



**UCD Mathematics Support Centre  
University College Dublin**

**Report on the Academic Year 2012 / 2013**

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## Executive Summary

The Mathematics Support Centre (MSC) offers support in mathematics to students from all programmes in UCD not just those studying mathematics. This includes students at all levels from Access to PhD students and includes mature students and those with disabilities.

This year the number of visits to the MSC was 4,750 an increase of 7.93% on last year's total. The median number of visits by a single student was 2 visits. The attendance by any one student ranged from 1 to 83 visits and 21.7% of students visited 5 times or more. The average length of a visit was 97 minutes up by 18% from 82 minutes last year. Based on some feedback, it may be that students have to wait some time to be seen by a tutor, particularly if they arrive at the MSC when it is busy. An obvious answer is to provide extra tutors but there is of course a financial restriction to this solution. Imaginative use of online resources may be an approach that could be adopted. Students could be guided to view relevant online videos while waiting for a tutor.

Students from Stage 1 formed the majority of attendees at 42% of the total number. This was 11% less than their percentage last year and 21% less than the previous year. 25% of visits were from Stage 2 students, 17% Stage 3 or higher and the balance of 11% were from zero modules and pre university Access to Science and Engineering programmes. The reasons for the decreasing attendance of Stage One students may be a cause for concern. It may simply be the increasing level of points for entry to some courses. This year over 80% of students entering first year Science and over 60% of those entering first Commerce had taken the Honours Level Leaving Certificate (LC) Mathematics paper. Has the introduction of Bonus points for the Higher Level (LC) Mathematics paper been an influence in this entry level? Maybe students are only experiencing difficulties in second year. A further reason for non-attendance of first years may be, the unsuitability of the location of the MSC and the difficulty that first years in particular, may have in finding the venue. However none of these may be the cause. This downward trend may be a cause for concern and requires attention and scrutiny over the coming year.

The MSC opened 31 hours per week Monday to Friday in the first semester. In the beginning of the second semester we reduced our hours to 28 per week. This allowed money saved to be used in the last weeks of drop-in to employ extra tutors. 16 hours of extra tutoring were provided per week for the last four weeks and this included the MSC remaining open through the lunch hour. This timetabling proved very successful. But this arrangement depends on the availability of extra tutors at the end of semester. It is important to note that this is not often possible and alternate solutions may need to be employed.

A further method of creating more efficient use of the MSC hours is the use of Hot Topic sessions. If lecturers or students identify particular areas in which students are having difficulty, the MSC, with the agreement of the lecturer, designs and delivers Hot Topics in these areas. This year Hot Topic sessions were run in the following: Trigonometry and Resolving Forces, Exponentiation and Logarithms, Probability and Statistics, Eigenvalues and Eigenvectors, and Differential Calculus. It is recommended that by increasing the number of these sessions and organising them earlier in the semester, it may help to decrease the number of one-on-one sessions required in the MSC.

The MSC database is now entering its fifth year of data collection. This data is a valuable source of information for research purposes. The present manager retires in September 2013 and has been awarded a PhD Research Demonstratorship under Dr Maria Meehan. The topic for her research is "identifying university students' mathematical "trouble-spots" and developing effective supports: an analysis of Maths Support Centre data." A new manager is to be appointed in September 2013.

February 2014 will be the 10<sup>th</sup> anniversary of the opening of the MSC. From February 2004 to August 2013 the total number of visits to the MSC was over 22,200. During this period the MSC has changed location 5 times. Our on-going concern is the provision of a permanent venue of sufficient size, located in an area readily accessible to the students. Our change of location to the Library Link in the James Joyce Library has been a very beneficial move. After the MSC re-location to the library not only did we observe an increase in numbers attending compared to the

same time last year but we also noted an increase in attendance by students studying modules other than those with an ACM/MATH/MST/STAT code. These non-mathematical modules represented 61% of the total number of modules compared to 48% for the same time in the previous year. We would like to thank the James Joyce Library for allowing us to use this venue and agreeing to extend our occupation of the space for an extra year. However it is essential that planning ahead for a suitable location is maintained as a priority.

The MSC assisted UCD Access and Lifelong Learning by developing and delivering pre-semester mathematics workshops for both incoming 2012/2013 Higher Education Access Route (HEAR) students and separate workshops for Mature students. The Manager spoke to the Disability Access Route (DARE) students and registered these students with the MSC. This made it easier for these students to come to the MSC when they needed help. The MSC data shows that visits to the MSC by students from the UCD Access Centre for Disability Support doubled this year, 242 visits compared to 120 last year.

The following UCD programmes were represented by students attending the MSC this year: Actuarial and Financial Studies, Animal Science, Archaeology & Geology, Architecture, Arts, Agriculture, Business and Law, Commerce, Chemistry, Computer Science, Dairy Business, Economics, Economics and Finance, Engineering, Food Science, Forestry, Health and Performance Science, Geography, Horticulture, Landscape & Sports turf Management, Mathematics, Mathematical Physics, Medicine, Nursing, Physiotherapy, Psychology, Radiography, Statistics, Sociology, Social Science, Sports and Exercise Management, Veterinary, and Veterinary Nursing. This confirms our belief that the MSC supports students from a wide range of programmes throughout UCD.

The following nations were represented by students attending the MSC this year: Afghanistan, Algeria, America, Belarus, Belgium, Brazil, Britain, Bulgaria, Burundi, Canada, China, Denmark, France, Finland, Germany, Hungary, India, Iran, Iraq, Italy, Kazakhstan, Kuwait, Lithuania, Malaysia, Moldova, Nigeria, Norway, Pakistan, Philippines, Poland, Portugal, Romania, Russia, Rwanda, Slovakia, Somali, South Africa, Spain, Sudan, Sweden, Syria, UAE, Uganda, Ukraine, Uzbekistan, Venezuela, and Zimbabwe. International students often have language difficulties, and they frequently attend the MSC to further their understanding of lecture notes.

Once again this year the MSC Evaluation Form was put online and students who had attended the MSC in 2012/2013 were emailed in Jan 2013 and May 2013 to inform them of the site address and to encourage them to complete the evaluation. There were 231 responses. The results of the evaluation were very encouraging. (See Section 3: Evaluation of quality of service provided by the MSC.)

In conclusion the MSC is currently more than fulfilling its stated aims. Students show a very high level of satisfaction with the mathematical support provided. To continue coping with the increasing demand, at minimum a retention of this year's budget will be required. However, the fact that the MSC changes its venue on average every two years is a serious issue with cost implications not purely financial. The MSC urgently requires a secure tenure of sufficient size, in a suitable area frequented by the students. Future planning for the MSC is curtailed because of the lack of a permanent location.

We believe that the MSC represents a model of best practice for the provision of support within UCD.



# 1. Introduction

## 1.01 *Origins of the Maths Support Centre (MSC)*

In 2003 the Department of Mathematics secured Higher Education Authority (HEA) funding for the establishment of the UCD Maths Support Centre. A manager was appointed in February 2004 and the Maths Support Centre was opened on 16<sup>th</sup> February 2004. Further HEA funding was sought and awarded in 2004 and 2005. A full-time manager was appointed in September 2007 and will retire this year. A new manager is to be appointed in September 2013. University College Dublin has funded the MSC since September 2007.

## 1.02 *Aims of the MSC*

The Maths Support Centre aims to:

- Provide mathematics support for students of all mathematical abilities, on a one-on-one or small group basis, in a friendly, relaxed and informal atmosphere.
- Enable students who are experiencing particular difficulties in mathematics to overcome their fear of the subject, take control of their own learning and build confidence in their own mathematical ability.
- Ease the transition of first year students from secondary-level to tertiary-level mathematics.
- Provide targeted mathematics support for Access students, HEAR (Higher Education Access Route) and DARE (Disability Access Route) students, mature students, and students with disabilities.
- Increase its effectiveness by evaluating its activities and communicating and co-operating with other mathematics support centres in Ireland and the UK.

## 1.03 *Services provided*

The MSC provides a range of services including:

- Dedicated drop-in centre staffed by friendly and supportive tutors.
- One-on-one tuition or group-tuition as required.
- Supervised study.
- *Hot Topic* tutorials.
- Relevant textbooks and useful handouts.
- Web-based learning materials including self-diagnostic tests.
- Directed link on Blackboard to the MSC.
- MSC-developed notes in areas that the MSC have found students experience difficulty.
- MSC-developed laminated question and answer pages.

#### **1.04 Staffing**

The Director, Dr Maria Meehan is a member of staff from the UCD School of Mathematical Sciences. A full-time manager, Ms Nuala Curley currently manages the MSC. She is due to retire in September 2013 and a new full-time manager will be appointed. The majority of tutors employed are postgraduate students studying for PhDs in Mathematics, Finance, Mathematical Physics or Statistics. This year a number of the MSC tutors completed their PhD studies and were no longer available for work in the MSC. For this reason the MSC needed to employ new tutors. These positions were advertised internally. Interviews were held and a number of new tutors appointed. Combined training of MSC and School of Mathematical Sciences' tutors took place in September 2012.

#### **1.05 Improving facilities and coping with increased numbers**

The MSC was initially set up in 2004 in a small office in the John Henry Newman Building. In 2006/2007 the MSC was relocated to a room on the ground floor of the Physics building. However, due to development of that area, a room in the Science Lecture Building was allocated to the MSC in 2007/2008. Three years ago that room was extended to twice its size. In October 2011, due to development of the Science Hub the MSC changed location again - this time to a large bright room in the old wing of Science Centre South. An area in this room was sectioned off for the Manager. However this location in the second semester became in reality a building site and difficult to find. The number of students attending was considerably reduced. This would have been particularly true for first years who might not have experienced the benefits to their study that the MSC offered. During the midterm of the second semester the MSC was allocated a room on the first floor of the James Joyce Library. This has been a beneficial move for the MSC and we have since seen an increase in numbers attending the MSC. (See Section 2.01 Annual visits to the MSC.) A further feature of our new location is the increase in the number of students taking non-mathematics modules who are now attending. (See Section 2.02 Programmes using the MSC.)

Office space for the Manager, with a computer and facilities such as a printing and photocopying, is situated in the School of Mathematical Sciences. This allows the Manager of the MSC to carry out her managerial function. However due to the move of the School of Mathematical Sciences to Business Office Park (BOP), the distance between the MSC and BOP made the use of the office in BOP impracticable except for periods outside semester time. This made it difficult for the Manager to find any respite from teaching in the MSC and required her to carry on her managerial duties in the evenings. This problem persisted in the move of the MSC to the library. It is not an ideal state of affairs and needs to be urgently addressed.

The MSC has a separate computer used by students solely for the purpose of logging in and out each visit. Four notebooks were originally intended for tutor use in updating our database. This year three extra notebooks were purchased as they proved to be of great benefit to students logging in to Blackboard. They were also used by the tutors to demonstrate to their students the usefulness of various internet sites.

The MSC has once again increased its library of suitable books on mathematical topics thanks to gifts from lecturers in the School of Mathematical Sciences. Staff members, tutors and students avail of these while in the MSC. UCD library have once again been very helpful in ordering certain textbooks that have been found to be especially beneficial for students attending the MSC.

Last year the MSC purchased extra stands to hold our ever increasing collection of worksheets. These worksheets contain sample questions with answers and are developed by the MSC tutors when the MSC is not busy. Some extra notes and worksheets are available in the MSC this year due to tutor free time as a result of the low attendance of students particularly in the first half of the second semester. These sheets are created on topics that we have found cause particular difficulty for students.

A number of leaflets on integration and differentiation, statistical formulae and other mathematical physics formulae have also proved very popular with students. These leaflets are produced by The Higher Education Academy in the UK and had been very generously provided to us free of charge. However they can no longer supply colleges outside the United Kingdom and we must now pay for printing them.

