



Joint Committee on Education and Social Protection
 Leinster House
 Wednesday 7th October 2015

Student Evaluation of Mathematics Learning Support: key insights from a large multi-institutional survey.

Ciarán O'Sullivan (IT Tallaght), Ciarán Mac an Bhaird (MU), Olivia Fitzmaurice (UL), Eabhra Ní Fhloinn (DCU)



irishmathsupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



NATIONAL FORUM
 FOR THE ENHANCEMENT OF TEACHING
 AND LEARNING IN HIGHER EDUCATION



What is MLS and why is it needed?

- MLS is free mathematical support given to students in addition to lectures, tutorials and assignments.
- MLS is now commonplace in Ireland and internationally, e.g. in the UK, Australia etc.
- MLS is part of the response to the internationally documented 'Mathematics Problem', students entering Higher Education without the mathematical background that they require.
- The IMLSN is a volunteer organisation of academics which promotes collaboration between individuals and HEIs involved in the provision of MLS.

irishmathsupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



The Questionnaire

- Anonymous and paper-based;
- 17 questions in total, with a variety of multiple-choice, five-point Likert-scale, and open-ended questions.

Section A: respondents' profile

Section B

(users of MLS)

– Ascertain their levels of satisfaction

– Investigate their perception of the impact of MLS

Section C

(non-users of MLS)

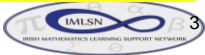
– Investigate the reasons for not engaging

