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Title: Bringing engineering students' views into play: what mathematics they want and how they view mathematics

Nature of proposal: Research

One sentence summary: The purpose of this study is to explore how engineering students view mathematics, what mathematics they want in their courses and for their profession and why they hold this view.

ABSTRACT

In recent years, the mathematical education of engineering students has gained more attention from mathematics educators, university mathematics lecturers and professional associations. Main reasons for this, to us, are threefold: the issue of reassessment of engineering students' mathematical needs in the light of new technological development in work of professional engineers (Kent & Noss, 2003); engineering students' difficulties with mathematical concepts; and their changing mathematical background at entry to engineering departments over the years and problems arising from this (see, Bingolbali, Monaghan & Roper, 2007, for more detail). Concerns regarding these issues amongst parties responsible for engineering students' education have resulted in reconsideration of not only what mathematics to teach to engineering students but also how mathematics can be better taught to them (e.g., Kent & Noss, 2001; Hibberd & Mustoe 2000 and journals (www.ltsn.gla.ac.uk) in which lecturers report on aspects of teaching mathematics including service mathematics). In this paper, we would like to bring forward the *voices* of engineering students themselves and explore how they view mathematics, what mathematics they want in their courses and for their profession and why they hold this view.

The data for this paper comes from interviews with engineering students. The students were interviewed to put across their views with regard to many issues including mathematics and what kind of mathematics they want in their mathematics course. The findings demonstrate that the students view mathematics as 'a tool' and only as a tool; they want to learn mathematics that they can apply in engineering applications. As Kent and Noss (2003) point out engineering students certainly need to learn and know mathematics. However, important question here, as Maull & Berry (1997) rightly draw our attention, is how do we view mathematics taught to engineering students: a mental discipline or a tool? Either choice would bring about dramatic differences in the approaches to teaching mathematics to engineering students. Viewing mathematics as a mental discipline puts a heavy emphasis on mathematics which could mean the ignorance of the students' interests and needs. Yet if mathematics is viewed as a tool, then students' interest and satisfaction is placed in the centre and this raises rightful doubts with regard to 'intellectual rigour'. There does not appear an easy way out of this dilemma but engineering students' views on what mathematics they need and the reasons for these could make significant contributions in making progress towards the resolution of the controversies and dilemmas.

Reference

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