Senior Secondary Students' Pre-calculus and Calculus Understanding

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There are substantial and ongoing concerns in the Australian and international secondary and tertiary education sectors about students' transition from secondary to tertiary mathematics. Declining enrolments in *advanced mathematics* in secondary schools and less stringent university entry requirements are seen as a major concern for the future of STEM education in Australia.

In this round table, I will present data collected from secondary school students on pre-calculus and calculus topics. These data were collected from two groups of students: those studying *intermediate mathematics* in the last two years of secondary school; and those studying both *intermediate* and *advanced mathematics.*

The results suggest that there are distinct differences in students' procedural and conceptual understanding depending on which mathematics they studied in the last two years of secondary school. Students who studied both *intermediate* and *advanced mathematics* performed considerably better in all questions, not only on the calculus questions but also on junior mathematics pre-calculus topics such as gradient of a straight line. The data also showed that both groups of students had difficulty identifying lines parallel to axes, as well as explaining the meaning of the definition of the derivative.

This presentation is part of a two-year state-wide longitudinal project that is investigating the transition from secondary to tertiary mathematics.