com/`.

The value of old issues of *Mathematical Reviews* is basically zero within the U.S. Some mathematicians have shipped their copies to China or to Africa, where there is still a need. Direct contact with a visitor to the U.S. is one way of finding out about a particular need. A shipping cost is involved, and sometimes one can find a charity that will pay that cost.

Distance- and Computer-Learning

I basically agree with Steven Krantz's major claim in his opinion column (*Notices*, May 2000), that "we should be hesitant to undermine or discard the traditional [math education] methods" and alert to the danger that distance- and computer-learning may bring to math education. However, I don't think his reasoning is quite convincing.

On the one hand, the major drawback or flaw that Krantz indicates for distance- and computer-learning actually also applies to traditional teaching and learning. In many cases, doesn't traditional math education, which "places students in a classroom" and lets them "learn from a curriculum," also "value form over substance"? Many kids don't understand math or even hate math just because tons of mathematical "substance" was poured directly from the "trained professional or teacher" into their ears, not to their minds, nor through their own active exploration and construction. This situation is true, especially when Krantz's perspective on the nature of the learning process is considered: *a give-and-take human interaction*. Thus, "the important question" is not which approach is more substantial, but rather lies in the point that Krantz himself raises: *whether students are internalizing and retaining the material*.

On the other hand, computer and network are capable of accomplishing many of the tasks that human instructors can. Krantz provides a list of activities that he thinks of as characteristic of a good human teacher (e.g., "shows the students how to read the subject matter," "sets a pace for the students and evaluates their progress," "adjusts the material to the audience," etc.) while suspecting that a machine cannot do these. Actually, most of these are just the fundamental features that an interactive computer- and distance-learning environment could, or at least in principle should, have. If we try to integrate the experiences of experts/good teachers into a well-designed electronic learning system, isn't it more powerful than an unqualified human "professional or teacher"?

In a mercantile society it is no surprise that the design, publication, or adoption of curriculum materials is often connected with commercial benefits, either for traditional textbooks or innovative educational technology. The major fault should not be attributed to commerce or technologies themselves, but rather to ignorance and its resultant superstition or fear that our provosts, deans, principals, as well as faculty and teachers possess. In my view, technology can never replace the role of creative and inspiring teachers and faculty, but it can supplement their works on many occasions and in many approaches. And it will be extremely challenging, especially for the mediocre ones.

—Xuhui Li
University of Texas, Austin

(Received April 3, 2000)

I would like to reply to Steven Krantz's commentary, "Imminent Danger—From a Distance," in the May 2000 *Notices*.

Krantz is obviously very troubled. He decries efforts to develop

computer-aided mathematics instruction as "alarming" and "dangerous." He conjures up visions of invaders from the Internet who "want to substitute the act of 'logging on' for the productive interaction of first-class minds that takes place in the classroom." He despairs dramatically that "What is at stake is the next generation of mathematical scientists."

I believe this is called "yellow journalism".

And the rhetoric is tired. Yet we keep hearing it from people who seem to have little or no engagement with online learning. Unlike those of us who are eager to see what new technologies have to offer and what new strategies might be developed for mathematics instruction, Krantz seems to believe that he has the process of education all figured out. "The vast majority of today's college faculty…were educated with traditional methods," he claims. Indeed.

I don't see much point in responding sentence-by-sentence to Krantz's distorted polemic. His excesses should be apparent enough.

I would like to say, however, that Krantz does not seem to understand the motivations of the vast majority of the mathematical community engaged in a more considered discourse concerning the costs and benefits of classroom technology. We are not out to destroy mathematics to make a buck. We are not looking for a quick fix. We do not take our responsibilities to students lightly. We are not underqualified. And we are not naive.

Krantz may eventually have to capitulate, just as he did when he could not "consciously" choose calculators for his classroom. I plan to *understand* technology and use it towards better ends. That's what I learned in school. The rest of the rampaging horde, I do trust, can think for itself.

—William Mueller
MathSoft, Inc.
Cambridge, MA

(Received April 13, 2000)

The opinion column on distance-learning (*Notices*, May 2000) reminded me of a silly joke that I told an administrator who was a "believer" in distance-learning. I was interviewing for a job at the time (and actually got the job). There is a distance-learning tool that is versatile, highly portable, universally available, reasonably cheap, and of high quality. It has been around for hundreds of years. Almost every version of this tool has been developed by highly trained professionals. All the advantages of self-paced learning and "no missed classes" are incorporated in it. It's called a book. What does this mean? It means that if the concept of distance-learning was a cure-all, then books would have done the job a long time ago.

The problem is (just as with online materials) that the qualities of a teacher that the associate editor mentions cannot be incorporated. So what if the online stuff "talks", moves, and is in color, etc.? It's the same idea, only with more distractors. Can online materials help? Yes, by addressing learning styles that cannot be addressed in books, we will probably be able to reach a few more students. In my opinion that is good. Online adaptive testing is another opportunity. So is compressed video delivery to a classroom that has another teacher to interact with students, especially in areas where certified teachers and classroom experience are at a premium. But each opportunity sees technology as a support, not a replacement.

What of the dangers of bad materials? The danger is probably similar to that encountered when working with a bad book. There are now plenty of texts that have no focus, value form over substance, etc. (consider the comments of the TIMSS study on the U.S. curriculum). I agree that there is a danger in the extensive "sales jobs" that publishers are now trying to do. Maybe the little story above can get the stars (or dollar signs) out of some people's eyes. After that, pick those materials that work for you and move on.

—Bernd S. W. Schroeder
Louisiana Tech University

(Received April 19, 2000)

Facilitating Getting Mathematics Teachers and Researchers Together

In the April 2000 "Commentary", Mark Saul argues the case for the importance of getting mathematics teachers and researchers together "face to face".

The problem is to facilitate this marriage. The first step could be a *virtual* meeting. Under the flagship of mathematics associations, some talented teachers from high schools, colleges, and universities could be selected to have a lecture, tutorial, or seminar videotaped. Some of the better ones would be put on a Web site.

Subsequently, as a second stage, these lectures could be discussed by the two parties in smaller groups face to face.

This project could become an annual event with different participants. As a spinoff, future generations could inherit a library of lectures presented by talented teachers comparable to the collections of records of great concerts or plays.

—Joseph Hammer
Sydney University

(Received May 29, 2000)

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