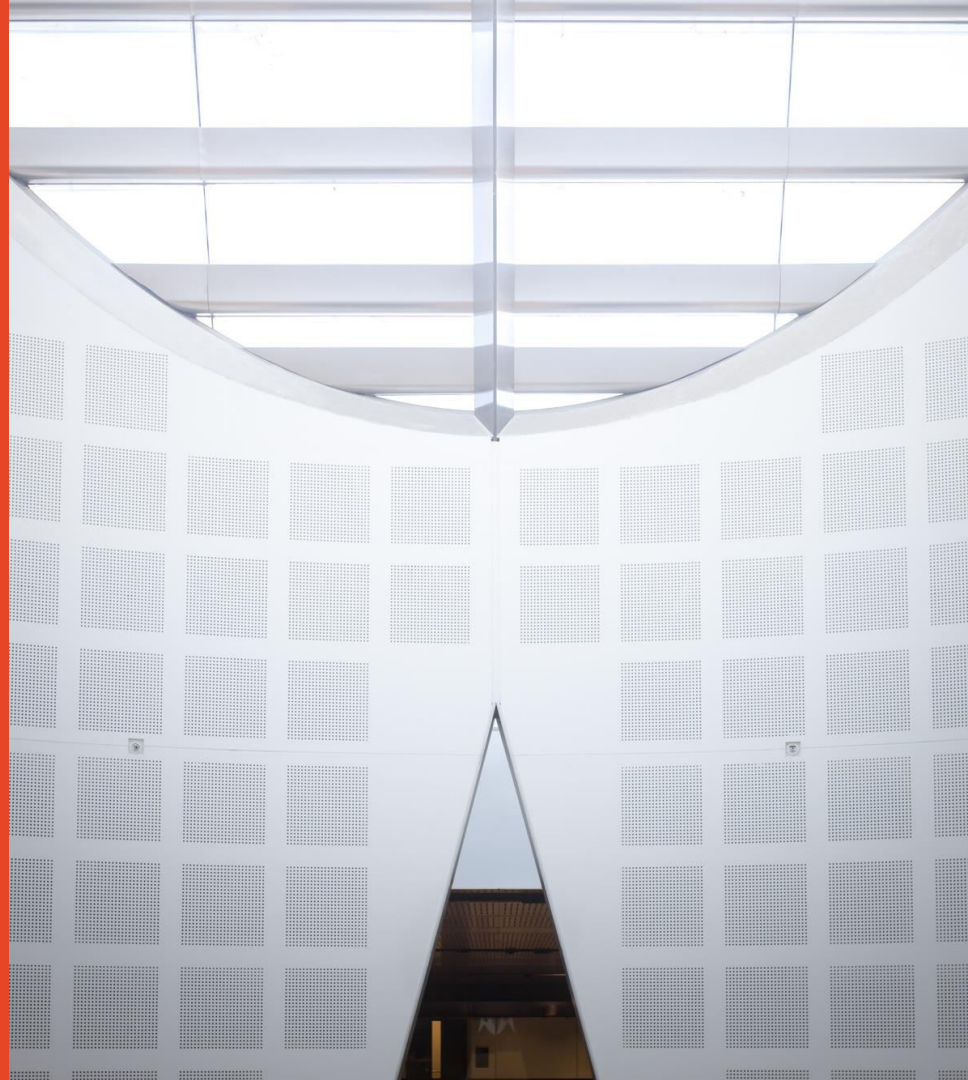


Measuring success in mathematics support

Presented by

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Mathematics Learning Centre



What constitutes success? A tale of two students from 2006

Tony

- Mature age – 30
- Previous TAFE teacher
- Enrolled in Engineering
- Studied advanced maths at school (1994)
- Heavy user of maths support
- Past all first year maths units

Jane

- Mature age – 23
- Previous degree BMus
- Enrolled in Science
- No maths studied since Year 10 at school (2000)
- Heavy user of maths support to Week 7 and then dropped out

Mathematics support: Learning support in mathematics and statistics

MacGillivray (2009, p. 457) gives a definition:

“Learning support in mathematics and statistics in universities is any facility or program providing extra optional assistance in mathematics and statistics for students *during* their enrolled study in a university degree program, with such assistance being outside the formal scheduled classes and activities of their enrolled course.”

