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## Abstract

The Mathematics Support Centre (MSC) at NUI Maynooth was established in October 2007. The aim of the centre is to offer mathematical support to all students of the university. The main activity of the MSC is the drop-in centre which is staffed by the MSC manager and by experienced tutors. The MSC is one of the busiest in the UK or Ireland.

Student feedback has been invaluable in tailoring the supports offered to the learning needs of the students. The feedback has also provided insight into the way the MSC has changed students' study habits and attitudes to mathematics.

There is strong evidence to suggest that the MSC has a positive effect on the grades of the students who regularly attend. It appears particularly beneficial to first year students with weak mathematical backgrounds. As these students are most at risk of failing or dropping out of University, the positive impact of the MSC on their grades is most welcome.

Analysis of the data from the second year of operation has shown however, that the centre is increasingly being used by more senior students striving to attain the highest possible mark in their degree. Thus the MSC is contributing to the raising of standards for the general student population.

## MSC Basic Services

- **Drop-in centre** open 18 hours a week, 12 weeks in each semester (10 weeks in 2007-2008).
- The online **Mathematics Proficiency Course** started in 2008 as a follow up for 'at-risk' students. There were 16 follow up workshops.
- The online **Mathematics Foundation Course** was set up in 2009 for students not taking Mathematics modules. There are also follow up workshops.
- The **First Science Mathematics Workshop** covers methods and ideas in First Science. This group contains the highest number of 'at-risk' students.
- The workshops use the **touchscreen technology Symposium** so students do not have to take notes as they will be uploaded online.
- **Third Year Mathematics Study Group** set up in 2009 to promote group work amongst final year students.
- **Second Level drop in sessions** for local schools.
- Development of **online second level Mathematics resources** for Meath County Council.





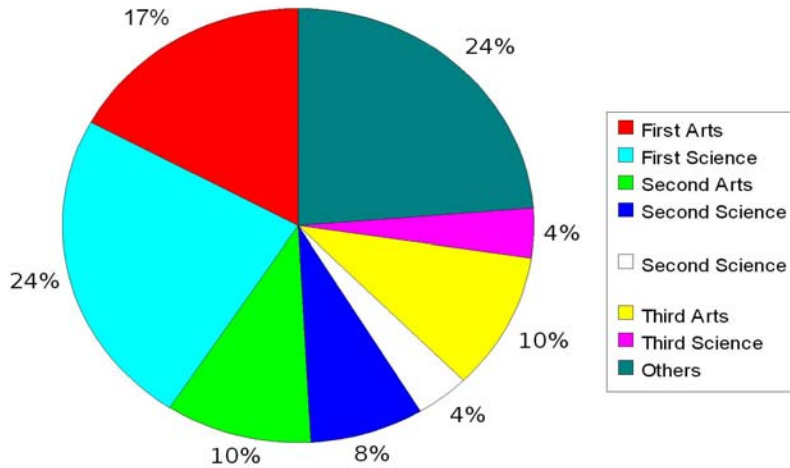
# Measuring the Effectiveness of Mathematics Support Initiatives at NUI Maynooth.



NUI MAYNOOTH  
Ollscoil na hÉireann Mú Nuad

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## Facts and Figures



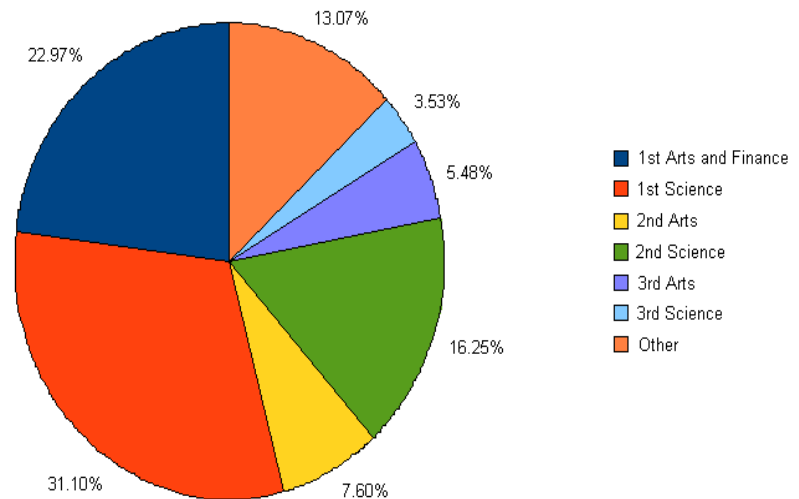
**2007-2008:**  
273 individual students registered, 2493 attendances.

