Assumed mathematics knowledge – we need to talk!

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Background FYiMaths project

- An Australian Government funded project 2012-2014
- A/Prof Deborah King & Ms Joann Cattlin,
  The University of Melbourne
- Professor Jo Ward
  Curtin University
- A/Prof. Leon Poladian
  The University of Sydney
- Dr Adrian Koerber
  The University of Adelaide

Data Collection

- Interviews with 40 academics in 26 universities in Australia and New Zealand.

- Workshops in June 2013, 2014 and 2015 at The University of Melbourne.

Teaching Challenges

- Diversity of student backgrounds (knowledge and competencies)
- Service-teaching to a wide range of disciplines, often within the same class, presents challenges in contextualizing the mathematics.
- Isolation from colleagues within their Faculty, Institution and mathematics colleagues in other institutions.

Number one challenge

Removal of prerequisites from mathematics dependent degrees is creating challenges across the sector

- Across all states, size and types of institution
  - Students turning away from high level mathematics subjects even though they want to pursue quantitative dependent disciplines
  - Enrolments in intermediate and advanced senior secondary mathematics have been declining for over a decade

Entry requirements data

Intermediate Mathematics*	Bachelor of Science	Bachelor of Engineering	Bachelor of Commerce
Prerequisite	8%	56%	13%
Assumed knowledge	42%	38%	16%

	Bachelor of Science	Bachelor of Engineering	Bachelor of Commerce
Any mathematics	16% Pre Req 3% Assumed	3% Pre Req 0% Assumed	3% Pre Req 10% Assumed
No mathematics	31%	3%	58%

Number one challenge

- **Assumed knowledge entry standards** allow students to enrol without the expected background

For students:

- High failure rates in mathematics subjects
- Decreased level of engagement
- Low retention rates
- Mismatch between course and student background

For staff:

- Increased workloads for academics
- Proliferation of subjects
- Support services
- Adapting curriculum

Forum

National Forum on Assumed Knowledge in mathematics: its broad impact on tertiary STEM programs

- What (if any) impact is assumed knowledge having on students' quantitative skills in:
  - Chemistry
  - Biology
  - Physics
  - Engineering
  - Health sciences

Outcome

Students struggling across the board with quantitative skills.

Impacting on their ability to succeed in a range of subjects.

Not able to transfer maths skills to science contexts.

Question

How can we work together as scientists and mathematicians to provide students with the skills and the mindset that allow them to develop fully as scientists?

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