

Report on the PIMS Alberta Post-Secondary Curriculum Conference Held at BIRS, September 29–October 1, 2005

By Jack Macki, PIMS Education Coordinator at the University of Alberta

Decision 1: To form the group ACUPMS: Alberta Committee on Undergraduate Programs in the Mathematical Sciences, with initial secretariat consisting of Manny Estabrooks (Red Deer College), Dave McLaughlin (Grant McEwan), Jack Macki (PIMS), Joan Stelmach (U of Calgary), and Pamini Thangarajah (Mt. Royal). (Other names suggested: Math for the Millennium, Pi, and Alberta Advanced Curriculum Study Group--this last has the great sounding acronym AACSG).

Decision 2: A new curriculum in Analysis will be prepared by a group:

Gary DeYoung (King's College), Bill Freed and Andreas Guelzow (Concordia), Bill Hackborn (Augustana), Tom Holloway (U of Alberta), Dave McLaughlin (Grant McEwan), Viena Stastna (U of Calgary), and Peter Zizler (Mt. Royal), chair Jack Macki (PIMS). It will be Jack Macki's responsibility to prepare a detailed syllabus for each of these two sequences.

Decision 3. We will set up a website for the ACUPMS. It will run on a server based at an Alberta school, and there will be a link to it from the PIMS website under "Education".

Decision 4. A group will investigate e-learning:

Manny Estabrooks, Andreas Guelzow, Len Bos (U of Calgary), Darius Holland (U of Calgary), Malcolm Roberts and Tom Holloway (U of Alberta). The group will be examining, among other items, the quality and feasibility of:

Webworks (U of Calgary), MACSYMA (now called MAXIMA—open source), Maple online, eGrade.

Decision 5. Form a "visiting committee" from PIMS. This committee could consist of college and university mathematicians and non-academics with a scientific background. The mandate would be to

1. Visit, by invitation, college math departments and talk over issues—funding, failure rates (pressure to pass more students), grade inflation, admission standards.
2. If requested by the department, ask to meet with university administrators and hear their concerns.
3. Meet with representatives of "client" departments and faculties who send their students to study math with the department.
4. Take some time to discuss their findings among themselves, and provide a formal report.

From Thursday evening until Saturday noon, the meeting was intense and the participants hardworking and looking for solutions rather than simply criticizing. Peter Zwengowski of the U of Calgary provided a nice break in the intensity by describing his course Mathematical Explorations, aimed primarily at Arts and Elementary Education students. To begin, Peter asked for information on other courses aimed at these students. Mt. Royal has "The Beauty of Mathematics", Kings College has "Modern Applications of Mathematics" and "Foundations of Mathematics", Concordia has "Math Motifs".

A BRIEF SUMMARY OF DISCUSSIONS

1. The Social and Political Context: Colleges are expanding, university enrollment is increasing, and these huge numbers of students are arriving with high expectations (like Garrison Keillor's Lake Wobegon, where every child is above average). Among the students are the "sharks" (e.g., highly aggressive pre-med students). Many (too many) of entry level math courses are taught by sessionals. The financial pressures on the higher administration—at least as they see it—are such that they want a high "flow-through", which is administratese for "pass them". Students are not accustomed to covering topics at the rapid pace of university courses. Do we need some sort of accreditation procedure to ensure introductory courses are being taught by qualified instructors. Do we need remedial courses?

A sample of thoughts presented:

We may want to consider allowing students to write the final exam in a math course many times (e.g. three times), during any exam period within say two years of their taking the course. This is a common practice in Europe.

We should make every effort make our core compatible with the B.C. core curriculum.

We will need to distinguish carefully between curriculum and pedagogy. This proposal is only about curriculum (so far).

How does computation enter at each stage of our analysis sequence?

Applications--which are relevant, how do we integrate them?

Evaluation can use a variety of techniques.

2. e-Learning, Blended Learning

Con Ferris at Red Deer College has been using eGrade for five years.

Red Deer has a committee (Manny Estabrooks is on it) which is evaluating Maple On-Line and other possibilities.

Andreas Guelzow is very enthusiastic about open-source MAXIMA.

At the U of A, Maple is used for Engineering labs in year 1. Statistics courses use a range of tools, including on-line exams.

Viena Stastna reported that on-line lab quizzes for a linear algebra course was not a success (actually, she said it was "a mess").

Gary DeYoung has just started a project at Kings College, using LaTeX.

Len Bos is running a major project at the U of Calgary (WebWorks?) with a \$100,000 grant.

Joan Stelmach (U of Calgary) piloted WebWorks with a discussion board. She was amazed at the time students would spend trying to get a correct answer, rather than studying and analyzing the source of their difficulty. ePlus is better because it has hints that help avoid this problem.

Peter Zwengrowski (U of Calgary) reported that they stopped using WebWorks for testing and grading in a four section ode course--it was just too much hassle.

Upside pointed out by several: eLearning allows students to learn on their schedule.

Some students thrive with it.

Downside: Students don't learn to organize their homework as a written presentation; they do not learn to be neat and organized.

Consensus: Thorough and long-term evaluation of eLearning is needed.