

Development and implementation of MathBench for Australian Universities to improve quantitative skills of science and mathematics students.



Office for Learning & Teaching (OLT) Innovation and Development (ID) Priority Project Grant – Innovative use of technology in learning and teaching

Issue 5 Aug 2015



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# Save the Dates: 8-10 December for CUBEnet/VIBEnet/MathBench Symposium



The MathBench project team has teamed up with two Office for Learning and Teaching initiated networks, CUBENET and VIBEnet, to co-host a three-day symposium from **8-10 December** 2015 at the Shine Dome in Canberra. This event will showcase recent research studies on teaching and

learning in life science-related disciplines with a focus on quantitative skills (QS) to be provided by the MathBench project team. The MathBench team invited local and international keynote and session speakers whose work on QS in the life sciences have created awareness and understanding on the issues affecting teaching and learning including the life sciences. The speakers include:

**Jenny Koenig**, Dean of Lucy Cavendish College at the University of Cambridge, did her BSc (Hons I), University of Sydney, Australia; MPhil and PhD, University of Cambridge. Jenny is an experienced pharmacologist with great interest in teaching and learning of mathematics in the biosciences. Jenny developed an online course "<u>Essential Maths for Medics and Vets</u>", authored books, papers and reports including two commissioned reports: "A survey of the mathematics landscape within bioscience undergraduate and postgraduate UK higher education" which was supported by the UK Centre for Bioscience of the Higher Education Academy (HEA), and "Perspectives from the UK and the US on integrating mathematics into the teaching and learning of the biological sciences in higher education", with Nathan Pike of HEA.

**Kaci Thompson** is Director of Undergraduate Research and Internship Programs in the College of Computer, Mathematical and Natural Sciences (CMNS) at the University of Maryland (UMD). She holds BSc and MSc degrees in Biology from Virginia Tech and a PhD in Zoology from UMD. She is also a Smithsonian Institution Research Associate in the Department of Reproductive Sciences, National Zoological Park, working on social influences on reproductive behaviour and physiology. Kaci coordinates externally funded curriculum development initiatives in the biological sciences and oversees the CMNS Teaching and Learning Center. Kaci's team from University of Maryland developed the original <u>MathBench</u> modules and is also a member of the MathBench Australia team.

**Hugh Possingham** is the Director of ARC Centre of Excellence for Environmental Decisions; and an ARC fellow at the Schools of Biological Sciences; and Mathematics and Physics at The University of Queensland.



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Hugh did his BSc (Hons) 1st class in Applied Mathematics at the University of Adelaide, and his DPhil at Oxford University. Hugh is an experienced researcher and teacher in the field of ecology and has been awarded numerous scholarships and grants; and a prolific author and speaker, invited to speak at an average of 30 events annually. Among his team's big achievement is the development of a systematic conservation planning tool, <u>Marxan</u>, now being used in 105 countries. Hugh once wrote: "Happy to work with anyone that has strong quantitative skills that is dedicated to the conservation of biodiversity or like birds."

Among the highlights of the event is the launching and demonstration of the MathBench-Australia website featuring the contextualised interactive biology modules developed to *integrate quantitative approaches (such as in mathematics and statistics) more deeply into the introductory biology curriculum*. More details of the event will be circulated soon.

### Sneak preview: What students say about MathBench

Julie Markham of UWS led a study on *the effect of MathBench modules on perception & attitudes of microbiology students towards assessment of quantitative skills*, results of which

were presented at the International Conference: Assessment for Learning in Higher Education 2015 held in Hong Kong. The pre and post surveys; pre and post tests and focus group interviews showed positive responses from respondents. Final results from different partner universities will be presented on MathBench Day at the Shine Dome on 10 December 2015.

## Post-surveys: Written feedback

Positive ~70%

- 'Simplified the mathematical side well'
- 'It was helpful doing the modules before labs to understand and practice what we were going to do before we did it'
- 'Helped to show me the way to work out how to approach the question and methods of working it out'
- 'Step by step instructions based around real life situations that make it seem logical and that there are reasons why things are done'

## Focus group feedback

- 'I appreciated the real life scenarios, like the sort of story it mapped out, because that kept me interested and I could see the relevance to everywhere'
- 'it seems less scary..'
- "it's simple but it put it down to my level & then I could use it as a jumping point to go & get more stuff'
- 'MathBench has helped me with realising that it's not as bad as I felt like in high school...I hated it.'

More trials are planned at Griffith University, Monash University and The University of Queensland in the next term.

## Are we on the right track: Where we are, where to go for MathBench-Australia

One of the major findings of the <u>Quantitative Skills in Science</u> project as contained in its final <u>report</u> (2013) was the lack of knowledge and adaption of *existing* QS educational resources. This finding led to the conceptualisation of MathBench-Australia. One and a half years down the track, the team is positive that it has acquired an insight into and can contribute to addressing the issue of QS in science resources. The project indirectly alleviates the QS Project's other finding on the challenge posed by the lack of shared understanding of what we mean by QS, not just among academics who engage in the project, but also among students who participate in the project.



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The team will publish and disseminate its findings and reflections on its experiences to ensure the project's long term contribution to the development and improvement of QS among science undergraduate students.

The trialling of the MathBench modules is limited in the current grant but the team hopes to be able to provide support to, and collaborate with, colleagues who are interested in trialling the MathBench modules.

To contribute to further improving QS in science, <u>Liz Johnson</u> (2014) advises: "Start the conversation at your university". If you will need resources for QS in science, MathBench-Australia will be publically available by the end of 2015.

## Quote

*"Whilst every university appreciates individual teaching and learning champions, the QS issues appear to be more widespread and complicated, requiring a more strategic approach to the development of educational resources to build QS, and to the integration of QS across the entire science curriculum. "-* <u>Rylands, et al., 2011.</u>

For more information on the MathBench-Australia project contact: A/Prof Cenk Suphioglu, project leader, at cenk.suphioglu@deakin.edu.au or Ms Vilma Simbag, project manager, at vilma.simbag@deakin.edu.au