**Figure 1: MSC Attendance Breakdown by Faculty.**



**2008-2009:**  
535 students registered (509 at drop-in, an 86% increase), 4798 attendances (4647 at drop-in, a 93% increase).

**Figure2: MSC Attendance → Breakdown by Faculty.**



**Figure3: Comparison of attendance figures by year and faculty, 2007-2009:**

Groups	2007/2008	2008/2009
1st Science	32%	66%
1st Arts	34%	55%
2nd Science	37%	70%
2nd Arts	70%	77%
3rd Science	34%	59%
3rd Arts	66%	65%

**2009-2010:**  
376 individual students registered to-date (a 54% increase on same period last year), 1327 attendances at drop-in (a 106% increase on same period last year). A further 482 attendances at additional MSC services.



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## Grades and Attitudes

Group	Mean Mark of students who visited more than once	Student Numbers	Mean Mark of students who visited once or less	Student Numbers
HA	-	0	761.00	5
HB	752.23	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

**2007-2008:**  
**Figure4: Comparison of Mathematics Final Marks for 1<sup>st</sup> Science by MSC Attendance and Leaving Certificate Grade**  
←

**2007-2008:**  
**Figure5: Comparison of Mathematics Final Marks for 1<sup>st</sup> Year students who failed the Diagnostic Test.**  
↓

Group	Student Numbers	% of Students who visited MSC more than once	Pass rate of students who visited more than once	Pass rate of students who visited once or less	Mean Final Mark of students who visited more than once	Mean Final Mark of students who visited once or less
<b>First Arts</b>	31	52%	81%	53%	525	483
<b>First Science</b>	78	33%	73%	46%	481	362

### Student Attitudes:

1. Students who avail of the MSC services are more likely to retain Mathematics as a subject and less likely to drop out of University as a result of mathematical difficulties than their peers.
2. Students who attend report a greater confidence in their mathematical ability.

### Student Comments:

1. It's very useful and helpful – it's a support that's offered nowhere else (in any other subject), so I'm glad I came to Maynooth. [First Arts]
2. I found the MSC essential for first year and I would have spent so much time on Mathematics assignments and got nowhere. I actually wouldn't do Mathematics next year without it. It should be given more funding. [First Science]
3. Seem to be doing great work and are committed – fair play! [Second Science]
4. Only for the help of the MSC staff, my grades would not be as good as they are. Confidence and my ability to do Mathematics have grown significantly. [Third Arts]



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## Why we collect data and how we use it?

1. We collect data such as attendance, registration, the number of students who said the MSC had influenced their decision to remain in NUIM or retain Maths despite initial difficulties, student comments etc. This data helps us evaluate the type of service that we are providing. We can then maintain and expand the services that we are offering and improve or alter other services.
2. The data is also used to demonstrate the merit of the MSC to the University with a view of securing permanent funding.
3. Results of the analysis of grades and attitudes are also presented to students. Students see evidence that using services regularly, asking for help and working in groups gives them confidence, improves their grades etc.
4. The collection of this data allows collaboration between other third level institutions in Ireland and the UK to identify common issues and develop common strategies and resources for students who are struggling with Maths. Such collaborations to date have led to the development of the Irish Network for Mathematics Support (Ciarán Mac an Bhaire committee member) which hosts workshops and an annual conference on Maths Support.