### **1.06 Record keeping**

Data relating to all students attending the MSC has been maintained confidentially for the last six years. In the second semester 2009/2010, a very successful student log-in log-out system, developed by the Manager and Dr Brendan Quigley from the UCD School of Mathematical Sciences, was introduced. This allowed student data which was previously recorded on an attendance sheet and manually uploaded to a database, to be registered directly to the database.

2012/2013 saw further improvements and refinements of the programme. Since then tutors log in to the database and update the topic covered as they finish the session with each student or students. In addition, for the last two years, lecturers in the School of Mathematical Sciences may log on to their module on the database on a daily basis. This has allowed them to view the current problems that their students are presenting with, in the MSC. Confidentiality is maintained and identities of students are not available. There were a few teething problems initially but improvements in the system are on-going. I would like to thank Dr Brendan Quigley for his work on these enhancements. The manager is due to retire this year but has been awarded a research grant for a PhD studies project *Identifying university students' mathematical "trouble-spots" and developing effective supports: an analysis of Maths Support Centre data* under the supervision of Dr Maria Meehan.

An evaluation form originally filled in manually by the students has been online for the last five years. The information gained from this evaluation has been a crucial element in many improvements carried out in MSC. In particular seeking suitable accommodation.

In both of the above forms students are given the option by means of a tickbox to indicate whether they agree to this information, other than their name or number, being used for research purposes.

### **1.07 Accommodation and opening hours**

The MSC remains open throughout the year. It operates on a drop-in basis during semesters and opens on an appointments only basis throughout the holiday periods. Students who, for example have not passed exams or perhaps may have exceptional circumstances, avail of this one-on-one appointment system. Some staff or postgraduate students also attend during the summer months. The majority of out of semester visits are by Masters or PhD students needing help with statistics for their theses or others seeking help with mathematics revision for the coming year.

The MSC opened officially on a drop-in basis on 24<sup>th</sup> September 2012. We had found over the previous years that the number of students coming to the MSC prior to late September is limited to a small number. Therefore it is not financially viable to open for drop-in before this time but these students can be catered for on an appointment only basis.

There were 12 weeks for drop-in services in the first semester and 13 weeks drop-in in the second semester. These included both the revision and assessment weeks.

Opening times in the first semester were as follows:

- Monday/Thursday 10:00 to 13:00 and 14:00 to 17:00
- Tuesday 10:00 to 13:00 and 14:00-20:00
- Wednesday 10:00 to 13:00 and 14:00 to 19:00
- Friday 11:00 to 13:00.

Late opening on Tuesdays 6pm to 8pm were exclusively for Stage 1 and Access to Science & Engineering students. Student attendance records at the end of the first semester indicated that our evening opening times on Tuesdays had few visitors. In the second semester we closed at 5pm on Tuesdays and only left late opening on Wednesday. Other hours were as in semester 1. A further reason for this was to allow money saved to be used to employ extra tutors in the last weeks of drop-in. Sixteen extra hours of tutoring were provided per week for the last four weeks and this included the MSC remaining open through the lunch hour. This timetabling proved very successful. But this arrangement depends on the availability of extra tutors at the end of semester. It is important to note that this is not often possible. This year a number of tutors had completed their PhD but had not as yet found employment and were therefore available to take the extra hours.

Despite the extra tutoring hours, students have expressed dissatisfaction with the insufficient number of tutors. Many students, while praising the high level of tutoring, were critical of the length of time they had to wait for a tutor. (See Section 4.13: Size of room, opening hours, number of tutors and resulting concerns.) This was more evident approaching, and during, study weeks and the first week of exams. (See Figure 5: Number of visits per week by students.)

In addition the MSC held *Hot Topic* sessions in the evenings to ensure all students would have the opportunity to attend. Once again as in previous years the Hot Topics proved very popular. (See Section 4.09: Hot Topics.)

### **1.08 Publicity**

Second level students are informed about the Mathematics Support Centre service in UCD through the Qualifax website which is the National Learners website organised by the Guidance Councillors of Ireland. Teachers and guidance councillors answering queries on the Leaving Certificate helpline were informed of the MSC. This enabled them to reassure students worried about third level mathematics that extra mathematics help would be available in UCD for any student who required it.

The MSC website [www.ucd.ie/msc](http://www.ucd.ie/msc) is updated on a regular basis. Location, opening hours and best times to visit for specific topics are among the items displayed. A number of self-assessment tests (with answers) are

available on the site. Incoming students are recommended to try these if they are uncertain of the level of mathematics required for their programme or need to revise particular areas in mathematics. The website also contains links to many excellent teaching videos in specific mathematical topics. The MSC site is linked to Current Students/Student Support, the main A-Z UCD directory and the UCD School of Mathematical Sciences.

Students attending orientation, with the assistance of the student advisers and peer mentors, were specifically targeted. These included students from Postgraduate Computer Science, Mature Students, Students with a Disability and International Students. Students were given information about the assistance provided by the MSC and its webpage and were informed that it was a free service for all students in UCD. It was stressed that the MSC was not a grind centre and that students would be expected to carry out the work themselves but given as much help from the tutors as they needed. It was emphasised that students of all levels of ability attended.

The MSC also developed and ran special tutorials on basic mathematical topics for students entering UCD by both the Higher Education Access route (HEAR) and the Mature student access route in the week prior to orientation. These were organised at two different levels of mathematics.

In order to further publicise the MSC, and in particular for those taking mathematics as one of their modules, the Manager (with the agreement and support of the lecturers) visited first year mathematics lectures at the beginning of the semester. The students were told that the MSC did not replace lectures or tutorials but was an extra free facility provided not alone for those finding problems with their mathematical studies but for all students to enhance their performance in mathematics. The students were also reminded by the lecturers both in lectures and on Blackboard of the benefits of using the MSC. This latter method once again proved to be a highly effective strategy and the most important factor in the attendance of students at the MSC. The second important factor was the recommendation of the MSC by a friend. Other forms of advertising used were posters, plasma screens and flyers. (See Section 3.02: Knowledge of existence and purpose of the MSC.)

### **1.09 Funding**

The MSC initially received HEA funding for three years. Since September 2007 the MSC had been funded by UCD with an annual budget. The majority of this funding pays for the staffing costs of a full-time manager and post-graduate tutors and a balance goes towards the purchase of necessary equipment and stationery. This year the funding (total funding €95,400) allowed the MSC to open evening hours in the first semester on a Tuesday from 5pm to 8pm and on Wednesday evenings from 5pm to 7 pm. In the second semester we opened one late evening only on Wednesday but added extra hours in the last four weeks of semester 2.

Students show an extremely high level of satisfaction with the services provided. However they still express dissatisfaction with overcrowding and lack of tutors despite the increase in size of the venue. Annual attendance at the MSC has once again increased. (See Figure 1: Annual number of visits to the MSC.) UCD first funded the MSC in 2007/2008. That year there were 1,440 visits. This year the number of visits amounted to 4,750 an increase of almost 8% on last year. The MSC works to a tight budget and with the appointment this September of a new manager it is essential that the budget allocated to the MSC tutors be maintained at the same level or increased for the next two years.

### **1.10 Conferences and workshops attended**

Annual Conference in Mathematics and Statistics Service Teaching and Learning: The challenges of teaching service mathematics. Held in National University of Ireland Maynooth on 28<sup>th</sup> & 29<sup>th</sup> May 2012.

Project Maths Development Team: Workshop 7 – Functions. Held in Blackrock Education Centre on 9<sup>th</sup> November 2012

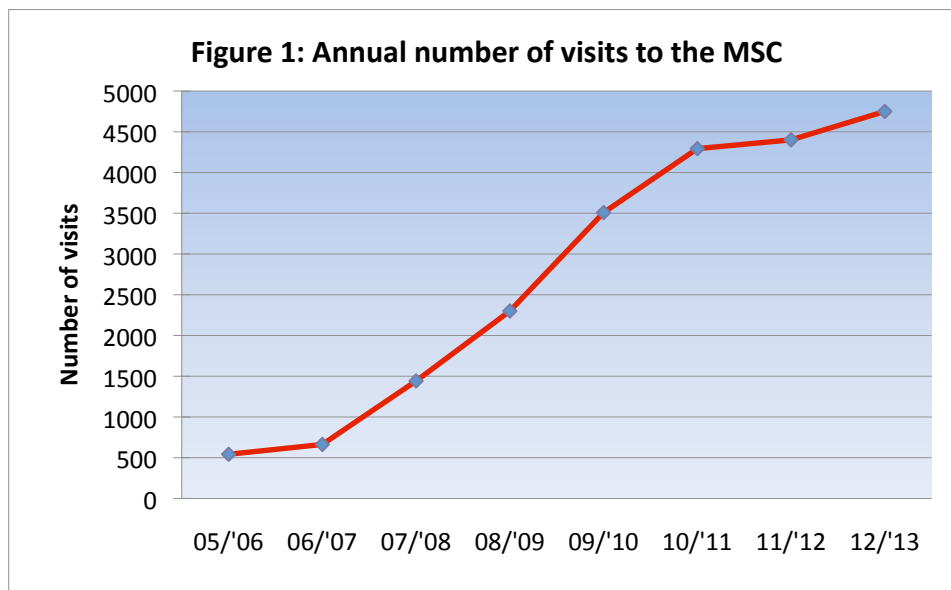
The 7th Annual Irish Workshop on Mathematics Learning and Support Centres: Promoting Learning Support and Engagement with Mathematics: a discussion of all avenues of approach including the use of technology. Held in Queen's University, Belfast on 7th December 2012.

Conference: Why Maths Matters. Held in University of Limerick on 8<sup>th</sup> March 2013.

UCD Research Ethics Annual Workshop 2013: Research with Children and Young People held in UCD on 21<sup>st</sup> March 2013.

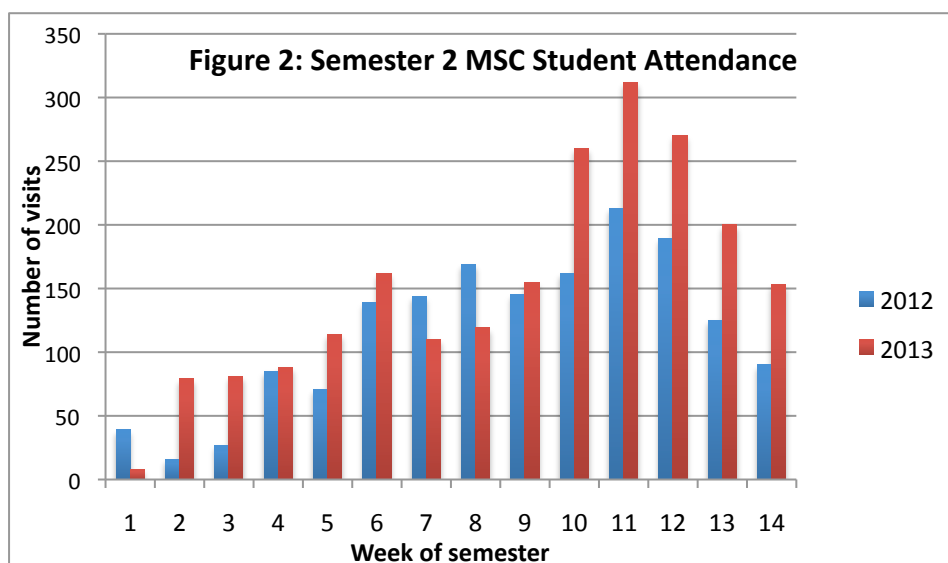
## 2. Mathematics Support Centre usage

### 2.01 Annual visits to the MSC since 2004



The number of visits to the MSC has grown steadily each year. (See Figure 1: Annual number of visits to the MSC.) In 2012/2013 the number of visits to the MSC was 4,750 an increase of 7.93% on last year's total.

