



**Maynooth
University**

National University
of Ireland Maynooth

Effective Methods for Improving Student Retention and Progression

Dr. Ciarán Mac an Bhaird

@cpmacanbhaird

ciaran.macanbhaird@mu.ie

MathFest 2018

August 2nd

Denver, CO



‘The Mathematics Problem’

- A decline in the mathematical ability of students transitioning from second-level (Lawson, Croft, & Waller, 2012).
- Colleges and universities worldwide have seen an increase in failure rates for first year mathematics courses (Rylands & Coady, 2009).
- The Organisation for Economic Co-operation and Development (OECD) has viewed this as a contributing factor in low enrolment and retention rates in science and technology courses (OECD, 1999).

Saxe and Braddy (2015) report for the MAA

...the high rate of failure in post-secondary mathematics classes is an embarrassment to our profession. It is a major contributor to increased attrition rates, and it lengthens time to degree at all types of post-secondary institutions.

Mathematics courses are the most significant barrier to degree completion in both STEM and non-STEM fields. (p. 28)

So what do we do?

- How do we improve student retention and progression without lowering our academic standards?
- One approach internationally has been the use of Mathematics Learning Support (MLS).
- MLS refers to activities and resources provided to support and enhance student learning of math and statistics, which are in addition to that which they receive as part of their programme of study (including traditional lectures, tutorials, examples classes, and coursework).
- MLS is prevalent in the UK (Perkin et al., 2012), Ireland (Cronin et al., 2016), Australia (MacGillivray, 2008) and probably in the US?*

MLS at Maynooth University: A brief history

2007

- Established by the Dept. of Math and Statistics as a response to the 'math problem', following (inter)national best-practice.
- Offered drop-in only, 18 hours per week: in a venue shared with lectures, staffed by the speaker and one other tutor.

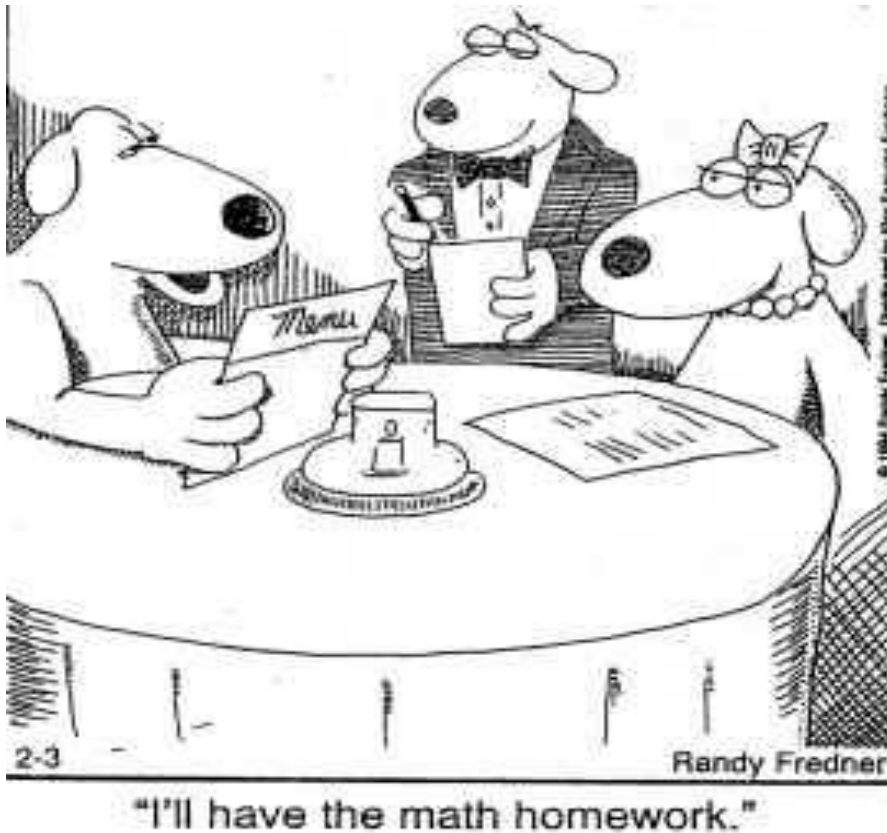
2018

- 156,961 student visits, 27 (125 tutor) hours drop-in per week, plus 4 on-demand workshops, 2nd level drop-in and extensive online resources in a dedicated venue.
- A dedicated MU MSC University Tutor (since September 2016).

Integration into our Department's Academic Structure is key.



Evaluating Maths Learning Support



Measuring the impact of MLS properly is extremely important, but can be time consuming.

Data Collected in the MSC

- At the end of each academic year, we issue 3 separate student evaluations.
 - One for MU students using\ not using the MSC.
 - Two for the 2nd level drop-in (one for students and one for MU student tutors).
- The surveys are all anonymous. The second level surveys are brief, the MU survey has grown to 36 questions.
- There are also student registration and attendance forms for the MSC.

