Submittee: Malgorzata Dubiel
Date Submitted: 2012-06-27 14:37
Title: 2012 Changing The Culture Conference
Event Type: Conference-Workshop

Location:
SFU Vancouver at Harbour Centre, 515 W. Hastings Street, Vancouver, BC

Dates:
May 18, 2012

Topic:
Good Questions, Big Ideas

Methodology:
Lectures, workshops and panel discussion

Objectives Achieved:
Educational discussions

Scientific Highlights:
Plenary Talks: 1. Hey, What's the Big Idea? Working with Guiding Themes from Mathematics and Mathematics Education, David Pimm, SFU 2. Asking Better Questions when we Teach Math, Marian Small, UNB

Organizers:
Dubiel, Malgorzata, Department of Mathematics, SFU Alvarez, Melania, PIMS Milner, Susan, Department of Mathematics, SFU Oesterle, Susan, Department of Mathematics, Douglas College

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Speakers:
1. David Pimm, Faculty of Education, SFU: Hey, What's the Big Idea? Working with Guiding Themes from Mathematics and Mathematics Education. Abstract: Two different elements inform this talk. The first is my experience over the past year working on two NCTM books on geometry for secondary mathematics teachers, books that have involved creating four 'Big Ideas' (different ones for grades 6-8 teachers and grades 9-12 ones). The second is a realization that it is now twenty years since David Tall edited the book Advanced Mathematical Thinking (Kluwer, 1991), whose blurb claims "This book is the first major study of advanced mathematical thinking as performed by mathematicians and taught to students in senior high school and university." I wondered what has

happened in the intervening time in this area. So in my talk I will attempt to explore what a 'big idea' is (whether in mathematics or in mathematics education at the undergraduate level), as proposed by mathematicians (ancient and modern) and by researchers in post-secondary mathematics education, before considering what it might mean to teach mathematics bearing one or more such guiding themes in mind. 2. Marian Small, Faculty of Education, UNB: Asking Better Questions when we Teach Math Abstract: It does not matter whether you are teaching elementary school students, high school students, or post-secondary students - it is the questions you ask that make the difference in your students' perceptions of what mathematics is and also their success. I think we can all do a better job of asking questions that focus on deeper understandings in mathematics rather than on details. We can also do a better job of asking questions that are accessible to a broader range of our students and that better engage them. And we can ask more open questions that evoke richer and broader, rather than narrower, conversations about mathematics. I will share samples of some student responses to this approach to questioning and will also describe the impact that this has had on many teachers and their students. 3. Warren Code, Carl Wieman Science Education Initiative, UBC: Should we change what we do in the calculus classroom? Abstract: In an attempt to answer this question, I will present results from various measurements of student learning in differential calculus taken over the last few years at UBC. There are indicators which suggest room for improvement. To address the inevitable follow-up: "But how might we change?", I will also describe our recent, formal comparison of teaching methods similar to Deslauriers, Schelew & Wieman's "Improved Learning in a large-enrollment physics class" published in Science last year: each of two sections of the same calculus course were subject to an "intervention" week where a less-experienced instructor produced a much higher level of student engagement by design. Our instructional choices encouraged more active learning ("clicker" questions, small-group discussions, worksheets) during a significant amount of class time, building on assigned pre-class tasks. The lesson content and analysis of the assessments were informed by existing research on student learning of mathematics. Based on our initial analysis, we can report improved student performance - on conceptual items in particular - in the higher engagement section in both cases. This represents the work of several people at UBC Mathematics, including fellows Costanza Piccolo and Joseph Lo of CWSEI, faculty member Mark MacLean (honoured at Changing The Culture 2012) and graduate student and calculus instructor David Kohler.

Links:

Comments / Miscellaneous:
The first two talks are posted on the conference's website