What is significant this year is the dramatic increase in numbers in the second half of the second semester 2013 as compared to the same semester in 2012. The chart below gives the numbers of students attending in semester 2 for both years. Weeks 5 and 6 were weeks corresponding to mid term tests. Week 8 was the first week in the library. It is clear that there was a dramatic increase in attendance compared to the previous year from week 9 onwards. This we believe is due to the library location. We are very pleased that the library have welcomed the MSC and permitted them to occupy this location for a further year.



Average time of visits this year was 97 minutes and increase of 15 minutes over last year. However the increase in average time spent with a student and the increase in attendance put severe pressure on the staff of the MSC to cope with the numbers particularly at exam times. It is not possible to employ extra tutors due to the limited funding. (See 2.03 Number of individual student visits and average time of visits.)

## 2.02 Programmes using the MSC

When the MSC was established in 2004, it was expected that the majority of visitors to the centre would be Stage One students enrolled on a mathematics course/module. While a significant number of visitors to the MSC in 2012/2013 still fit this profile, we have again observed that students from programmes such as Psychology, Radiology and Social Science, where mathematics modules are not core, are attending the MSC with mathematical problems or issues they meet either in mathematical electives or in non-mathematics modules.

After the MSC re-location to the library on the 25<sup>th</sup> March 2013, students visiting the MSC represented a total of 171 modules as compared to 104 the previous year. Worthy of note is that 107, approximately 63%, of these modules did not have a ACM/MATH/MST/STAT code. The previous year this figure for the same period was 48% of the modules. Below is a table representing these numbers.

**Number of different modules attending the MSC in 2012 and 2013**

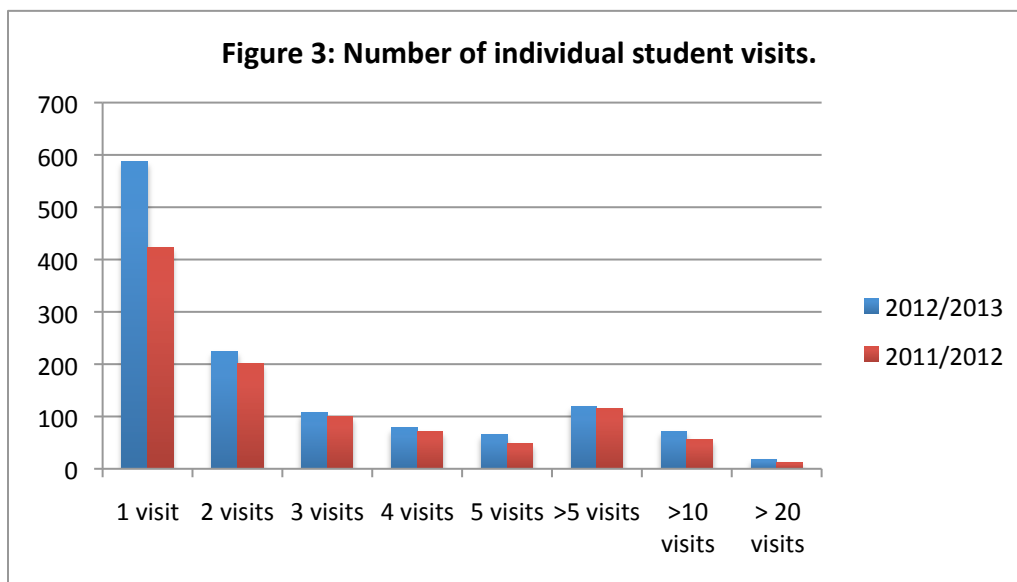
<b>2013</b>	ACM/MATH/MST/STAT	64
	Others	107
	<b>Total</b>	<b>171</b>
<b>2012</b>	ACM/MATH/MST/STAT	54
	Others	50
	<b>Total</b>	<b>104</b>

We conjecture that the new location not only increased the numbers (see Figure 2: Semester 2 MSC Student Attendance) but also increased the visibility of the MSC for non-ACM/MATH/MST/STAT students.

The following UCD programmes were represented by students attending the MSC this year: Actuarial and Financial Studies, Animal Science, Archaeology & Geology, Architecture, Arts, Agriculture, Business and Law, Commerce, Chemistry, Computer Science, Dairy Business, Economics, Economics and Finance, Engineering, Food Science, Forestry, Health and Performance Science, Geography, Horticulture, Landscape & Sportsturf Management, Mathematics, Mathematical Physics, Medicine, Nursing, Physiotherapy, Psychology, Radiography, Statistics, Sociology, Social Science and Sports and Exercise Management, Veterinary, Veterinary Nursing. We are delighted to see these students attending as they are testament to the success of the MSC in publicising its services, and illustrate the service we offer to all UCD students. (For students' comments see Section 4. 07: Usage of MSC by programmes throughout UCD.)



### 2.03 Number of individual student visits and average time of visits



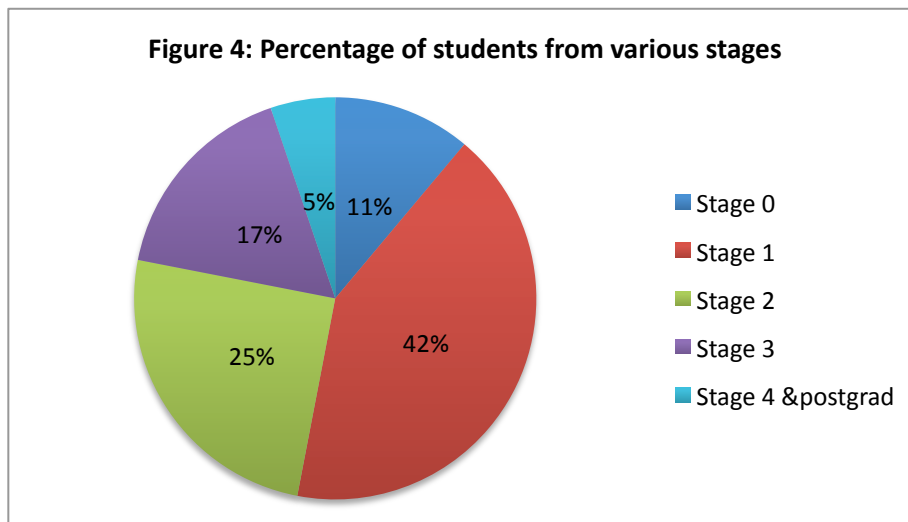
The total average time spent by a student in the MSC in 2012/2013 was 97 minutes. This is 15 minutes longer than the average time last year. The average time for the previous year had also increased by 11 minutes. Students in their evaluation commented on the patience of the staff. The tutors emphasize the importance of understanding mathematics and take as much time as they can with each student. The MSC strives to give their students a mathematical understanding of their topic but this does require time spent with a student. As one student said: *The staff at the MSC were always very helpful and encouraging. They are doing a great job, as they seem under pressure to service the amount of people who are seeking their help.* The increase in the average time that a student spends in the MSC may in part be due to the increased efforts of the tutors to give the student this understanding. But of course another possible explanation for this increase could be that it is also due to the longer waiting times for a student to be seen by a tutor.

The median number of visits by a single student was 2 visits. This stands at the same value for the last three years.

The number of visits by any one student ranged from 1 to 83 visits. The highest number of individual visits in the previous year was 101. The percentage of individual students who visited 5 times or greater was 18% last year but increased to 22% this year.

(For students' comments see Section 4. 13: Size of room, opening hours, number of tutors and resulting concerns.)

## 2.04 Percentage numbers of students from various levels



Students from Stage 1 still formed the majority of attendees at 42% of the total number. This was 11% less than their percentage last year. Even allowing for the increased number of visits this still resulted in a smaller number of first year students attending compared to previous years. A possible reason for this may perhaps be the result of the increase in points this year required for entry to some programmes for example Science. In the above data we have included in modules at stage zero the numbers from Access to Science, Access to Engineering and also level zero modules for example MATH00010. Zero level modules are introductory modules intended to help incoming students to understand and master those topics from Leaving Certificate mathematics that are necessary for successful engagement with the School's level 1 modules in mathematics.

Below is a comparison of student attendance over the last three years. The decrease in Stage 1 attendance and also the increase in Stage 3 and Stage 5 are noteworthy.

Stage	2012/2013	2011/2012	2010/2011
Stage 0	11%	3%	1.10%
Stage 1	42%	53%	62.90%
Stage 2	25%	33%	24.70%
Stage 3	17%	7%	9.40%
Stage 4 & postgraduate	5%	4%	1.90%

## 2.05 Equality of opportunity

The continued close co-operation between the Student Advisers and the MSC has proved to be very effective. The MSC and the Student Advisers were in frequent contact during the year.

Our data-base showed that there were 242 visits by students from UCD Access Centre for Disability Support this year. This was double the numbers who visited the previous year. We will be employing a number of new tutors

this year as many of our experienced tutors have obtained fulltime employment. We approached the Disability Support Access Centre and they have kindly agreed to run a staff training workshop for our new MSC tutors in September 2013.

Once again this year the MSC developed and delivered six mathematics workshops for incoming HEAR students in August 2012. These were for those students who were entering academic programmes with some mathematical element. They were organised at a higher and lower level. The first, which was for those students coming in with Ordinary Level Leaving Certificate (LC) Mathematics, was a basic mathematics workshop. For those who had taken Higher Level LC Mathematics there was a statistics workshop. A further benefit of these courses was the familiarity of the students with the MSC tutors which meant they had no qualms about attending the MSC when they needed its services.

The Manager also spoke to the Mature students at Orientation informing them of the MSC facility and advising them of the self-assessment tests on the MSC website. These are designed to help incoming students revise their second level mathematics. Mature students may either have forgotten a lot of the mathematics they once knew or else may not have reached the required standard. The MSC developed and delivered a mathematics course in September to students entering UCD in September 2012 as Mature students. The students were informed of the topics that would be covered and invited to attend those they felt were relevant to their needs.

Mature students are normally well motivated but need assistance which can often most effectively be given on a one-on-one basis. This however can be difficult when the Centre is busy. In light of the current financial situation in the country the number of Mature and Access students may rise and the support given by the MSC could be a critical factor in allowing them to complete their programme to degree level. Here is how one mature student described their experience of using the MSC: *I would have been lost without the Maths Support Centre and am so grateful for all of the help I received. Maths is an awful lot clearer to me now and I feel a lot more comfortable and confident in my class.*

## **2.06 Visits to the MSC by international students**

The MSC set up an information desk at the orientation day run by the international office. The Manager of the MSC was also invited by Dr Carl Lusby to speak to the incoming medical students at their orientation.

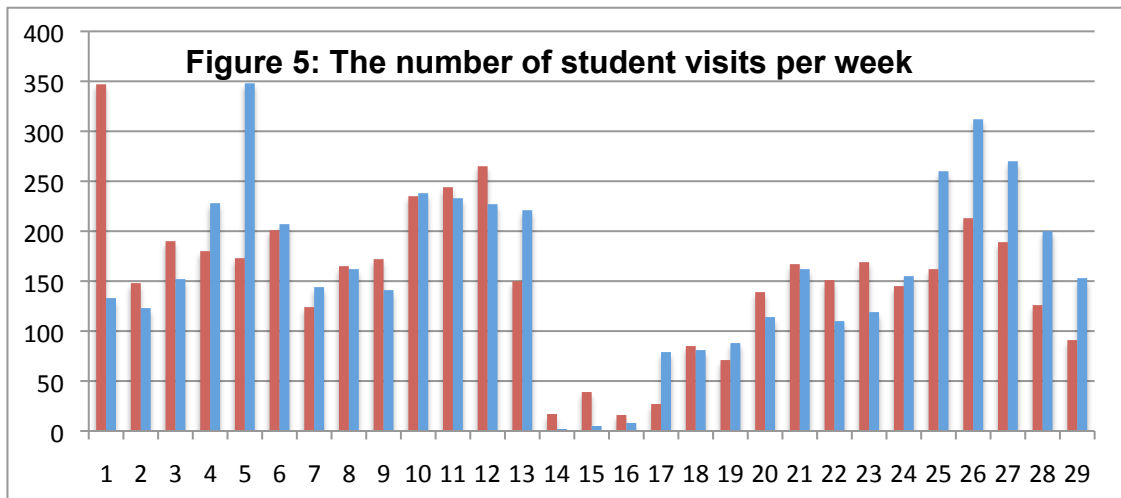
What is evident from our data each year is the surprising number of different nationalities who attend the MSC.