– What would encourage them to engage

irishmathsupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>

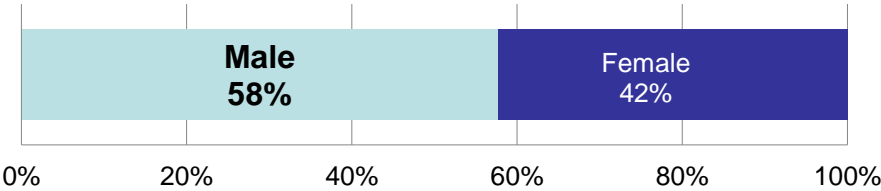
Page 97

Page 98

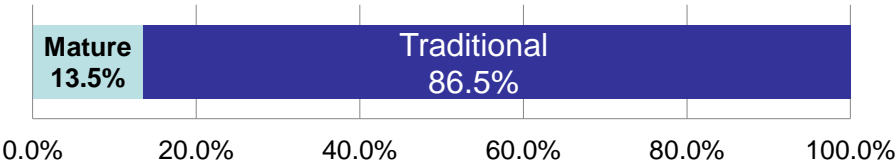


Profile of Respondents

Gender of survey respondents



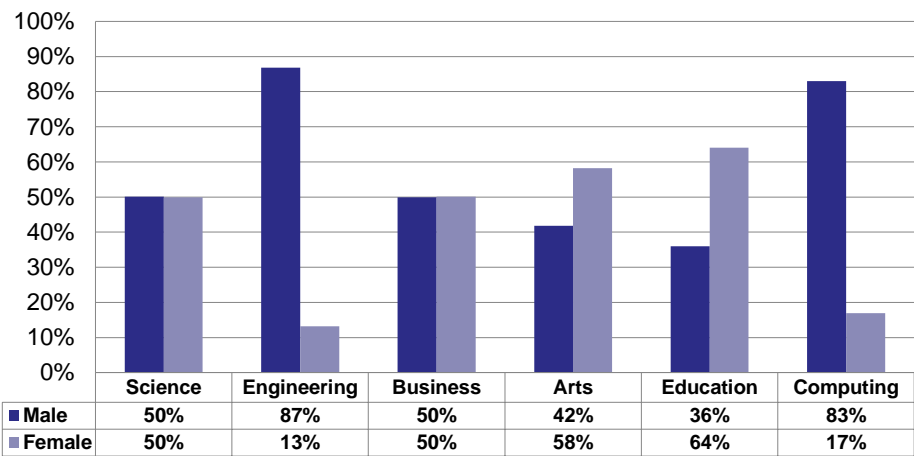
Mature student respondents



irishmathsupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



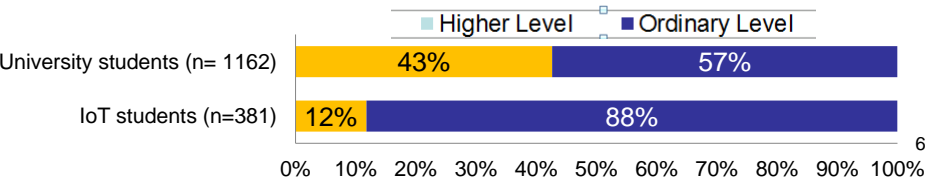
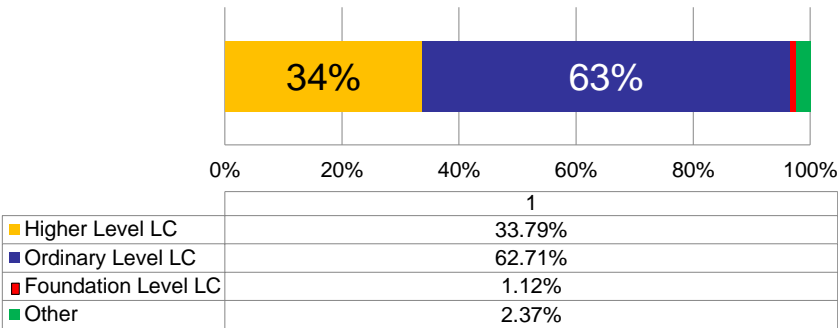
Breakdown of survey respondents by discipline area and gender.



irishmathsupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



Leaving Certificate mathematics level of respondents (n=1601)



The Questionnaire

(1633 students across 9 HEIs)

<p>Section B</p> <p>(users of MLS)</p> <ul style="list-style-type: none"> – Ascertain their levels of satisfaction – Investigate their perception of the impact of MLS 	<p>Section C</p> <p>(non-users of MLS)</p> <ul style="list-style-type: none"> – Investigate the reasons for not engaging – What would encourage them to engage
--	---

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



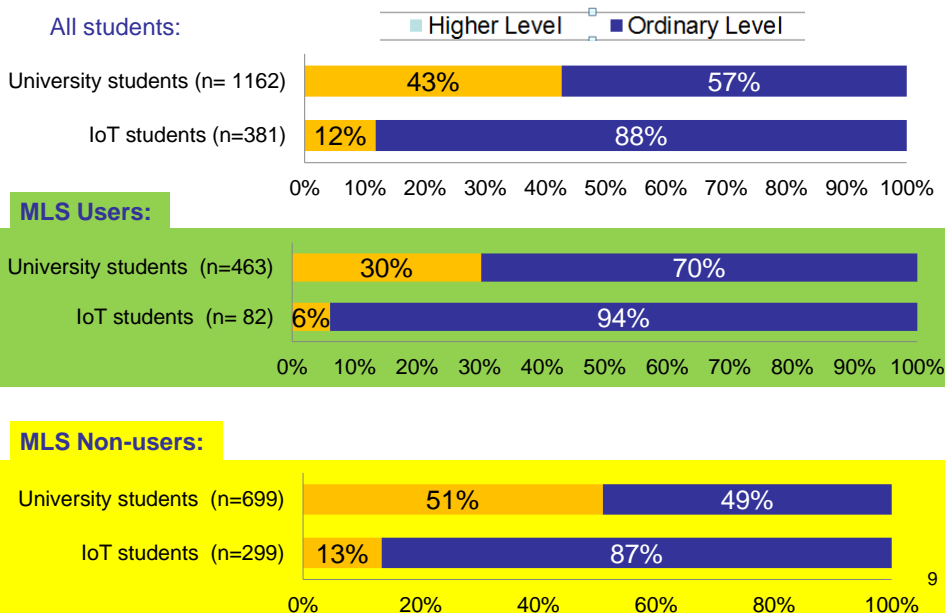
All Students

Used MLS	Did not avail of MLS	
	Did not need help	Other Reasons
36%	31%	33%

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



Breakdown of the LC levels of students in the two types of HEI



Impact on students considering dropping out

22% of MLS users stated they had considered dropping out due to difficulties with mathematics.

63% of the 110 eligible students stated that MLS was an influencing factor in their decision not to drop out.

- Example comments:
 - 'Greatly. It has given me the confidence to turn maths as my worst subject into one of my best'.
 - 'Encouraged me to trust that my worries were normal and that practice would improve me'.

Further 3% of MLS users left comments stating that they never considered dropping out because of MLS being available to them.

- Example comments
 - 'Never felt the need because of the support provided'.
 - 'No, but did worry about failing maths before using these facilities'.

Impact on students considering dropping out

1 in 4

considered dropping out of HE because of mathematical difficulties.

$\frac{2}{3}$

indicated that MLS had influenced their decision not to drop out of HE.