Mathematics Learning Centre: established 1984

The Centre offers an informal flexible learning environment where students can:

- Seek advice about the mathematics knowledge they need;
- Receive one-to-one support at our Drop-in Centre;
- Join a revision workshop in selected units of study; or
- Use web-based study materials (including MathCasts) developed by us.

Students may also enrol in a mathematics bridging course (in February)

Measuring the success of mathematics support

Problematic: no assessment for degree credit
students self-select whether to use maths support
students come from diverse backgrounds

“the essence of learning support is that it is not formal”
MacGillivray & Croft (2011, page 196)

“One of the major strengths ... [of maths support initiatives] is their flexibility and student-centred approach. ... which is a major downfall in terms of evaluating their effectiveness.”

Godden & Pegg (1993, page 301)

Measuring the effectiveness of maths support

A framework for evaluating maths support:

- Attendance data

- Student survey data

- Performance of students in their mathematics units

All measures are imperfect but when taken together can be useful indicators of the effectiveness of mathematics support.

Student attendance as a measure of effectiveness

Voluntary attendance in MLC programs provides evidence that students value what is on offer (MacGillivray & Croft, 2011).

More sophisticated measure: repeat visits (Lawson et al, 2003).

Week 6 in Semester 1 2016 – Drop-in Centre attendance

- 189 student hours of attendance

- 57 students visited for a total of 103 visits

- 25 students (44%) made multiple visits (mean = 2.8 visits)

- Mean time spent per visit of one hour 48 minutes.

Student feedback as a measure of effectiveness: 2016

Student feedback – limited indicator (MacGillivray & Croft, 2011)

Internal data: 95% (n=20) rated our service as good or excellent (4+ out of 5)

External data: Student barometer/International student barometer

% of students who were satisfied or very satisfied (3+ out of 4)

Faculty of Engineering and IT: 97.3% (n=111)

Faculty of Science: 92.96% (n=142)

Total: 92.98% (n=655)

Student achievement as a measure of success

Defining success is problematic – even if you take a narrow view of success (success = pass).

“Pass rates if those who use support can be used to measure success, however, if those who seek support are the weakest students then success might not be visible as such students might not gain enough to reach a passing grade”. (Rylands & Shearman, 2015, p. 65)

“The success of support is tied up with the success of engagement, making it difficult to measure the success of learning support.” (Rylands & Shearman, 2015, p. 64)

Example from the literature

Student achievement – needs base line for mathematics knowledge, eg diagnostic tests.

Mac an Bhaird et al (2009)

- 78 'at risk' science students
- 33% attended MSC more than once (MSC group)
- 73% MSC group passed, 46% Non-MSC group passed
- difference in mean final marks (out of 1000) was 109 marks in favour of the MSC group, $p=0.002$
- 95% confidence interval (46.2, 193).

2010 study: Gordon & Nicholas (2012)

Introductory calculus unit: no student had studied calculus before

7% of MSC group (n=56) did not complete the unit compared to 23% of Non-MSC group (n=120), $\chi^2=6.21$, $df=1$, $p=0.01$

Of the students who received a grade (n=149):

- 80% of MSC group passed; 51% of Non-MSC group passed, $\chi^2=13.89$, $df=1$, $p<0.001$
- MSC group (n=52) achieved, on average, 5.8 marks more (out of 100) than the Non-MSC group (n=97), $t=2.17$, $df=145$, $p=0.03$

What constitutes success? A tale of two students from 2006

Tony

2007

- Second year engineering
- Past all maths units

Graduated

- Bachelor of Engineering

Jane

2007

- Re-enrolled in the previous maths unit
- Made extensive use of MLC and achieved a credit
- Passed all other maths units

Graduated

- BSc Honours in Psychology

The last word: Siobhan

I spent time in the MLC last year and it was very supportive and encouraging of me ...

I did integral calculus ... and unsurprisingly didn't do well in my final result (39%). It was an ambitious leap from MATH1111.

I've transferred to an Arts degree and I'm studying history and linguistics. I'm loving history, it has as many nooks and twists and great thinkers as maths.

Success?

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