Forty-eight countries were represented this year. They were the following: Afghanistan, Algeria, America, Belarus, Belgium, Brazil, Britain, Bulgaria, Burundi, Canada, China, Denmark, France, Finland, Germany, Hungary, India, Iran, Iraq, Italy, Kazakhstan, Kuwaiti, Lithuania, Malaysia, Moldova, Nigeria, Norway, Pakistan, Philippines, Poland, Portugal, Romania, Russia, Rwanda, Slovakia, Somali, South Africa, Spain, Sudan, Sweden, Syria, UAE, Uganda, Ukraine, Uzbekistan, Venezuela, and Zimbabwe.

## **2.07 Weekly visits to the MSC in 2011/2012 and 2012/2013**

The number of weekly visits as expected was lower at the beginning of each semester but increased over the course of the semester with the exception of week one when extra classes were organised for Access and Mature entry students. These were organised in consecutive weeks in 2012/2013. The reduced number of visits at the beginning of the semester was due no doubt to the fact that students were unaware of their difficulties early on but as the coverage of the module increased and mid-term examinations approached the students

realised they needed the extra support. The peak in week 5 in 2012/2013 is explained by the extra Hot Topics one in mathematics and the other in statistics held by the MSC that week. The percentage increase in numbers was maintained in the second semester only we believe, as a result of the new location in the library. The number of visits per week for 2011/2012 (below in red) and 2012/2013 (below in blue) are shown in Figure 5: The number of student visits per week .



## 2.08 Identifying areas of greatest need: Hot Topics

If lecturers or students identify particular areas in which students are having difficulty, the MSC with the agreement of the lecturer, design and deliver Hot Topics in these areas. The MSC had an excellent working relationship with the Student Union this year. We would like to thank Shane Comer for his assistance in this respect. He organised the advertisement of the MSC on the Student Union website for the first time that this has been done and also encouraged the class reps to consider a Hot Topic if they felt the students were finding difficulty in a specific area. Hot Topics are normally two hours in duration, held in evening times and lecture rooms were normally booked for these sessions. However our location in the library was ideal for Hot Topics in the second semester as the library agreed to allow us to borrow extra chairs for these sessions. The numbers attending a Hot Topic usually vary between 15 and 45 students. This year Hot Topics were run on following subjects: Trigonometry and Resolving Forces for Architectural students, Exponentiation and Logarithms, Probability and Statistics, Eigenvalues and Eigenvectors, and Differential Calculus. (See Section 4.09: Hot Topics.)

## 2.09 Retention figures

Students who get help in time can be prevented from failing and possibly dropping out of college. However retention figures are difficult to quantify. The following question was asked on the MSC evaluation form. *Did you ever consider dropping out of your course/college because of mathematical difficulties?* 11.3% of those students answered “yes”. If a student answered “yes” they were then asked: *What specifically influenced your decision not to drop out?* The following is how one student answered this question. *“With a bit of extra work and help,*

*particularly from the MSC and encouragement from my family".* First year students in particular, often need that extra help with basic mathematics which they may have either forgotten or never understood. Once they get this basis they can build on it to a higher level. (See Section 4.06: MSC assisted the retention of students.)

Often you will hear very able students remark that they could never do "maths". This lack of confidence in their mathematical ability and the related stress may also be a factor in causing them to drop out. Yet with the right help they can move on to at least, be capable mathematically and hopefully to enjoy it. Sometimes it is just that they need the extra support to adjust to third level and are often shy about looking for help. One-on-one support is particularly important for these students. (See Section 4.10: Students benefited from one-on-one help.) It is essential that the MSC is seen as a place where you can always go no matter how low you feel your level of understanding of the module may be. Many students commented on the importance of the MSC in helping them gain this confidence. This is how one student describes her experience. *I had a very low level of maths to start off with and very little time to catch up. When I went there I was embarrassed to let them know how little I knew and as a result spent the first couple of sessions nodding along to things I didnt really understand but (with) their patience and understanding I soon found the confidence to vocalize what I didnt know and ask questions. If it were not for the maths support center there is no way I would have passed my exams.* (See Section 4.12: MSC increased students' confidence.)



### 3. Evaluation of service provided by the MSC

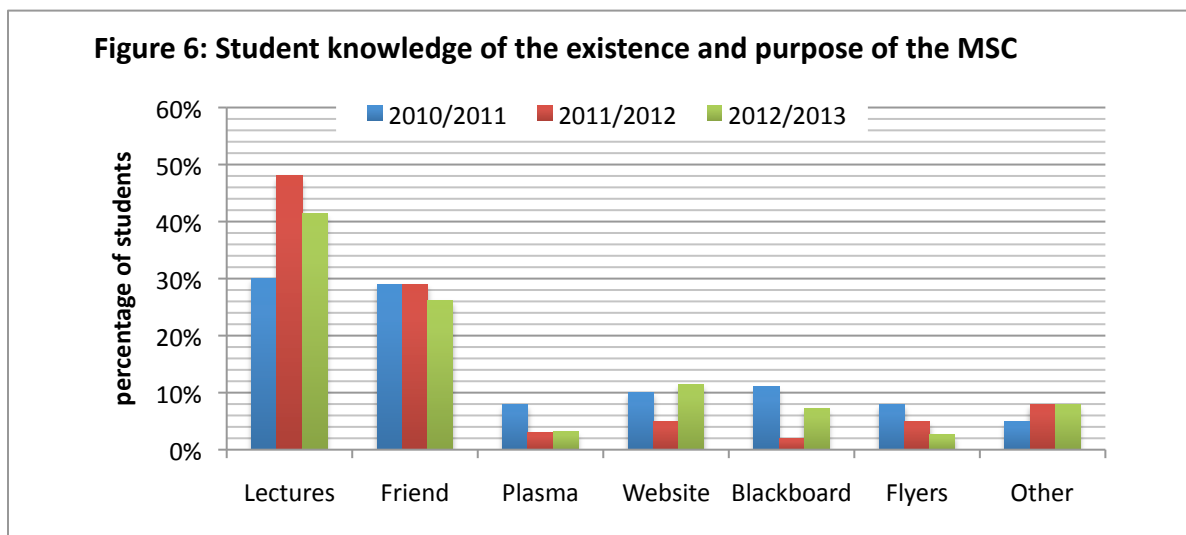
Once again this year the MSC Evaluation Form was put online and students who had attended the MSC 2012/2013 were emailed in January 2013 and May 2013 to inform them of the address of the site on which the form could be found and were encouraged to complete the evaluation. There were 231 responses. This chapter summarises the results of this survey.

#### 3.01 Level of student attainment in mathematics prior to third level

Our attendance records show that 50% of those coming to the MSC this year had taken the Honours Level Leaving Certificate (LC) Mathematics paper, 32% had taken the Ordinary Level LC Mathematics paper and 18% had other second level qualifications. The other qualifications included Fetac 5, GCSE (UK), Junior Certificate, Primary Certificate, Open University, Erettsegi (Hungary) and equivalent of the Irish Leaving Certificate in countries such as China, South Africa, Lithuania, Italy, Russia and Belgium.

Those attending who had taken the Honours Level LC paper, 61% of these had received a B3 or above. This is an important factor as it indicates that the MSC is catering for the needs of the more able students and not just those who might be struggling. At the lower end of the scale only 7% of those who took the Ordinary Level LC Mathematics paper had received a C1 or lower.

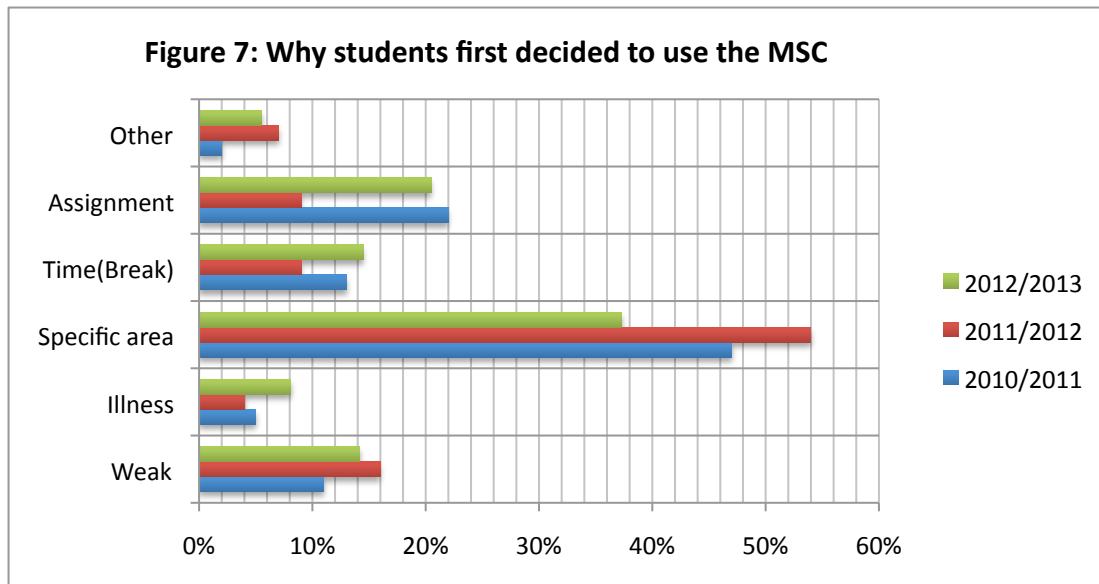
#### 3.02 Knowledge of existence and purpose of the MSC



The students were asked to tick one or more ways in which they had found out about the MSC. The recommendation and reminders by lecturers as in previous years, still remains the most important factor in encouraging students to attend the MSC. However this year the the percentages are lower than last year but this is balanced by the increase in students learning of the MSC on Blackboard. 42% of students indicated in the Evaluation Form this year that they had heard of the MSC at lectures and 7% on Blackboard. Word of mouth i.e.

being informed by a “friend”; this method at 26% is still significant though slightly down from last year. The importance of the latter in advertising the MSC has been further backed by the answers given to the question asking “Would you recommend the MSC to a friend?” This year 99% said “yes”. Plasma screen as a method of advertising does not appear to have been very effective in the last two years. Perhaps the students have become so accustomed to seeing them they no longer read the messages. Would they be more effective if placed where students congregate? The website as a method of advertising has increased this year. On our website we have a timetable of the most suitable times to attend for particular topics. Students frequently use the website for this purpose. Flyers have not been widely distributed in the last couple of years mainly because of the uncertainty in the location of the MSC. However they are not expensive to produce and could be used more effectively by for example handing them out in tutorials or leaving them in areas where students gather.

