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Evaluating the effectiveness of mathematics support

Key Words

mathematics support, effectiveness, framework for evaluation

Abstract

Mathematics is needed for many disciplines including engineering, science, economics, pharmacy, agriculture and information technologies. Indeed, studying mathematics at the higher levels in senior secondary school is critical for 'successful pursuit of degree programs in Engineering and most areas of science' (Wilson, Mack & Walsh, 2013, page 200). Yet, the participation rates of students in intermediate and advanced mathematics courses in the senior years of secondary school have been falling in Australia and other Western developed countries for many years (Barrington, 2012; Hoyles, Newman & Noss, 2001; Hourigan & O'Donoghue, 2007). This has contributed to a rise in the number of students who enter university without sufficient mathematics preparation for their degree. The Advisory Committee on Mathematics Education in the UK identified a mismatch between the number of students (330,000) entering higher education each year that 'would benefit from recent experience of studying some mathematics' beyond the equivalent of Year 10 and the number of students (125,000) who have done such study (ACME, 2011, page 1). In NSW universities do not (as yet) have mathematics pre-requisites for entry into degrees, including engineering and science degrees, which further exacerbates the situation. Universities have responded to this mismatch by providing systems of mathematics support for their students. The term mathematics support has been defined in the literature to mean 'a facility offered to students which is in addition to their regular programme of teaching' (Croft, Grove and Lawson, 2016, page 3). At the University of Sydney, the Mathematics Learning Centre provides a range of mathematics support including bridging courses held in February, and a Drop-in Centre and targeted revision workshops held throughout the academic year. All but the bridging courses are free to eligible students. Measuring the effectiveness of our mathematics support programs 'is and always has been problematic' (Gordon & Nicholas, 2012, page 99). There is generally no degree credit given for mathematics support programs, students attend the programs voluntarily and mathematics support programs are by their nature informal (MacGillivray & Croft, 2011). Early research suggested that the student-centred approach and flexibility of mathematics support was one of its major strengths but that this created a significant obstacle to its evaluation (Godden & Pegg, 1993). Godden and Pegg (1993, page 297) argue that 'evaluation, in the traditional sense, may be incompatible with the successful conduct of tertiary mathematics assistance programs'. Nevertheless, a framework has been developed to evaluate mathematics support by the mathematics support community. This framework includes three measures: attendance in workshops and support facilities, student achievement in their mathematics units and qualitative data from student feedback surveys rating student satisfaction with the support received and its effect on their confidence in learning mathematics (Dowling & Nolan, 2007; Matthews, Croft, Lawson & Waller, 2013; Patel & Little, 2006). In this presentation, I will discuss framework developed to evaluate mathematics support, the advantages and limitations of each measure and the difficulty of defining success in mathematics support more generally, with examples from our practice.

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