## How do we collect data?

1. All students who attend the MSC fill out a registration form when they first attend giving us contact and other information. The students also sign their permission for us to use their grades for research purposes. Each time students attend they fill out attendance forms and are encouraged to fill in comments about the MSC.
2. All incoming Mathematics students sit a Mathematics Proficiency Test. The students also volunteer their Leaving Certificate grades. The Mathematics Department gives us access to students' continuous assignment grades, module results and attendances at tutorials.
3. At the end of each academic year we distribute a questionnaire to both attendees and non-attendees surveying their attitudes towards Mathematics and the MSC.
4. In Summer 2008 and 2009 we hired a SPUR (Summer undergraduate research programme) student who inputted the questionnaire data. We also employ a person who stays on the door of the MSC to issue and collect forms from students and input this data into SPSS files.

## What this data tells us and how it impacts on students.

1. The data analysis points towards the positive impact that the MSC is having on students' grades and their attitudes towards Mathematics.
2. Amongst first year students, at-risk students are more likely to attend the MSC than stronger students. Final year students who aim for higher grades are more likely to attend. This feedback allows us to provide extra resources to cater towards these students specific needs.
3. This feedback and analysis is made available to students and has made a considerable difference to their attendance rates.



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## Current Research Projects:

1. We have a research Masters student who is commencing 'A Study of First Year Students' Mathematics Learning Experiences at NUI Maynooth'. We have received funding from NAIRTL (National Academy for Integration of Research, Teaching and Learning) towards this project.
2. The impact of Mathematics Support on students' attitudes towards Mathematics.
3. What type of student avails of Mathematics support and why do they avail of it?
4. Students' attitudes towards diagnostic testing and the reasons behind these tests.
5. The benefits of assignments and continuous assessment for third level Mathematics students.
6. What is the first year Mathematics Learning Experience?
7. What do third level students think of the History of Mathematics?
8. The development of further second level online Mathematics resources.
9. The development of podcasts and screencasts to complement current Mathematics text resources.

## List of Publications:

1. Is Mathematics Support worthwhile? An overview of the 3rd Irish workshop on Mathematics Learning and Support Centres, (C. Mac an Bhaird and A. O'Shea) *MSOR Connections*, Vol 9 No 2, p52-55, 2009.
2. Introducing the History of Mathematics to Third Level students with weak mathematical backgrounds: A Case Study, (C. Mac an Bhaird) *Proceedings of the CETL-MSOR 2008 Conference*, p63-68, 2009.
3. The Impact of the Mathematics Support Centre on the Grades of First Year Students at the National University of Ireland Maynooth, (C. Mac an Bhaird, T. Morgan and A. O'Shea) *Teaching Mathematics and its Applications*. Vol 28, p 117-122, 2009.
4. An investigation of the mathematical literacy of first-year students in the Republic of Ireland, (A.O'Shea, S. Breen and J. Cleary), *International Journal of Mathematics Education in Science and Technology*, Volume 40, 2, p229-246, 2009.
5. The Necessity of Mathematics Support Centres in Higher Level Education, (C. Mac an Bhaird), submitted, *Aishe Online Conference Proceedings 2008*.
6. What type of student avails of mathematics support and why?, (C. Mac an Bhaird and A. O'Shea), submitted, *Proceedings of the CETL-MSOR 2009 Conference*.

## Conclusions:

All the evidence indicates that making the extra effort to provide Mathematics support for students, especially 'at-risk' students, makes a significant difference to students who avail of this support regularly. It appears to significantly improve their grades and also changes their attitudes towards Mathematics.

The reasons why these supports are needed at third level are a matter for discussion elsewhere, but clearly promoting a positive attitude in third (and second) level students towards Mathematics will have a significant impact on the future of Mathematics in this country.

Proper collection and analysis of the data from such services is essential to ensure the future of such services, it also show students the tangible impact of the services on their performances and attitudes.