### 3.03 Why students first decided to use the MSC



Respondents were allowed to indicate multiple reasons if applicable. Approximately 37% per cent of answers indicated their attendance was motivated by needing help in a specific area. This was a significant decrease over previous years. Often a student might have a problem in a particular area that could be resolved in a single visit to the MSC but for other students the area could be a significant part of their module and require a number of visits. 21% stated that attendance was motivated by a tutorial/assignment/project to hand in, this was a noticeable increase over the previous year of 9%. This may be due in part to lecturers altering tutorial practice to allow students get as much help in the MSC as they need for their tutorial. Marks are only then given for a short quiz during the tutorial. This allows the MSC tutors to explain the theory of the topic covered in detail and it is hoped that the student will be able to use their increased understanding to answer any questions on the quiz. Also some lecturers mark specific questions for which students are not allowed to get assistance while help can be given for the balance of the tutorial. The percentage who felt their background in mathematics was weak was 14%, this was slightly lower than the previous year. Other reasons at 6% had multiple responses. Among these were the following: difficulty keeping up with pace of lectures, lack of understanding lectures, getting behind



with lectures, examination preparation and as one student said *I needed the encouragement and support provided by the MSC. I felt very welcome there and this really helped in my maths.*

### 3.04 Students' opinions of the MSC

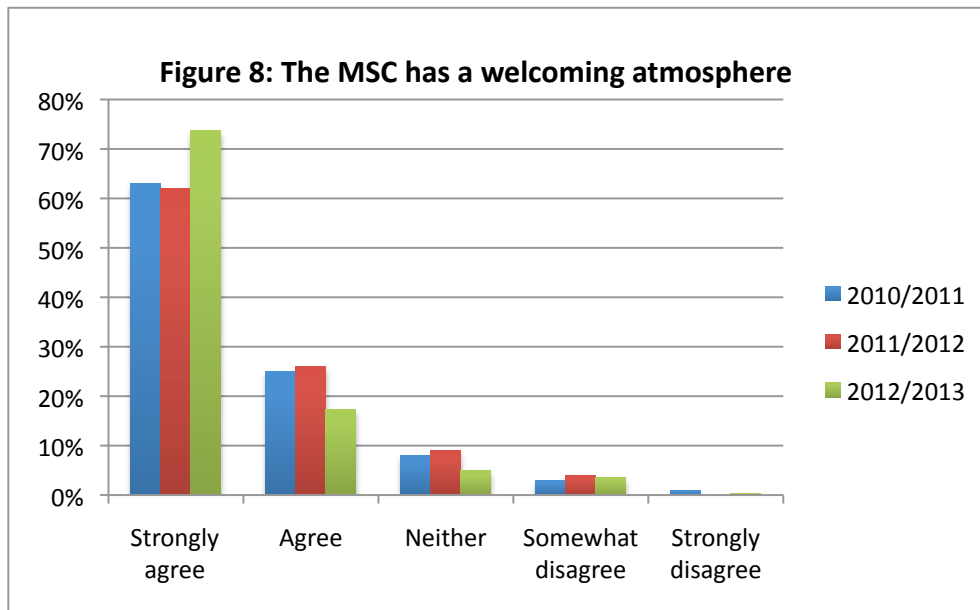
The respondents were asked for their opinions on various aspects of the MSC using a five-point Likert item.

The questions were as follows:

Did the MSC

- Have a welcoming atmosphere?
- Have suitable opening hours?
- Encourage students to work with other students in their class?
- Provide a relaxed place to study?

The following charts describe their replies.



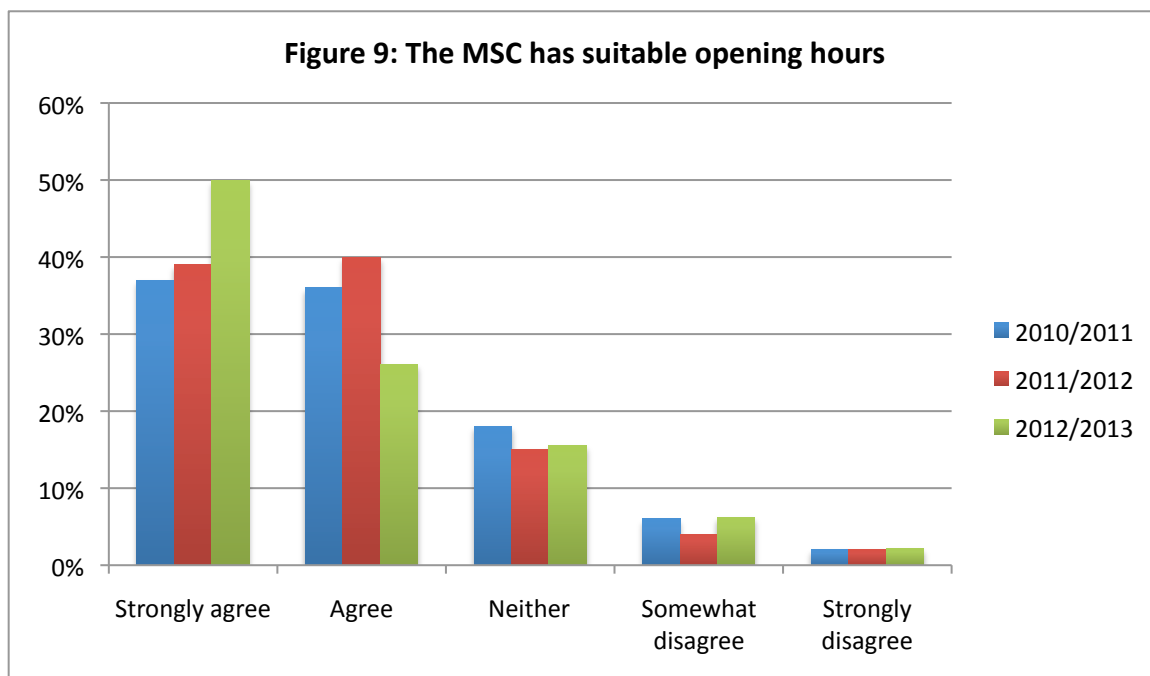
The welcoming atmosphere of the MSC is a critical factor in encouraging students to attend. Students may often be quite nervous coming in for the first time. As shown 91% of respondents agreed or strongly agreed that the MSC has a welcoming atmosphere. This excelled last year's values by 3%. No student strongly disagreed and the median value was "Strongly agree".

However this welcoming atmosphere does not just happen. It is the result of the careful recruitment and training of the MSC tutors. Tutors in the MSC must not alone be mathematicians but also have the social skills to relate well with students and their tutor colleagues. They need the gift of making mathematics appear easy and demonstrate a love for the subject. The following is a quote from one of this year's students

*I found the MSC to be welcoming and helpful and I never ever felt like I was being judged. I was so glad I sought help when I got confused. I will definitely use this service again in the future when needs be.*

The principle comments from students who *somewhat disagreed* at 3.6% were from those coming for the first time at mid term or end of semester examination times. They mentioned long waiting times, overcrowding, and not knowing the protocol when they arrived. These are our peak visiting times and the centre is always at its busiest with up to 80 students attending per day. Inevitably at these times the centre will be full to capacity and students may have to wait some time to get attention.

This year we displayed in a prominent position a FAQ sheet explaining the formalities of the MSC. However few students read notices.



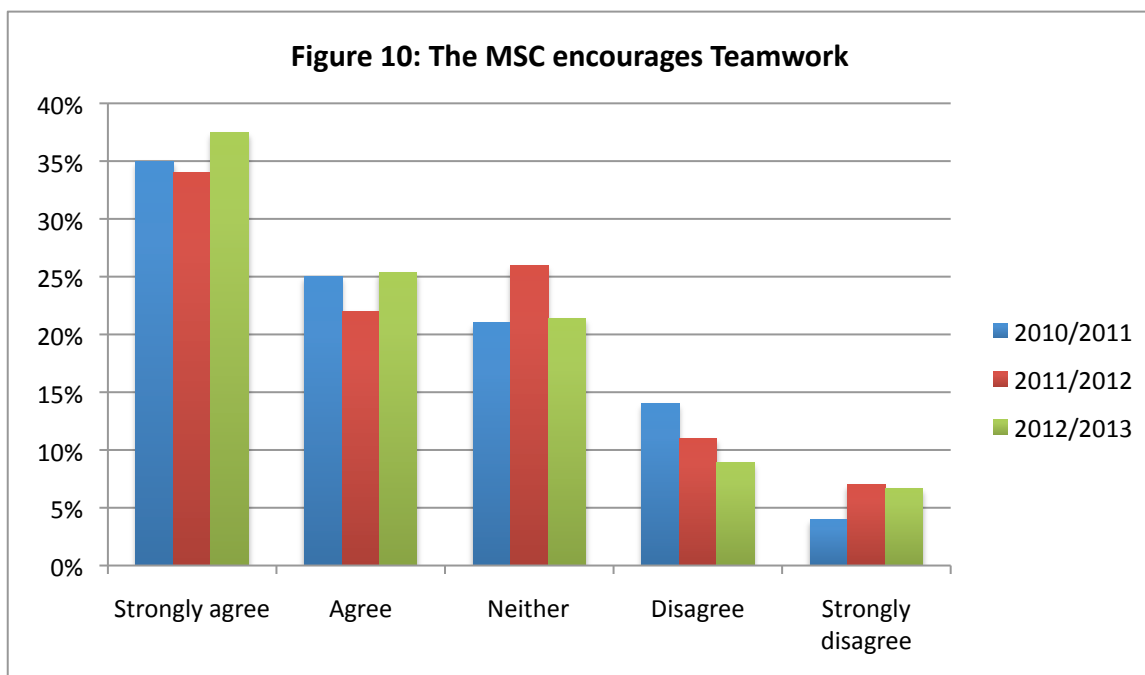
There was a slight decrease in student satisfaction with the opening hours 76% this year over 79% last year. The unsuitability of the opening hours particularly concerned Science, Engineering and Access students. Science and Engineering students have a very full timetable during the day and many Access students are working full time and therefore these students and many others in similar circumstances are only free to attend in the evening. We opened late on Tuesday evenings from 5pm to 8pm and also on Wednesdays from 5pm to 7pm in the first semester. However we found that the Tuesday evenings were not well attended. In the second semester we only opened late on a Wednesday evening.

The Manager has once again become aware of an increasing difficulty in finding suitable tutors. She believes this is due in some part to the lack of research funding in Ireland for Pure Mathematics and Applied Mathematics. Other problems were related indirectly to this. Certain topics beyond first year require an understanding not just of the mathematics involved but also the area of study, for example economics. The MSC recommends students to come at specific times for these subjects but with our restriction on tutors these times are limited and may not suit a student's timetable. However this year a number of our tutors had completed their PhD in March and had not as yet found employment, the Manager foreseeing this had budgeted for sixteen hours a week extra tutoring for the

four weeks prior to end of examinations. For students' comments (See Section 4.13 : Size of room, opening hours, number of tutors and resulting concerns.)

In the opinion of the Manager opening the centre on an appointment only basis, as has been briefly mentioned in the evaluation comments, would strictly limit the number of students who could attend and as some student might require five minutes while another an hour or more it would be very difficult to run with effective use of resources.