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



Recommendations

- MLS should be **embedded as a permanent fixture** in every HEI in the country and should be properly resourced in order to ensure the best mathematical experience for all students.
- Evidence of the **positive contribution of MLS in terms of student transition and retention** should be widely disseminated to HEI authorities to **highlight the benefit from a financial perspective.**

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



Ratings of MLS services

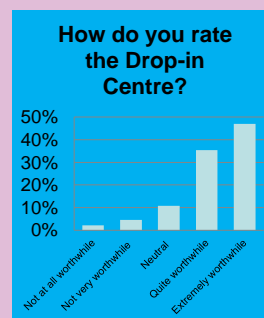
Support available	Number of the 9 HEIs offering each service	No. of respondents availing of the services.	% positive endorsement
Drop-In Centre	9	519	83%
Topical or Exam Revision Workshops	6	232	80%
Support Tutorials	3	101	80%
ICT enabled Support	8	268	56%

irishmathssupport@gmail.com
http://supportcentre.maths.nuim.ie/mathsnetwork/



Recommendations

- Priority should be given to **bespoke training and development** of all MLS staff to ensure the optimal student experience.
- **Digital literacy skills** of students and practical issues of accessing online materials/service require further consideration in MLS to be of maximum benefit to students.



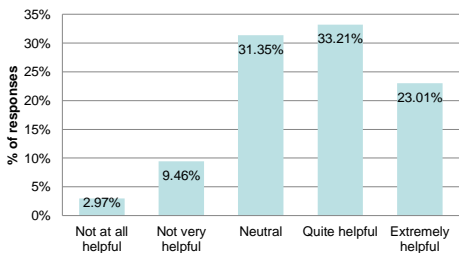
irishmathssupport@gmail.com
http://supportcentre.maths.nuim.ie/mathsnetwork/



Impact on mathematical confidence

(n = 541)

- 56% of these stated the impact as helpful or extremely helpful



“Instead of just giving you the answer the MLSC helps you and makes you get the answer yourself - when you see this is possible it increases confidence”;

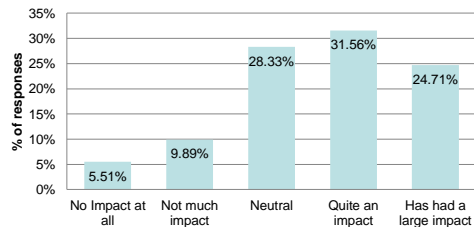
irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>

Category of comments	% of 106 comments
Very helpful/good to know it's there	32%
Made maths/ examinations/ assignments doable	20%
Understanding improved	15%
Weak at maths/not confident	12%
Didn't go enough	11%
Confidence not an issue	6%

Impact on mathematical performance

(n=528)

- 56% of these stated that it had quite an impact or had a large impact,



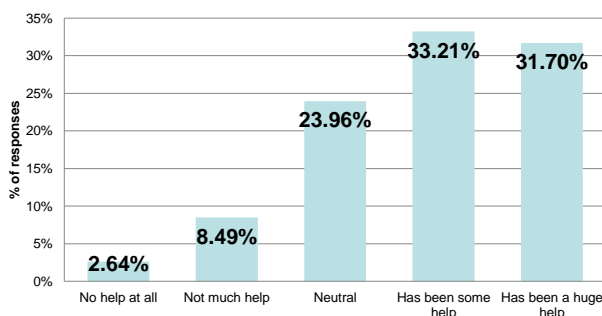
“It has helped no end, the only problem is I'd like to be able to make more use of it”;

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>

Category of comments	% of 103 comments
Grades improved	28.16%
Very helpful	27.18%
Useful for assignments	17.48%
Understanding improved	9.71%
Didn't go enough	6.80%
Results unknown	5.83% ⁶

Impact on coping with mathematical demands of course (n=532)

- **65%** of these indicated that MLS :
'Has been some help' or 'Has been a huge help'



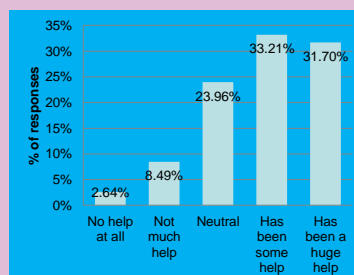
"I probably would be failing really badly without it"

irishmathsupport@gmail.com
http://supportcentre.maths.nuim.ie/mathsnetwork/



Recommendations

- Evidence of the **positive contribution of MLS** both in terms of student transition and retention, and improved student confidence in their mathematical ability and a more positive student attitude towards mathematics as a subject, should be communicated to **incoming first year students** in order to encourage engagement with MLS.
- Evidence **that MLS services were used by one third of the first year students** in this study with another one third possibly needing them should be communicated to **incoming first year students** to promote the accessing of MLS services as a key element of taking active responsibility for their own learning mathematical learning in HE.



