

Helping Students Develop Mathematical Habits of Minds without Compromising Key Concepts from the Syllabus

Date: January 8, 2008 (Tuesday)

Time: 8:30am – 9:45am

Venue: Room 6C, San Diego Convention Center

Abstract: As teachers, we are entrusted to teach the long list of mathematical concepts specified in the syllabus. In addition to the tension between depth and breadth, we need to incorporate into our lessons opportunities for students to develop mathematical thinking, called "habits of mind" by Cuoco, Goldenberg, and Mark and "ways of thinking" by Harel. A panel of mathematicians and mathematics educators will discuss and explore ways to help students develop mathematical habits of mind while learning key concepts.

Organizing Chairs:

- Kristin Camenga <Kristin.Camenga@houghton.edu>
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- Kien Lim <kienlim@utep.edu>
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Presenters:

- Hyman Bass <hybass@umich.edu>
University of Michigan
- Al Cuoco <acuoco@edc.org>
Educational Development Corporation
- Guerson Harel <harel@math.ucsd.edu>
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- Annie Selden <js9484@usit.net>
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Quotes

- "The goal is ... to help high school students learn and adopt some of the ways that mathematicians *think* about problems. ... A curriculum organized around habits of mind tries to close the gap between what the users and makers of mathematics *do* and what they *say*. ... It is a curriculum that encourages false starts, calculations, experiments, and special cases." (Cuoco et al., 1996, p. 376).
- "Sometimes referred to as 'mathematical habits of mind' or 'mathematical practices,' these ways of thinking about and doing mathematics may be fairly widely regarded as productive, but are often left to the implicit curriculum" (Selden & Selden, 2005, p. 1).
- "[T]he knowledge, practices, and habits of mind of research mathematicians are not only relevant to school mathematics education, but that this mathematical sensibility and perspective is essential for maintaining the mathematical balance and integrity of the educational process—in curriculum development, teacher education, assessment, etc." (Bass, 2005, p. 417).
- "Students' ways of thinking impact their ways of understanding mathematical concepts. Conversely, how students come to understand mathematical content influences their ways of thinking" (Harel & Sowder, 2005, p. 39)

References

- Bass, H. (2005). Mathematics, mathematicians, and mathematics education. *Bulletin of the American Mathematical Society*, 42 (4), 417-430.
- Cuoco, A., Goldenberg, E. P., and Mark, J. (1996). Habits of Mind: An Organizing Principle for a Mathematics Curriculum. *Journal of Mathematical Behavior*, 15 (4), 375-402.
- Harel, G., & Sowder, L. (2005). Advanced Mathematical-Thinking at Any Age: Its Nature and Its Development, *Mathematical Thinking and Learning*, 7, 27-50.
- Selden, A., & Selden, J. (2005). Perspective on advanced mathematical thinking. *Mathematical Thinking and Learning*, 7, 1-13.