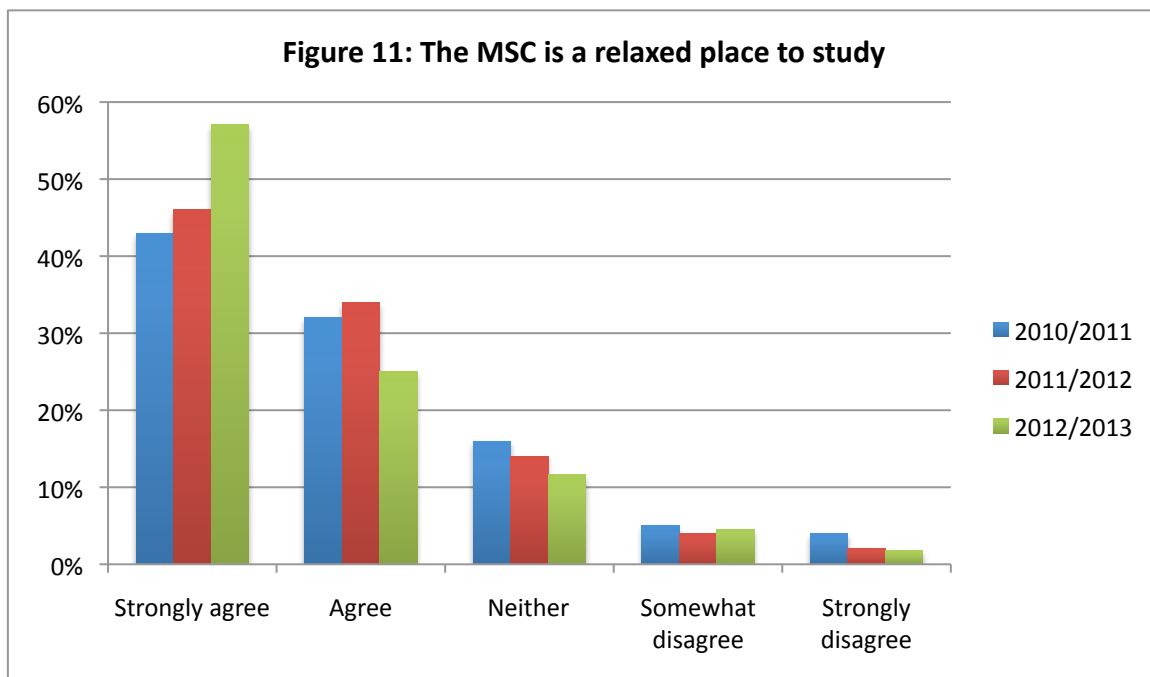
The Manager has taken on board the students' comments. We will be able to implement improvements if it is possible to employ additional tutors and thus be in a position to extend opening hours.



The tutors try to encourage small groups of students to work together. If students from the same module come in to the MSC they are, if possible, taken together and then encouraged to remain and work with each other in solving further problems. It was hoped that they would continue this group work outside the MSC. At 63% agreeing or strongly agreeing that the MSC encourages teamwork the number is a substantial increase on last year's value of 56%. The move to the James Joyce Library has we believe contributed to this. Many students working in the library came in to the MSC in groups of three or four when they came upon areas in their study in which they needed clarification.

Our Hot Topic sessions were an effective method to increase group participation. In particular they encourage the weaker students who may have come to the MSC for the first time, to come back afterwards often in groups of three or four.

The large size of the venue in the library has allowed our Hot Topics to take place there. We would like to thank the library for the loan of extra chairs for these evenings



Teaching in the MSC is difficult due to background noise from multiple simultaneous teaching sessions and this was exacerbated this year with the noise of the building construction directly outside. Our move to the library occurred after mid term in the second semester. It does not appear to be external factors that influence this feeling of relaxation as otherwise we would have expected a dramatic difference between the first semester evaluations compared to the second semester. However the values are very similar. 83% agreed or strongly agreed compared to 80% last year that it was a relaxed place to study. Perhaps some students in answering this question are saying they do not feel pressurised when studying in the MSC.

The venue is a critical factor for both students and tutors alike. Many students remarked on how pleasant the area in the library was when they came in for the first time. Students in the evaluation stated waiting times were often very long. This was especially true coming up to study weeks and exam time. In these circumstances it can be very claustrophobic and difficult for students to study on their own while awaiting the assistance of a tutor.

Another aspect which is limited sometimes during examination periods, by the size of the room is that a number of students express the wish to remain in the MSC after a session to carry on with their study and have guidance as needed. It is critically important that the room size be maintained or increased in any forthcoming move to new premises.

### **3.05 Had the student passed the module for which they sought help**

The percentage pass rate of 96% as given in the evaluation forms was up on last year's rate of 94%. Some students thanked the MSC for the help they received and remarked that thanks to the MSC they had passed their mathematics modules. Some indicating that without the assistance given to them they would not have

survived first year. One student stated *“The staff were more than friendly and very helpful. I would have failed two of my modules without the MSC.”* (See Section 4.06: MSC assisted the retention of students.)

It is very important that the MSC is also viewed as somewhere that students can attend to lift their standard to the highest level and where they can receive a first class grounding in their mathematics module. The MSC aims to increase the level of a student’s understanding of mathematics and it was pleasing to note that some students commented on the fact that it was not just a question of passing their modules but increasing their mathematical understanding and developing their interest in mathematics. A quote from a student this year, *I have used the MSC over the past two years in college. It was of enormous benefit to me. Not only did I pass the modules I had sought help with, I got good grades in them and actually began to enjoy doing the maths involved. The staff at the MSC are extremely helpful and patient ... the MSC is an amazing service.*

(See Section 4.11: MSC increased students’ understanding and encouraged independent learning.)

### **3.06 MSC tutors**

The importance of the quality of tutors employed in the MSC cannot be overstated. The comments on the evaluation forms have clearly demonstrated not only the exceptional ability of these tutors to communicate their knowledge but also the encouragement and support given by them to the students attending the MSC. It is also important to note that if these tutors are eventually to become lecturers they will have an excellent understanding of the problems experienced by undergraduate students.

But what of the benefits the tutors might gain by tutoring in the MSC? Naturally the most obvious benefit is that it helps support PhD students financially. The second benefit is that the tutors retain a grounding in their basic mathematics. Thirdly, it increases their problem solving skills as they must answer in realtime any query a student may produce. Fourthly, working in the MSC develops their multi-tasking ability as they must be able to rapidly change topic as they move from one student’s problem to the next. Lastly they develop the capacity to work as a team. The final three benefits are regarded as key transferable skills in any job application. A number of our tutors have told us that their new employer regarded their work in the MSC as a significant element in achieving their present positions.

The Manager would like to thank all the tutors for their dedicated work often under difficult circumstances. The MSC employed 14 tutors in 2012/2013. They were Aisling Connolly, Alex Byrne, Alison Sneyd, Anna Heffernan, Anthony Brown, Arthur White, Cathal Dempsey, Chris Kavanagh, Claire Brennan, Cormac Breen, David Conti, Luke Coburn, Niamh Russell, and Nick Byrne.

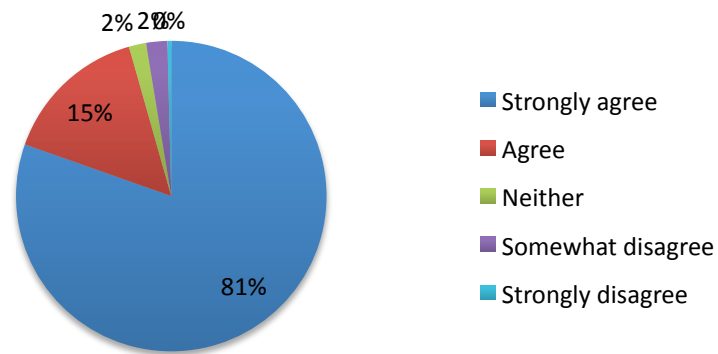
### **3.07 Students’ opinions of the MSC staff**

The respondents were asked for their opinions on various aspects of the MSC staff again using a five-point Likert item.

The questions asked about the MSC staff were as follows:

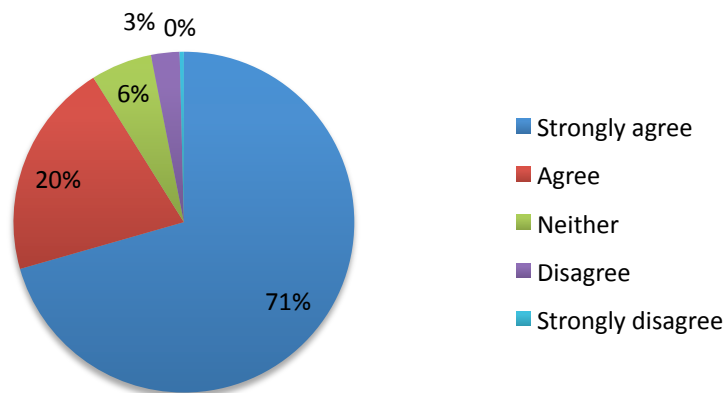
- Are they friendly and approachable;
- Have they good teaching abilities;
- Have they a good knowledge of mathematics;
- Do they help you to cope better;
- Do they motivate you to study.

**Figure 12: The MSC Staff are friendly and approachable**

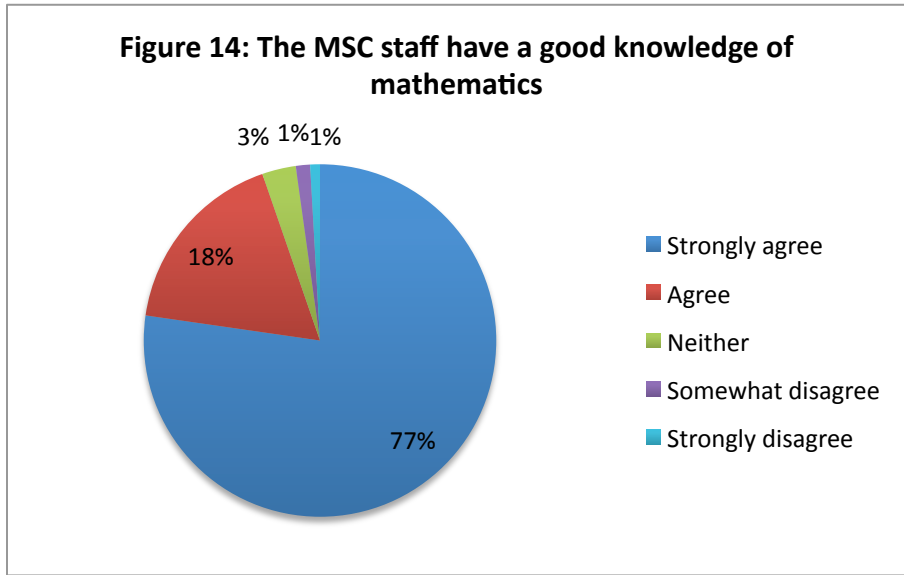


The attitude of the staff to students coming in to the MSC is very important as often those coming in for the first time are quite anxious. It is essential that they feel that they can approach the staff and not feel intimidated. The tutors are well aware of this and encourage the students to relax and explain where they are having problems. 96% of respondents an increase of 6% on last year's percentage, agreed or strongly agreed that the tutors were both friendly and approachable. A student remarked *"Friendly, open atmosphere with staff who are extremely knowledgeable in most areas of maths. Couldn't recommend it any more."* (See Section 4.02: Atmosphere in the MSC was friendly and supportive.)

**Figure 13: The MSC staff have good teaching abilities**



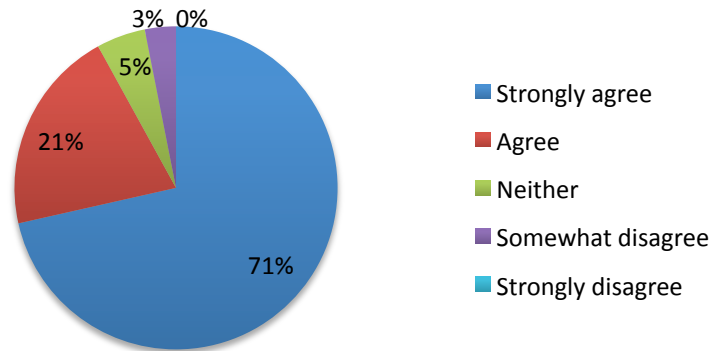
The fact that 91% of the respondents agreed or strongly agreed that the MSC staff have good teaching abilities was very encouraging. This has increased 3% over last year. The widely expressed satisfaction with the standard of tutoring is in no small measure due to the care that is taken when recruiting tutors. Not only their mathematical knowledge but their ability to communicate this knowledge is critically important. *Brilliant, I would not have passed without the MSC. Teachers are helpful.* (See Section 4.03: General high standard of tutoring.)



