Letters to the Editor

Reliable Research Literature

Surely most mathematicians know not to just trust what's in even the "better" journals. But fewer of us may realize that some prominent authors, and some of these "good" journals and their editors, aren't striving to make the research literature more reliable. Instead, they 1) recklessly publish without proofreading/refereeing, 2) irresponsibly do nothing when serious errors are found/reported, and/or 3) perversely obstruct the publication of significant corrections.

While it may be impossible to stop all the cheating, journal publishers—corporations and math societies—can oblige their editors to behave more honorably, and employers can use their leverage over irresponsible authors.

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NSF-Sponsored Educational Programs

In his Opinion article "Because Math Matters", Solomon Garfunkel outlines true problems but draws wrong conclusions. His statement "We are not doing a very good job. U.S. students are falling behind students in most industrialized countries" is true, but his claim that the NSF [National Science Foundation] has "led the effort for innovation in mathematics education since the 1950s" is loaded as well as overtly political (something he claims we should avoid). I am not sure what the NSF was doing in the 1950s and 1960s with respect to math education, but it has been quite involved since the 1980s and in mostly bad ways. Look at some of the results of NSF programs' de-emphasis on arithmetic calculation and algebraic manipulation and the (NCTM-encouraged [National Council of Teachers of Mathematics]) substitution of calculator usage for long division. Implicit in his analysis and many such writings is the opinion that teaching children strong computational skills is bad. But the example given is the poor performance of U.S. students. However, this poor performance has taken place during the NSF's most innovative period, i.e, from the 1980s to the present. This is why the backlash against fuzzy math on the part of parents has been so extreme; during this time U.S. children have plummeted in math.

A good example to study would be the New York City public school system and the CUNY [City University of New York] college system. It is acknowledged that in the 1940s–1960s the CUNY colleges produced more scientists (including mathematicians) and doctors (and various professionals) than any other college system. Furthermore, many of these people came from the working and middle classes. Doesn't this need to be analyzed? I went through the NYC public school system and CUNY in the 1960s and 1970s, and many of my classmates ended up in highly successful professions. However, there were bad things, one of which was tracking minorities into programs where they were denied traditional approaches to education. One of the dubious achievements of reform movements of the 1980s and 1990s was that basic arithmetic competence was denied to minorities as well as to the white working and middle class children.

Let me summarize: The U.S. became a world leader in mathematics between the 1940s and the 1960s. In fact, many of the countries that are beating us now sent thousands of their future scientists (and still do) to be educated in the U.S. Since the 1980s, concomitant with the rise in "innovative" teaching techniques, the U.S. has declined considerably in international comparisons. Garfunkel is wrong in saying this isn't political; it is most definitely political. In fact, the NSF needs to immediately stop funding all education initiatives and start subjecting future education grant proposals to the same rigorous standards they use for mathematical/scientific research.

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Problems in Teaching through Applications

In his March 2007 Opinion piece, Solomon Garfunkel is making a point about the importance of applications in teaching mathematics. I do not think that there is any disagreement about that. Probably the vast majority of teachers would agree that both the skills and the ability to apply them are important; striking the right balance is where the disagreements start.

The only example of teaching through applications that Solomon Garfunkel gives is confusing, to say the least. He writes, "We can continue to ask students problems of the form 'solve for x in the equation $x^2 - 3x + 1 = 0$'. Or we can ask at what proportion of performance-enhancing drug use in the population is it cheaper to test two athletes by pooling their blood samples—which leads to the same equation." It would be interesting to know how much time it would take for an average reader of the *Notices* to derive the equation (actually, that should be an inequality, not an equation). The "pooling blood samples together" protocol that leads to $x^2 - 3x + 1 > 0$ is: Test a mix of blood samples. If the result is negative, then both athletes are clean. Otherwise, test the first one. In the case of the negative result, the second athlete is guilty. If the result is positive, then test the second athlete. I wonder if the author of the problem has factored in the cost of a lawsuit in the case when the second athlete is accused of cheating without his blood having ever been tested. On top of that, solving the problem requires a bit of probability theory (probability of the intersection of independent events and the notion of the expectation) that goes somewhat beyond what a student just starting quadratic equations usually knows.

Unfortunately, this is not just an isolated bad example that has accidentally found its way into an article. There is quite a number of very confusing problems in modern textbooks (I am mostly familiar with calculus textbooks). Trying to keep up with the trend, textbook authors are incorporating as many "applications" as they can. I suspect that in some cases they do not understand the "applications" themselves. And the students suffer. These "real-life problems" do not motivate students, they do not clarify the concepts. They just confuse. And they have little to do with real life as well.

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Mathematics and Applications

As the healthy debate between and pure and applied mathematicians continues, I would like to recall what one of my teachers, Nicolás Martínez, used to say: "Mathematics is what is lost in its applications."

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Verify Authors Know Paper's Contents

It is my suggestion that every department of mathematics and statistics begin an internal and/or external investigation to scrutinize all the papers professors in their departments have written.

I feel that there is a strong need to review every professor's papers in every department. I think it is unfair to a person who puts a lot of work into one paper to get the same credit as a professor who may have just given an idea and put his or her name on a paper. To clear this possible unfairness (if any), I suggest that committees of mathematicians and statisticians (internal and external) be set up to interview the writers of every paper to see whether they know the content of each paper. This of course will require preparation on the part of the professor, but I think it will make things more fair in terms of credit attribution.

If a professor cannot describe the content of a paper that bears his or her name, then I think it is not ethically scientific that the paper should bear his or her name. If a person fails in this task in a number of them, then something is wrong with the system.

I know that this is a long process, but I feel that fairness should prevail. If an author does not know the content of a paper or did not do a fair amount of work on it, then a letter should be sent to each journal [publishing] each such paper, and a retraction should be made about that paper's authors. In addition, all the mathematical and statistical citation databases should be informed about this retraction.

In conclusion, I do not believe it is fair or ethical that a paper bear the name of a person who did minimal work on a paper or who does not know the content of the paper.

I hope that mathematical and statistical associations will consider this request in any of their future meetings.

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Reply to Rosen

Rosen misstates the actual timeframe for reform funding and as a consequence misplaces the blame for poor performance. The NCTM Standards were published in 1989. They were universally endorsed by all of the major mathematical professional societies. The Standards were in fact undertaken because of a pervasive sense that we were doing an inadequate job of educating students in mathematics at the K–12 level. NSF funding of reform efforts began in the early 1990s, and the major reform curricula did not appear until the mid- to late-1990s. And at their height (there has been some drawback of high school programs since the math wars) the elementary, middle, and high school curricula achieved no more market share than 25%, 20%, and 5% respectively. It is clearly inappropriate to blame poor performance in the 1980s and 1990s on these innovative curricula. The inconvenient truth is that there were no good old days, just a lot of hard work left to be done.

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Submitting Letters to the Editor

The *Notices* invites readers to submit letters and opinion pieces on topics related to mathematics. Electronic submissions are preferred (notices-letters@ams.org); see the masthead for postal mail addresses. Opinion pieces are usually one printed page in length (about 800 words). Letters are normally less than one page long, and shorter letters are preferred.