irishmathsupport@gmail.com
http://supportcentre.maths.nuim.ie/mathsnetwork/



Recommendations

- There should be an **increased collaboration** between those teaching first year mathematics in HEIs and those providing MLS



- First year mathematics modules should have an element of **continuous assessment scheduled** to occur very **early in the module**.

irishmathssupport@gmail.com
http://supportcentre.maths.nuim.ie/mathsnetwork/



Student reasons for not availing of MLS

Category of response	% of all students who did not avail of MLS (n=1041)
I do not need help with Maths	48%
The times do not suit me	28%
I did not know where it was	18%
I hate Maths	15%
Other	13%
I was afraid or embarrassed to go	11%
I never heard of the MSC	8%

irishmathssupport@gmail.com
http://supportcentre.maths.nuim.ie/mathsnetwork/

What encourage non-users of MLS to engage

Category of response	% of responses from overall population (n = 667)
Go if needed	29%
Results/Exams	11%
Better times	17%
More Information	13%
Resources/ Location	15%
Advised to go	6%
Student Feedback	5%
Miscellaneous	2%



What would encourage students to avail of MLS?

- The **stronger the mathematical background** of the student, the more likely that their response was that they would attend if they needed help.
- The **weaker the student**, the more likely they were to comment on changes to MLS structures.

The results were statistically significant
(Chi-Square test, $p < 0.001$)

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



Focused Study: Prior Educational achievement

- Significant association between Leaving Certificate mathematics levels and whether students availed of MLS,
 - the **higher** the level, the **less likely** they were to avail of MLS.
 - **BUT** students using MLS had a **broad range of mathematical backgrounds**.
- **60%** of students who reported taking OL LC mathematics prior to entry indicated that they had **switched from HL to OL**.
- For OL students who were initially doing HL and then switched:
 - the **longer** they stayed in HL the **better** their OL LC grade.
- There was an association between switching from HL to OL and availing of MLS:
 - the **later** they switched to OL, the **less likely** they were to seek help.

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



Focused Study of Mature Students

	Used MLS	Did not avail of MLS	
		Did not need help	Other Reasons
Adult learners (n=221)	61.5%	17%	21.5%
Traditional learners (n =1387)	32.2%	33.3%	34.5%

Adult learners are much more likely to avail of MLS than traditional students (statistically significant, Chi-Square test, $p < 0.001$)

irishmathsupport@gmail.com
http://supportcentre.maths.nuim.ie/mathsnetwork/



Recommendations

$$\sum_{k=1}^{\infty} \frac{P(1-\cos^2(kh))}{k^2 k_h + \sin 2}$$

- Adequate MLS provision should be put in place as part of the learning infrastructure for the **expanding population of Mature** Students entering HEIs.
- The stark **differences in motivation for availing of support** should be highlighted in the training of MLS staff so as to enhance the learning experience of Mature Students.
- HE and the MLS **community should be prepared for the high levels of Mature Student engagement.** This trend will have resource implications when coupled with stated national policy objectives to increase the numbers of Mature Students in HE.

irishmathsupport@gmail.com
http://supportcentre.maths.nuim.ie/mathsnetwork/



Focused Study: Gender and MLS

- A statistically **higher proportion of females than males availed of MLS** regardless of prior mathematical achievement levels or discipline of study.
- There was a **significant association between gender and the categories that emerged from the reasons given for use of MLS.**

BUT.....

- Once they have engaged with MLS, male and female students **did not report any difference in the academic impact of MLS or in their experience of MLS.**

irishmathsupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



Current Work

- Received network funding for the IMLSN from the National Forum for the Enhancement of Teaching and Learning.
- Objectives:
 - a. Strengthening the Network
 - b. Auditing MLS provision in Ireland
 - c. Tutor Training Project

irishmathsupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



MLS is a success but...

- There are recurring issues which you can help us with, e.g.
 - a) In many institutions there is a lack of adequate and permanent funding for MLS.
 - b) A lack of funding for postgraduate students in mathematics significantly contributes to the ongoing challenge of finding sufficient numbers of appropriate tutors.

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>



Thank you

- ISBN:9781905952588
- IMLSN website: <http://supportcentre.maths.nuim.ie/mathsnetwork/>
- National Forum: <http://www.teachingandlearning.ie/>
- Printed copies – contact
 - ❖ IMLSN irishmathssupport@gmail.com
 - ❖ NCE-MSTL Helen.Fitzgerald@ul.ie

irishmathssupport@gmail.com
<http://supportcentre.maths.nuim.ie/mathsnetwork/>