The tutors teaching in the MSC are mainly studying for their PhD or doing research in various mathematical areas. 95% of the respondents agreed or strongly agreed that the staff had a good knowledge of mathematics.

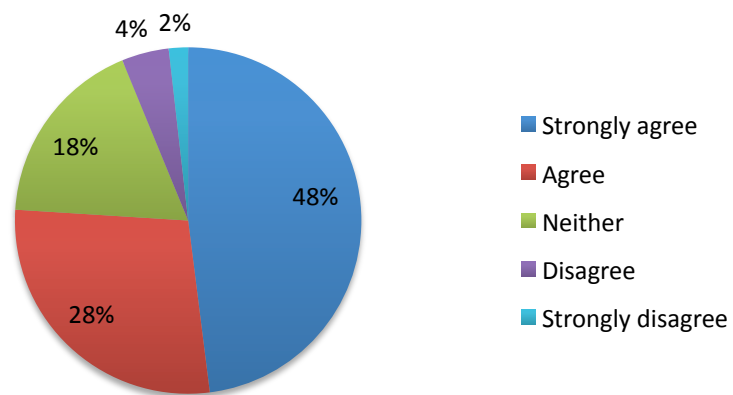
We cannot expect our tutors to be knowledgeable in all areas requiring mathematics beyond a certain level. Students come looking for advanced help in for example economics, pure mathematics, applied mathematics or statistics. At the basic level any tutor can cope but at other levels we allocate times for specific subjects. We advertise these on our website and also on our notice board outside the MSC. However students do complain that they are not aware of these different times. This year we have a new FAQ sheet prominently displayed near our check-in computer which among other facts informs students of where to look for the most suitable times to come for their particular topic. We have noticed a decrease in comments relating to the problem this year. Perhaps as tutor availability changes from semester to semester these times are also altered and this can lead to some confusion for students. But of course these specialist times are also limited by budget and increasingly by the difficulty in finding specialist tutors.

**Figure 15: The MSC staff help you cope better**



It is essential that the students do not regard the MSC as a place where they can come to avoid doing the work themselves. From the above diagram it can be seen that 92% of respondents in comparison to 84% last year agreed or strongly agreed that the MSC helped them cope better. The students coming to the MSC should get a good basic understanding of the topic and must be encouraged to develop this understanding further by working on their own and when necessary coming back to the MSC with any problems. The MSC provides example sheets with answers and some students found these useful. This was one student's comment in their evaluation. *It helped me with understanding data analysis projects and thanks to your help I got a B in my repeat exam. The handouts were useful.* Confidence in their ability is often a problem for students coming in to third level. Many students expressed the view that the MSC had given them confidence in coping with their module. For students' comments (See Section 4.12: MSC increased students' confidence.)

**Figure 16: The MSC staff motivate you to study**



This year 76% of respondents agreed or strongly agreed that it motivated them to study. This was a substantial improvement over last years value of 66%. Sometimes a student may feel that either there is so much to learn that they don't know where to start or else get lost in a specific area. Coming to the MSC will often give them the wherewithal to move on with their study. However there is no doubt that the imminent approach of examinations is a greater motivation and this is evident in the increased numbers attending at these times.



## **4. Students' descriptions of their experiences of using the MSC**

The Mathematics Support Centre (MSC) has a crucial role to play in enhancing students' knowledge of mathematics and in supporting those students who are having problems associated with mathematics. This is confirmed by the comments given by the students in the completed evaluation forms for 2012/2013. To give some indication of these we have categorised some of the comments under headings as given below. The comments were, almost without exception, very positive. Unfortunately many of their recommendations will be restricted by budget restrictions and tutor availability. To maintain authenticity we have not made any spelling or grammatical adjustments.

### **4.01 General Satisfaction**

*Great service, hope it is maintained.*

*I found the resources very user friendly and I really appreciated their approach and their assistance.*

*Very pleasant experience. It helps to break the communication barrier between students and experts.*

*The staff are approachable, amiable and above all professional. They also have the patience of saints!*

*The MSC is a fundamental facet of UCD student life for many students from all backgrounds and should stay that way. Considering the vast range of topics thrown at the MSC everyday from different disciplines they cope very well with the resources they have.*

*It's a great service provided by UCD. Well done.*

*I found it extremely helpful in sorting out the problems I had. I would strongly advise anyone with mathematical difficulties to go and I would like to thank the Support Centre for its help.*

### **4.02 Atmosphere in the MSC was friendly and supportive**

*Friendly efficient relaxed atmosphere, brilliant service, brilliant great to know it is there for help at any time.*

*Very nice people and helpful.*

*I found it a bit daunting at first but after I used the service a few times I started to feel really comfortable in there. The phd students were a great help. I hope to utilize the MSC even more this semester.*

*I found the MSC to be welcoming and helpful and I never ever felt like I was being judged. I was so glad I sought help when I got confused. I will definitely use this service again in the future when needs be.*

*Friendly, open atmosphere with staff who are extremely knowledgeable in most areas of maths. Couldn't recommend it any more.*

*It's an accessible, friendly environment to work in, with several tutors on hand to give you the help you need. In the MSC there is no such thing as a stupid question.*

#### **4.03 General high standard of tutoring**

*The MSC was great when I needed help with specific areas of my modules that I was finding difficult. The webpage was helpful because I knew when the person who could best help me would be there.*

*Really grateful, because even the smallest question will be answered, so why walk around feeling stupid when someone can refine your thoughts and click you into the the correct thought wave for a specific question. Our brains don't all work the same way and sometimes it just takes a nudge, staff are very good at directing examples into a form you can understand.*

*The Maths Support Centre is a truly valuable resource for me. I work hard for college but the MSC has helped to bring me up to the highest grades that I can get. I always feel more able to ask questions in the MSC rather than in lectures.*

*The MSC has been really helpful the staff are supportive and really helped me to grasp areas of maths i found quite difficult.*

*I found the centre staff really approachable and hugely helpful. I had looked up some online resources and tutorials but found it much more helpful to have a centre where you could go in and get help on specific topics.*

*It was a pleasant experience, the tutors all know what they are talking about and they know how to explain it to you in simple terms so it is understandable. Sometimes the language used in the lectures is difficult to understand but once it is approached in a different way it can be a lot simpler than it seems at first, which is what I found most helpful from the MSC.*

*The tutors are very friendly and really know there stuff. It's such a handy place to pop into when you're stuck on something and I go often. They try and make sure you understand why you would use such a method to solve a problem etc.*

*The MSC is extremely useful! It is comforting to know that there is an extra area of help outside of lectures and timetabled tutorials, to teach and guide you with your mathematics. At the MSC, you can ask and query exactly what is confusing you and can get the clarification you need. The staff in the MSC are very helpful and help you to learn where you are going wrong with your maths. The MSC is an extremely valuable resource!*

*Teaches you the basics before diving into tough maths.*

#### **4.04 MSC helps to reduce student stress**

*Very helpful, issues that I had spent hours trying to figure out were comprehensively solved in minutes. It spared me a lot of unnecessary stress in terms of futile study.*

*Very helpful when coming up to exams to figure out any problems I had trying to revise myself. It's a very stressful time and the support centre helped with this enormously.*

*The msc is an extremely useful resource in UCD. I have used the service every semester so far and fully intend to use it this semester also. The staff are always very friendly and welcoming and ease your nerves ... in the msc, I'm never afraid to ask a 'stupid question'.*

*The MSC is a great ... It has made studying maths easier and less stressful. Huge help! Don't know what I'd do without it.*

#### **4.05 International students**

*I personally think it is a very important service for all students. The tutors are very approachable and always ready to help. (Nigeria)*

*Very nice people and helpful. (Bulgaria)*

*Very good when not many people in the Centre. (Russian)*

*MSC saved at least a few years of my career life by helping me to learn maths. Otherwise I would have dropped out of college because I cannot afford to pay private tutor to help me with maths whole year round. Even though I didn't pass my STATS this semester due to illness and very difficult problems, I know that next semester I will definitely pass it because I will get excellent help from MSC. I am very thankful for this service UCD provides for students. (Lithuania)*

*Really nice and appropriate atmosphere and location. I love the way tutors really explain the basics first before diving in to solving the problem. The tutors are very approachable and friendly, I don't feel embarrassed at all for asking questions I couldn't ask in lectures. (Filipino)*

#### **4.06 MSC assisted the retention of students**

*I would have been lost without the MSC in college and may not have been able to finish my degree. Thanks a million for all your help in all the various modules. It was excellent.*

*Very helpful would not be in my final year without the MSC.*

*Don't get rid of the MSC. I would not have passed without it.*

*I found the MSC very helpful as the maths in my module was stuff I had never really covered and I found the lectures moved at a fast pace. The MSC were able to explain it all very easily to me and significantly helped me in understanding the material and passing the module.*

*If I had not used the MSC last semester I would not be confident enough to be studying Engineering Maths now. They have instilled a belief in myself and I find myself looking forward to their help again this semester. They are very cordial, approachable and their knowledge of Mathematics is not only astounding but inspirational.*

*I had a very low level of maths to start off with and very little time to catch up. When I went there I was embarrassed to let them know how little I knew and as a result spent the first couple of sessions nodding along to things I didn't really understand but their patience and understanding I soon found the confidence to vocalize what I didn't know and ask questions. If it were not for the maths support center there is no way I would have passed my exams.*

*Very helpful the only reason I passed my repeat.*

*The MSC is a great place. The staff are incredibly friendly and helpful. They are encouraging and very patient. I passed two of my modules in the previous semester thanks to the MSC. Extremely important. Without the MSC I would have floundered in maths last year. I owe them gratitude for their help and look forward to dropping in again next year.*

*The staff were more than friendly and very helpful. I would have failed two of my modules without the MSC.*

*It was so helpful I would have failed without their help.*

#### **4.07 Usage of MSC by programmes throughout UCD**

*I found it very helpful. I think it's great that it doesn't cost anything to use the msc. (Forestry)*

*MSC in two words is GOD SENT. (Social Science)*

*MSC approach maths in an intuitive manner which suits me well. (Human Nutrition)*

*Staff were helpful and friendly. Going in with some one from my course made it easier to drop in. (Computer Science)*

*Its an accessible, friendly environment to work in, with several tutors on hand to give you the help you need. In the MSC there is no such thing as a stupid question. (Commerce)*

*They are fantastic at explaining and further understanding only reason I passed linear algebra. No judgement at how little I knew. (Biomedical, Health and Life Sciences)*

*Very beneficial to me. I needed help with the stats aspect of the final year project in my course and without the MSC I would have no idea what test was appropriate or if I was performing the test correctly. (Radiology)*

*The MSC is a great place. The Staff are incredibly friendly and helpful. They are encouraging and very patient. I passed 2 of my modules in the previous semester thanks to the MSC. (Structural Engineering and Architecture)*

*Very helpful and friendly staff, unfortunately due to the specific nature of maths it can be hard to get help and answers for all the questions that i have. But overall I have found the MSC to be an invaluable resource in my studies. (Economics and Finance)*

*Using the centre is very laidback and you are never made to feel embarrassed by your difficulty with maths. They can help in all areas of maths with which you need help and are very good at explaining it clearly with you. They also encourage you to do more examples so they can ensure that you have learned (Animal Science Equine)*

*I found the MSC staff very helpful and approachable with any maths problems I had. (Arts)*

*Great to learn maths in smaller groups as I think its hard to learn maths in big lectures with no tutorials. (Economics)*

*Always welcoming friendly staff more than willing to help. I enjoyed going to the MSC. (Agricultural Science, Engineering Technology)*

