Publisher's Editorial

Stirring The Pot— The Common Core and All That

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Introduction

When I first started to think seriously about reform in mathematics education, some 45 years ago, I asked advice from my then Mathematics Dept. Chair at Cornell, Alex Rosenberg. I remember him telling me that he believed that every 20 years or so it is necessary to "stir the pot" so that we are forced to re-think how we teach and re-imagine how children learn.

Well, 40 years ago, I began to work with applications and modeling; 20 years ago, I was immersed in creating materials that exemplified the NCTM standards; and today, we are all dealing with implementation of the Common Core. The pot sure as hell is getting stirred.

But there is so much noise that it's hard to discern what's going on and what it all means. So here's my take.

The NCTM Standards and Reactions

In 1989, I believe that NCTM basically got it right. The standards that they wrote emphasized the need to improve the mathematics education of all students. There was no laundry list of topics to be mastered by a certain age, but rather some key notions of what some have called "mathematical habits of mind." The National Science Foundation (NSF) quickly funded a number of projects designed to produce "standards-based" curricula at the elementary, middle, and high school levels. It is interesting to note that the progeny of those curricula hold roughly 50% of the elementary market, 25% of the middle school market and 5% of the secondary market.

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So what went wrong? Enter the "math wars." Basically, a small—but extremely vocal—group of research mathematicians, right-wing politicians, the wealthy, and religious fundamentalists got scared, for a number of different reasons.

- The mathematicians were afraid that in creating curricula designed to serve all students, we would short-change the best and the brightest, potentially losing future Ph.D. candidates.
- For the political right, this smacked of federal interference in local control of education, i.e., a federally-mandated national curriculum.
- For the wealthy, we were potentially changing the rules in a game that they and their children were already winning—so why take the risk?
- For the fundamentalists, the emphasis on applications and modeling left the mathematics classroom open to influencing the hearts and minds of their children in a way that solving quadratic equations didn't.

And so words like "fuzzy math" were thrown around to make the new curricula look silly and non-rigorous, and members of this alliance turned out at every local and statewide school board meeting—and won.

There were many consequences of this turmoil. NCTM rewrote their standards in 2000 hoping in vain to placate their critics. NSF redefined its mission as one primarily—if not solely—devoted to research, backing away from 50 years of curriculum reform and implementation. But without the NCTM standards to provide direction, we were left without guidance on how to proceed with reform of math education.

NCLB and High-Stakes Testing

Enter No Child Left Behind (NCLB) and the mandated state-wide high-stakes tests from grade 3 onward in mathematics and language arts. Effectively, NCLB created 50 different sets of standards and the tests to assess them. As you can imagine, the tests are widely disparate in quality, and a satisfactory performance in one state may be woefully inadequate in another. But NCLB says nothing about what should be on the tests, how hard the tests should be, or what should be used as cutoff scores. Those are left up to the individual states to determine. And to be fair, it's a mess.

CCSSM: Higher Expectations—and Risks

Enter the Common Core State Standards for Mathematics (CCSSM). The logic of the Common Core rationale is simple and admittedly compelling: We have a standards/testing Tower of Babel; it makes no sense. We need one common set of standards to teach to and to hold students (and teachers) accountable.

The devil, however, is in the details. The current version of the CCSSM is, I believe, destined to disadvantage the already-disadvantaged. For the most part, it does obeisance to those who worry most about where our next generation of STEM researchers and workers will come from. In the name of raising expectations, it runs the risk of being irrelevant to the vast majority of students taking math today. The promise of the NCTM standards was "math for all." *CCSSM threatens to deliver math for the few.*

Ostensibly, the Common Core is a creature of the states; but its standards were certainly created in concert with administration education policy and strongly influenced by large private foundations, as well as publishers and test-makers.

And these standards, too, have their set opponents:

- educators who worry that the topic lists grade by grade are simply designed as an escalator to calculus;
- teachers and teacher unions who see the coming assessment of teacher performance—based in part on student performance—as an attack on tenure and a weapon to be used against teachers;
- the same right-wing politicians who fear federal control of education; and
- those who fear the undue influence of the aforementioned large corporate interests (publishers, test-makers), as well as that of private and public foundations.

All of this is confounded by the fact that, *to the general public, the Common Core is synonymous with the high-stakes tests being designed to assess them*. These tests will roll out this year and next. The results will likely be horrific, with predictions of failure rates in excess of 70%. This fact, the general cost of the assessments, and the factors mentioned above put the broader issue of acceptance of the CCSSM at great risk.

We Are Not in a Race

In some ways, this is a shame. There is promise here. CCSSM needs to be viewed as a living document, one that can be adapted as needed to serve the broad student population. If we can back away from our obsession with high-stakes testing, then we could use common standards to produce common assessments which we could then use to diagnose student needs in order to improve learning—not to punish students, teachers, or schools.

Forty years ago, we feared the Russians, 20 years ago the Japanese, and today the Chinese. Mathematics education is not a horse race. It is not about ensuring that our best are better than their best. It is about ensuring that every student has the opportunity to learn as much mathematics—and as much of how they can use that mathematics—as possible. That is a pot worth stirring.

About the Author

Solomon Garfunkel is the founder and Executive Director of COMAP and Executive Publisher of this *Journal*.

He served on the mathematics faculties of Cornell University and the University of Connecticut at Storrs, but he has dedicated the last 35 years to research and development efforts in mathematics education. He was project director for the Undergraduate Mathematics and Its Applications (UMAP) and the High School Mathematics and Its Applications (HiMAP) Projects funded by NSF, and directed three telecourse projects, including *Against All Odds: Inside Statistics* and *In Simplest Terms: College Algebra*, for the Annenberg/CPB Project. He has been the Executive Director of COMAP, Inc. since its inception in 1980.

Dr. Garfunkel was the project director and host for the video series *For All Practical Purposes: Introduction to Contemporary Mathematics*. He was the Co-Principal Investigator on the ARISE Project, and Co-Principal Investigator of the CourseMap, ResourceMap, and WorkMap projects. In 2003, Dr. Garfunkel was Chair of the National Academy of Sciences and Mathematical Sciences Education Board Committee on the Preparation of High School Teachers.

Editor's Note

About This Issue

This year we had almost 8,000 teams in the MCM and ICM contests combined; the 19 Outstanding papers ran to more than 500 manuscript pages. Editing and publishing all the Outstanding papers, which we once did, is simply not possible any more.

Hence, as in the past few years, we present in the pages of this *Journal* only one Outstanding paper for each of the MCM and ICM problems. The selection of which papers to publish reflected editorial considerations and was done blind to the affiliations of the teams.

All 19 Outstanding papers appear in their original form on the 2014 MCM-ICM CD-ROM, which also has the press releases for the two contests, the results, the problems, and some commentaries. Information about ordering is at `http://www.comap.com/product/cdrom/index.html` or at (800) 772-6627.