Additional Data Available

We have access to a range of extra quantitative data:

- Student Diagnostic Test and Leaving Certificate Results.
- Student Tutorial Attendance and Homework Submission Records.
- Student Mathematical\Statistical Module Grades, and overall subject mark.

Evaluating the Effectiveness of MLS

The most common investigations appear to be on the

- Retention and progression of students, and the
- Student experience of MLS.

There are, of course other factors that are considered:

- Extent of services*.
- Extent of provision (regionally and nationally)*.

Do we learn anything new?



What do we learn from Data Analysis?

- The majority of students rate the MSC very highly.
- Students are generally very positive about the atmosphere, the tutors, the help they get etc.
- Students want more MSC opening hours, more evenings, more mornings, more tutors..
- A minority of students have negative feedback, e.g. the MSC timetable, overcrowding, tutors.
- **Regular engagement appears to increase student retention and progression, and this is especially true for students with weaker mathematical backgrounds.**

Impact on retention and progression

- C Mac an Bhaird, T Morgan, A O'Shea. (2009). The impact of the mathematics support centre on the grades of first year students at the National University of Ireland Maynooth. *Teaching Mathematics and its Applications*, 28 (3), 117-122.
- E Berry, C Mac an Bhaird, A O'Shea. (2015). Investigating relationships between the usage of Mathematics Learning Support and performance of at-risk students. *Teaching Mathematics and its Applications*, 34, 194 – 204.

Impact on retention and progression

- 125 (22%) of 567 MLS users stated they had considered dropping out due to difficulties with mathematics.
- 69 (63%) of 110 students stated that MLS was an influencing factor in their decision not to drop out.
- A further 3% of MLS users left comments stating that they never considered dropping out because of MLS being available to them.

This was an Irish Math Learning Support Network (IMLSN) 2011 [research project](#), which was brought to Government attention and we presented to a 'joint houses' committee on education.

How do we use the Data Analysis?



"Sorry I'm late - I was working out PI to 5,000 places."

1st Science 2007-8

Group	Mean Mark of students who visited more than once	Number of Students	Mean Mark of students who visited once or less	Number of Students
HA	-	0	761.00	5
HB	752.25	4	730.92	25
HC	719.75	4	635.64	28
HD	654.00	1	567.47	17
OA	547.56	9	511.84	37
OB	450.00	19	381.86	36
OC	320.00	5	288.87	15
OD	510.00	1	302.17	6

MLS Saves Institutions Money

- Student retention, e.g. in 2016-17:
 - 26 students stated that the MSC influenced their decision to remain in MU.
 - 11 second level students said that it influenced their decision to attend MU.
- ‘Free Advertisement’ of and for the Institution and Department.
 - Free Second Level Drop-in.
 - MSC ‘rolled out’ by MU as an example of MU’s dedication to the student learning experience.
 - From the Institution’s perspective, our MSC has a very high profile locally, nationally and internationally.

Trainee Teacher

“I had intended to drop Maths after first year but the support I received in the MSC gave me the confidence that I needed to keep studying Maths and thus far I have spent four incredibly enjoyable years as a Maths teacher.”

“My time spent in the MSC helped me develop a positive attitude towards Maths and a love of the subject which I am now trying to pass on to the students in my class every day.”

Parent Feedback

“Just wanted to drop you a note to say that my daughter, who is a 2nd year student in Maynooth Post Primary School, has attend the maths support for the past 4 weeks...I am writing to say thank you so much for this service.”

“She has gained so much confidence in her ability since attending and the help she is receiving from the tutors is really beneficial. She looks forward to attending and comes out with a spring in her step.”

Collaboration and Networking

- The maintenance and dissemination of data also increases the opportunities for further research projects, funding applications and collaborations. For example:
 - An investigation into why students did not use the MSC in MU led to postgraduate funding, four research papers, and further initiatives (student monitoring) which are now implemented and improve student engagement.

Research, Resources & Collaboration

- [sigma](#) (network for excellence in mathematics and Statistics Support).
- Scottish and Irish Mathematics Support Networks.
- [Mathcentre](#) (links to research papers)

*We need your help

We are conducting an investigation into MLS in US HE through a short online survey. One of the main aims is to increase awareness of MLS initiatives amongst:

1. Math and Statistics teachers in HE, with a view to developing collaboration and sharing resources, ideas and best practice.

If you are aware of the person responsible for such MLS initiatives in your institution, please email me their name and email address.

Survey closes on September 30th 2018.



Contact Details

- Thank you all very much \ Go raibh maith agaibh uilig.
- Questions \ Ceisteanna.
- ciaran.macanbhaird@mu.ie
@cpmacanbhaird
- <http://supportcentre.maths.nuim.ie>

msc@mu.ie

@mu_msc