#### **4.08 Mature Students and Access Students**

*MSC really helped me to get through Statistics I for Psychology... Please keep it going - I will need it over the next 2 years.*

*Really grateful, because even the smallest question will be answered, so why walk around feeling stupid when someone can refine your thoughts and click you into the the correct thought wave for a specific question. Our brains don't all work the same way and sometimes it just takes a nudge, staff are very good at directing examples into a form you can understand.*

*This is my second year using the centre and I find everybody so helpful and accomodating, they have patience to repeat it if you dont grasp it first hand ...*

*I would have been lost without the Maths Support Centre and am so grateful for all of the help I received. Maths is an awful lot clearer to me now and I feel a lot more comfortable and confident in my class.*

*The MSC is an invaluable service. Having access to the kind of assistance it provides is of huge help to my studies. Thank you very much!*

*I found the MSC staff very helpful and approachable with any maths problems I had.*

*The MSC is not a fallback in case you miss many classes. It is to reinforce your learning and as long as this is clear, I think all students would be happy with the results.*

#### **4.09 Hot Topics**

*There was a long time to wait when I was there, but the tutorials they did for Data Analysis was awesome.*

*Very helpful especially hot topic sessions.*

*It a really good environment to work in. The staff are really helpful and supportive. It was really beneficial when there was hot topics on for the module I was doing.*

*The MSC also helped by providing hot topic sessions on difficult topics in our course. I found these helpful though a little slow moving however they helped to refresh my mind about certain types of techniques which we were assumed to know on our course.*

*I studied Maths in High School in Italy and I always found the subject extremely hard to understand. Since using the Maths Support Centre and in general by doing individual studying I was able to compensate some aspects such as Integration, Trigonometry and Probability. I found the help sessions prior to my final exam ... extremely helpful ... I would recommend to any student to visit the Maths Support Centre if they are struggling with a topic and I definitely think that this service is an asset for UCD. Keep up the excellent work!*

#### **4.10 Students benefitted from one-on-one help**

*I was struggling with some of my maths in mechanical engineering. I want a resource that allowed me to go in and express my queries and doubts. MSC is exactly that and I found it extremely beneficial. I definitely will be returning again.*

*Helpful, one on one help makes it so much easier.*

*Genuinely a friendly place to stop in and ask the stupid questions that you can't ask anywhere else, also it provides one-on-one tutoring I wouldn't be able to afford otherwise.*

#### **4.11 MSC increased students' understanding and encouraged independent learning**

*I was very confused about vectors and all of that kind of stuff in my course (I was studying linear algebra at the time) as most of my class had taken applied maths and/or physics for the LC I was way behind them and didn't understand anything. I am quite good at maths and would not need to go to the centre regularly but after 2 or 3 visits I was able to work everything out and had a much better understanding of the module and was much more confident.*

*Very helpful, really helped me understand what was going on, not just how to do the questions.*

*Very helpful and friendly. I got help with key questions and understood them completely after the session.*

*Extremely helpful staff. I found I have a much better understanding of maths after attending the MSC.*

*I have used the MSC over the past two years in college. It was of enormous benefit to me. Not only did I pass the modules I had sought help with, I got good grades in them and actually began to enjoy doing the maths involved. The staff at the MSC are extremely helpful and patient ... the MSC is an amazing service.*

*I found the centre very useful and worthwhile tool that college offers to its student, which is invaluable to our learning experience and helping us get (to) that next level. It increases confidence and competence through hard work and motivation.*

#### **4.12 MSC increased student's confidence**

Great. Felt good at maths for the first time ever!!!

*Without the Maths Support Centre I would never have passed my algebra module, I have never understood maths before in my life and the people in the maths support centre made me so confident in what I was doing I had people asking me what the answer was for the first time in my life. In my opinion the maths support centre is one of the most beneficial resources in UCD and more people should start using it. Unfortunately I only started going in second year but if I had used it sooner I'm sure other grades would have been much better and I would have been a lot less stressed in first year. Thanks for everything, I can't tell you how much I appreciate it.*

*After the help I received in the MSC I felt confident in approaching my exam sample questions and no problem returning to ask further questions.*

#### **4.13 Size of room, opening hours, number of tutors and resulting concerns**

*The staff at the MSC were always very helpful and encouraging. They are doing a great job as they seem under pressure to service the amount of people who are seeking their help.*

*MSC is really under staffed, sometimes you have to wait for more than an hour before someone can help you and often you don't have an hour. MSC though really friendly and don't mind that you don't understand and try to help you as best as they can.*

*Excellent help, everyone very good but can get very busy at times and don't get same attention.*

*It really is such a useful place to have, especially since you do not have to book a session, you can just drop in. The tutors are very helpful. Sometimes I felt another tutor would have been good as it could get very busy at times and if you don't have long in between classes, you might not get anything done. That is my only criticism. I will definitely be going again this semester with any difficulties I have.*

#### **4.14 Group room and new location**

*Really nice and appropriate atmosphere and location. I loved the way tutors really explain the basics first before diving into solving the problem.*

*Non judgmental atmosphere - excellent tutors (knowledgeable and relaxed pace of learning) - excellent new location. ...*

*The set-up is good. I think that often students present in the centre can help one-another so seating students studying the same topic can be an efficient way of teaching when the centre is full.*

*I attended in the last 2 weeks up to this semester exams after failing my module in last semester. I felt I needed every bit of help I could get. This was a great way of working with other students to learn and revise, while being able to depend on a talented team of staff that could help with any brick walls I came across.*

#### **4.15 MSC raises the level of mathematics in UCD**

*It was extremely helpful and enjoyable. I learned so much in the MSC. I was quite clueless initially and after about four visits to the MSC i got an A in my final grade for my maths module. Thank you for your help. I could not have acheived this grade without the help from the MSC.*

*I do not find the maths in my course particularly challenging yet it was very useful to use the MSC to help me with one section of my notes which were confusing. In general I think the MSC is a fantastic idea as many students in my course really struggle with maths and this is an excellent, practical way to help them out.*

*I've always struggled with integration, honestly it's the only part of maths that I've ever had a problem with. I've taken 2 maths electives this year along with one module as part of my course, so my standard of maths is high. I got an A and an A+ before Christmas, but there was no integration in either of those modules. My results on the 7th of June will tell a lot about the help I got from MSC, but I felt the exam went beautifully. Thanks for the help, even throughout the class, people have said MSC was very helpful.*

#### **4.16 Students mention their ability to ask what they refer to as *silly or stupid questions* in the MSC**

*The msc is an extremely useful resource in UCD. I have used the service every semester so far and fully intend to use it this semester also. The staff are always very friendly and welcoming and ease your nerves. In particular, I found Anthony Brown to be very helpful and enthusiastic whenever I used the msc. In the msc, I'm never afraid to ask a 'stupid question'.*

*It's a brilliant place to get help if you don't understand something. The staff are very helpful and make you feel like there's no such thing as a silly question. They understand that many students have problems understanding maths and don't make you feel embarrassed about it. Because of the help from MSC, I did lot better than I expected in all my core maths modules in Science. Thank you for your help!*

*Nuala and the other tutors are always incredibly patient; no matter how stupid the questions that are posed to them, or how slow the candidate is in arriving at a eureka moment; if he does at all!!*





## 5. Conclusions

- The quality of service provided by the MSC was formally evaluated in 2012/2013. Each student who attended was emailed and asked to complete the MSC evaluation form. The number of returns were 231. The results were very positive.
- Students show an extremely high level of satisfaction with the services provided but have expressed dissatisfaction with the provision of a sufficient number of tutors.
- Attendance at the MSC (4750 visits) has increased by 7.93% in 2012/2013 compared to 2011/2012. Average time spent by a student increased from 82 minutes to 97 minutes. If these upward trends continue they will most likely have a negative impact on services provided by the MSC.
- The attendance in the MSC of students taking level one modules has decreased significantly over the last two years. Perhaps this is the result of students coming in at higher entry levels. This year over 80% of students entering first year Science and over 60% of those entering first Commerce had taken the Honours Level LC Mathematics paper. Has the introduction of Bonus points for Higher Level LC Mathematics paper been an influence in this entry level? A further reason for non-attendance of first years may be, the unsuitability of the location of the MSC and the difficulty that first years in particular, may have in finding the venue. However neither of these may be the cause. Reasons for this decrease need to be investigated and if necessary a resolution found.
- The MSC database is now entering its fifth year of data collection. This data is a valuable source of information for research purposes. The present manager retires in September 2013 and has been awarded a PhD Research Demonstratorship under Dr Maria Meehan. The topic for her research is “identifying university students’ mathematical “trouble-spots” and developing effective supports: an analysis of Maths Support Centre data.”
- The change in location to the Library Link in the James Joyce Library has been a positive move. After the MSC re-location to the library not only did we observe an increase in numbers attending but we also noted an increase in attendance by students studying modules other than those with an ACM/MATH/MST/STAT code. These non-mathematical modules represented 61% of the total compared to 48% for the same time period in the previous year.
- The Library has agreed to extend our occupation of the Library Link, for our core hours of drop-in, for a further year. A six month review of this agreement will take place in January. Hot Topics if necessary will take place elsewhere.
- A new manager will be appointed in September 2013. The Library does not wish that the manager’s office continue to be situated in the Library Link.
- Provision of a suitable permanent venue in a timely manner will be the main restriction to maintaining the professional operation of the MSC and will certainly curtail the further growth of the MSC.
- The MSC is currently fulfilling its stated aims.



## 6. Recommendations

- The fact that there is a decrease in Level one students' attendance again this year may be a cause for concern. A survey of level one mathematics module students should be undertaken in the third or fourth week of the first semester to investigate their reasons for non-attendance. Where it is possible to resolve these issues they should be acted on. If the answer is shown to be that they feel that they have no need of help then the increase in numbers attending in second year and third year may need to be examined.
- The ability of the MSC to cater not only for the increase in numbers but also the increase in length of individual student visits is now a concern for the Centre.
- The increasing length of visit by a student, in particular, where it involves waiting time for a tutor needs to be addressed. The obvious answer is to provide extra tutors. There is of course a financial restriction to this solution. So a new approach to filling this waiting time needs to be developed. The research to be undertaken by the present manager should result in a more imaginative way to resolve this problem. For example the MSC could develop short videos on frequently asked topics that students could study while waiting for a tutor.
- Hot Topic sessions are an important approach to fulfilling the learning needs of a large group as opposed to one-on-one teaching. Increasing the number of these sessions early in the semester should be employed to reduce the call on tutors for individual tuition. An unexpected further advantage of these sessions is that students often arrive at the MSC in small groups as a result of working together in the Hot Topic session.
- A new office needs to be provided for the manager, separate from the Library Link but close by. This office should be furnished with a computer and printer. Records and confidential files should be stored here. This room will also act as a private area for one-on-one meetings with tutors or students as required.
- Relationships with the Library should be fostered. Our on-going concern is the provision of a permanent venue of sufficient size, located in an area readily accessible to the students. It is essential that planning ahead for a suitable location is maintained as a priority.
- Continued analysis of the pattern of student attendance and the mathematical content of the sessions tutored should be employed. This should allow for better time management and more cost effective working arrangements to be implemented in future years.
- Advertising the benefits of the MSC to all relevant bodies is critical for its survival. Frequent communication with students, lecturers and student advisors is recommended. The present good relationships with the Student Union, the UCD Library, the Irish Maths Support Network and similar international associations, are important for the future of the MSC and should be further developed.
- Information is now automatically stored on databases. These must be carefully maintained and updated as necessary. Full use should be made of these to facilitate research and further improvement in the work of the MSC.
- Staff should continue to promote and develop the MSC as a centre of excellence.
- Evaluation of the quality of service provided by the MSC should continue to occur on an annual basis.

