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# Building STEM students' numeracy for success in higher education

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### Project description:

STEM university students traditionally find mathematics to be a roadblock to success in their degrees, and data worldwide suggests that this is much more prevalent amongst students from low SES backgrounds. This project was designed to improve access and retention of students in STEM degrees by deliberately and systematically providing a suite of resources and support with mathematics, drawing on the experiences and expertise of teaching academics in Engineering, Education, Mathematics and Science. Each team member recognises the challenges faced by students from low SES backgrounds and the possibilities for improving their experiences at tertiary level. Furthermore, this project produced resources that other universities can adapt to their own contexts, which were the:

1. Creation of a research informed sequence of 20 innovative videos designed to tackle specific areas of mathematical knowledge and skills and common misunderstandings;
2. Unification of resources in a central interactive repository in a website: [www.mathstuneup.com.au](http://www.mathstuneup.com.au); and
3. Division of videos into categories corresponding to mathematical strands required in engineering fields as well as 'numeracy development' and 'thinking mathematically' strands.

### Conceptual and/or methodological framework:

The project was divided into three stages relating to the creation of the digital media resources: conceptualisation, production/marketing and evaluation. Firstly, content, skills and misconceptions both common and specific to STEM disciplines were identified and 20 video concepts were created to cover these issues. Following this, storyboards were developed for each video and the videos were produced, with accompanying resource sheets and supporting interactive quiz modules. An informal evaluation took place with Year 10 and 11 students (n=61) from 3 schools in the Hunter region, who completed an online survey which explored the usefulness of the video content, participant experiences with the website and effectiveness of the quiz modules. The data from the student focus groups was used to inform the innovation component of the STEM project.

### Key findings:

The resources have been divided up into 4 different categories according to specific mathematics skills. They are centrally accessible from the project website, which has been designed to display the material in an interactive manner, and can be used in first year lectures and embedded in Blackboard and social media sites.

Overall, the results from the online survey indicate that 97% of respondents felt the videos would assist students who were having difficulty with the topic area; the same percentage, considered the layout of the website to be user friendly.

### Implications for the future:

The results from the pilot evaluation demonstrated that participants were generally satisfied with the help and content provided, and that they would find Maths Tune Up! a useful resource. Elena Prieto-Rodriguez and Peter Howley will complete a full evaluation of the impact of the resources on teaching, learning, student success and retention in 2016.