

CREATING A PROFESSIONAL COMMUNITY OF MATHEMATICS TEACHERS

Al Cuoco

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with help from

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Joint Mathematics Meetings, January, 2013



OUTLINE

- 1 THE COMMUNITY
- 2 OUR GOALS
- 3 OUR DESIGN PRINCIPLES
- 4 SOME RESULTS
- 5 MOVING FORWARD
- 6 PARTING THOUGHTS (FOR THIS CROWD)

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THE INGREDIENTS

Built on programs with almost 25 years of experience:

- PROMYS and PROMYS for Teachers (1989–present)
- PCMI SSTP (2001–present)
- The Focus on Mathematics Partnership (2003–present)
- Math for America Boston (2009–present)

Collaborators:

- Boston Area Mathematics Teachers
- Boston University
- EDC
- PCMI
- Boston College
- MIT
- MfA

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FUNDAMENTAL GOALS

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- To conduct professional development programs, designed and taught by teams that are led by teachers and supported by the entire mathematical community.
- To close the gap between secondary school mathematics and mathematics as a scientific discipline.
- To help students at all levels experience the thrill that comes from doing serious mathematics.

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- Mathematics at the core
 - Experience before formality
 - Depth over Breadth
 - Low-threshold, high-ceiling
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 - in accommodating different intellectual cultures and traditions
- Situate school mathematics in the larger landscape
 - Create arcs from secondary school mathematics to current themes in the discipline
 - Seek out the depth in “elementary” mathematics
 - Focus on mathematical habits of mind

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- Over 2000 secondary students have participated in the annual *Mathematics Expo*.

PUBLISHED ARTICLES IN MT OR MMS

- Bowen Kerins and 50 teachers from PCMI: *Gauss, Pythagoras, and Heron*
- Ben Sinwell: *Chebyshev Polynomials: Patterns and Derivation*
- Steve Rosenberg, Dan Wulf, Mike Spillane: *Heron Triangles and Moduli Spaces*
- Allen Olsen: *Divisibility Tests*
- Marvin Freedman: *Converging on the Centroid*
- Ryota Matsuura: *Approximating π using similar triangles.*
- Ryota Matsuura and Patrick Harless: *From arithmetic sequences to linear equations.*

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STRUGGLES

The next phase is to work on issues like these

- Transference to classrooms doesn't come for free—the “expectation gap.”
- School systems (and administrators) are reluctant to let teachers drive professional development.
- Student achievement is measured by systems not sensitive to what the community thinks is important.
- Little research exists about the connections between teachers' mathematical knowledge and student learning.



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PARTING THOUGHTS

GLENN STEVENS

Mathematicians did not enter into this work with any preconception, intention, or desire of being part of a “silver bullet” that would somehow solve the nation’s education problems. Indeed, if they had suspected their work might ultimately be judged within such a framework, I think it would have been a lot harder to get them involved in the first place.



PARTING THOUGHTS

GLENN STEVENS

... mathematicians were asked to be involved *as mathematicians* in the work. From the beginning it was made clear that their contributions would be purely mathematical in nature and that their mathematical expertise would be highly valued by the partnership. On the flip-side, it was also clear that mathematicians were not expected to play the role of educators, and that there would be no pretension that they would be telling teachers how to teach.



PARTING THOUGHTS

GLENN STEVENS

... This would be exciting work that would engage mathematicians in new ideas and practices that are important to them *as mathematicians*. Using this mathematics-focused approach we've had no trouble generating interest among mathematicians.



FINALLY

And we could write a similar statement about the involvement of the other members of the community.



Thanks

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