



# Classroom notes

## **A national discipline-specific professional development program for lecturers and tutors in the mathematical sciences**

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Imagine learning to swim by being thrown in the deep end of the pool. That is the way all tertiary mathematical lecturers and tutors learnt to teach mathematics more than twenty years ago. It is now common for new lecturers to undergo a short course in learning and teaching. Unfortunately, these often leave our recruits on the sidelines with pedagogical instruction manuals that emphasise theory but fail to provide practical improvement of their teaching strokes in mathematical waters.

In 2009, a collaborative team of academics proposed a strategic leadership project to the Australian Learning and Teaching Council (ALTC) with the aim of overcoming this problem. The proposal was to create a national framework for professional development in the mathematical sciences, in order to create a way of learning about and improving university-level teaching of mathematics. It grew to include teaching in the wider quantitative sciences and was funded later that year.

The project was led by Leigh Wood, the Chair of the AustMS National Committee on Mathematics Education, and included all the authors of this article, with Nalini Joshi, then the President of the AustMS, as deputy leader. The AustMS was regarded as a crucial anchor for this project, providing professional oversight through its National Committee for Mathematics Education, and acting as a potential host for developing the program as a national standard.

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Work on the project started with a survey of heads of mathematical departments, academics and PhD students, with questions related to needs and experiences of mathematics education and professional development<sup>8</sup>. Informed by the results of the survey, we developed topics for a professional development program as listed below.

1. Introduction to teaching mathematics
2. Models of mathematical learning
3. Planning and designing mathematics lessons
4. Conducting mathematics lectures or tutorials
5. Teaching in service units
6. Questioning students in mathematics classes
7. Collecting evidence about teaching
8. Planning and designing units of study
9. Managing units of study
10. Assessing students
11. Developing mathematics learning communities
12. Evaluating units
13. Leading mathematical programs

The structure of the program and the content of the modules were also informed by the input of our reference group, which is made up of representatives from the AustMS, the Statistical Society of Australia, the Australian Association of Mathematics Teachers, the Australian Mathematical Sciences Institute, the Australian Council of Deans of Science, the Australian Council of Deans of Business, and Engineers Australia.

Selected topics were presented at a workshop which was held immediately after the annual meeting of the AustMS in September 2010 in Brisbane<sup>9</sup>. A report is forthcoming in another issue of the *Gazette*. Our hope is that such workshops will become a regular event associated with each annual meeting. Conversely, we anticipate that outcomes from such workshops will inform and shape the whole program as it evolves over a longer timescale.

Given the restricted budget of the project, and those in most university departments of mathematics, we decided to create a web-based system of modules to deliver the professional development program. A pilot study is about to be delivered as we write this short note. More than ten people have signed up to take these pilot modules. Later in 2011, the whole program will be publicly released through the website of the Australian Mathematical Society.

Our hope is that all new lecturers in the mathematical and other quantitative sciences will undertake these web-based modules. We anticipate that those who

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<sup>8</sup>The authors would like to thank the reference group and all who participated in the survey.

<sup>9</sup>We look forward to running a workshop on 30 September, after the 2011 AustMS meeting in Wollongong.

wish to do so may submit their participation in these modules as partial fulfilment of any locally required teaching and learning programs. We have suggested that the AustMS may wish to create a fourth category of accredited membership in order to recognise such participation.

We wanted to develop effective mechanisms for the identification, development, dissemination and embedding of good individual and institutional practice in mathematical learning and teaching in Australian higher education institutions. We hope that this program will raise the profile and encourage recognition of the fundamental importance of teaching in higher education institutions and in the general community. We look forward to getting your feedback and input.