University College Dublin
Maths Support Centre

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Annual Report 2017/18

Contents

New MSC banner hanging from Library overpass

1 Executive Summary

Key highlights of 2017/18 at the UCD MSC:

- The number of annual visits was 5,707, an increase of 9% on previous year.

- The average time spent with a tutor improved from 16.2 minutes in 2015/16 to 22.6 minutes in 2017/18, despite the increase in total student visits.

- The median wait time to see a MSC tutor has significantly improved from 29.2 minutes (2015/16) to 13.6 minutes (2016/17) to 6.7 minutes in 2017/18, *without* an increase in tutor expenditure.

- Improvements were made to the live feed on the MSC website indicating the expected wait time for a student to be seen by a tutor and tutors' strengths.

- Increased the weekly opening hours from 39 hours to 41 by opening until 7.30pm each night of Monday through Thursday.

- In semester two the MSC received visits from students registered to 54 modules delivered in semester one, i.e. repeat/resit student visits.

- There were 4,002 one-on-one MSC sessions and 560 MSC sessions with two or more students.

- The percentage of first time visitors to the MSC in the revision weeks of semester one and two was 6% and 3% respectively.

- We discontinued the MSC service at the Smurfit School of Business as it was deemed to fall outside of the remit of the MSC policy of assisting students registered to level 0-2 modules only.

- We renovated the MSC space to include whiteboard surface paint on two walls, mathematical art manifestations on the glass, improved air ventilation, and a large canvas banner was purchased and hung from the concrete overpass outside the library.

- Experimented with Saturday openings in the run up to examination periods.

- Provided five weekly dedicated 2-hour slots for HEAR, DARE, Mature, International, QQI/FET and Access students.

- Extended the MSC-Module Coordinator Partnership Agreement to more schools in UCD.

- Hosted two CPD events for tutors on mathematics and statistics education.

In the 2017/18 academic year the UCD Maths Support Centre (MSC) received 5,707 student visits, the largest number of annual visits in its 14-year history. These visits corresponded to 1,326 unique students studying 165 distinct modules representing all six colleges of the university. The MSC increased its opening hours from 39 hours per week in 2017/18 to 41 hours to include late night openings from 6-7.30pm each night Monday to Thursday. We opened for drop-in support for a total of 25 weeks of the academic year. The opening hours for both semesters were Monday to Thursday 10am-7.30pm and Friday 10am-1pm.

In August and September 2017 the MSC ran 14 separate maths support sessions for HEAR (Higher Education Access Route), DARE (Disability Access Route to Education), Access (Access to Science, Engineering and Agriculture), QQI/FET (Further Education and Training - formerly FETAC) and Mature student cohorts, supporting over 350 students in the process.

In May and June of 2018 the MSC assisted 61 Leaving Certificate students from DEIS (Delivering Equality of Opportunity in Schools) designated schools with their impending state mathematics examinations, the largest number of Leaving Certificate students supported through this programme since its inception in 2014.

The MSC facilitated over 100 hours of dedicated one-to-one support, which took place outside of the MSC, with students registered to the Access and Lifelong Learning Disability Support Service.

Throughout 2017/18 Scoilnet and the MSC management collated the uploading of 142 mathematics and statistics videos and accompanying worksheets, developed in the MSC, to their website www.scoilnet.ie. Scoilnet is the Department of Education and Skills official portal for Irish primary and post-primary education, and all resources on Scoilnet are tagged to the NCCA curriculum and specifications. These videos were created by MSC tutors through a grant from the UCD Access and Lifelong Learning's Future You Mentoring programme, which was developed with the support of Citi Foundation. The videos cover four strands of the Leaving Certificate mathematics curriculum: Algebra (35 videos), Functions and Calculus (27 videos), Geometry and Trigonometry (44 videos), Statistics and Probability (37 videos).

Also in 2017/18, the UCD MSC hosted visitors from Queens University Belfast, Dun Laoghaire Institute of Art and Design, Dundalk IT and the American University in Armenia, all of whom were interested in either setting up a maths support centre or

in the Armenian case enhancing their existing mathematics support provision. The MSC manager presented at the academic advising conference NACADA, held in UCD in July 2018, as well as refereeing paper submissions and chairing sessions at the UK's national mathematics and statistics support conference, CETL-MSOR, in September 2018 at the University of Glasgow.

The National Forum for the Enhancement of Teaching and Learning in Higher Education invited the MSC management to their headquarters in Dawson Street in 2018 to demonstrate the MSC feedback system as it aligns well with their enhancement theme of assessment for, as, and of, learning.

For 2018/19, the priorities include strengthening the governance and oversight of the MSC, upgrading the MSC website, the further roll out and successful implementation of the MSC-Module Coordinator Partnership to schools beyond the School of Mathematics and Statistics, as well as further improvements to the feedback system for lecturers and students from whose modules the MSC receive student visits.

2 Introduction

The Maths Support Centre (MSC) at UCD, offers free, non-judgmental academic support in mathematics and statistics for any UCD student registered to a level 0, 1 or 2 module. It is a drop-in service (not appointment based) and is staffed by 21 enthusiastic, skilled and welcoming tutors. The MSC, now in its 15th year of operation, is an established and genuinely university-wide academic support unit offering drop-in support that is centrally and neutrally located in the James Joyce Library. The first three years of the UCD MSC saw an average of 480 visits per year while the last three years have experienced an average of 5,512 visits per year. The following sections describe the activities of the UCD MSC for 2017/18. Where appropriate MSC student visitor feedback comments are used to complement sections.

3 Governance and Oversight of the MSC

For the 2017/18 academic year the MSC Oversight Committee consisted of Maria Meehan (Chair), Brendan Murphy, Head of School of Mathematics and Statistics (SMS), Áine Galvin, Director of UCD Teaching and Learning, Ted Cox and Andrew Parnell from the Applied and Computational Mathematics, and Statistics subjects

of SMS respectively. The committee met on September 26th 2017.

Separate regular meetings with MSC tutors and management are held throughout both semesters. The annual report is sent to the Registrar's office each year where it is further disseminated to the University's Management Team Student Experience Group. The report is also sent to the Dean of Students, the Dean of Undergraduate Students, the Librarian, relevant Undergraduate Deans, relevant Heads of School, the Director of Access and Lifelong Learning, the Head of the Student Advisers Group, relevant Academic Student Advisors, the Students Union Undergraduate Education Officer and the SMS Office Manager. See recommendation 1 from Section 20.2 below for further MSC Oversight information.

4   The Year in Numbers

The number of recorded visits to the MSC in 2017/18 was 5,707. Semester one visits totalled 3,310, while our semester two visits were up from 1,975 in 2016/17 to 2,397 this year. These visits equate to 1,326 distinct students receiving support – 1,023 students in semester one and 586 in semester two - with 283 students visiting in both semester 1 and 2.

The annual number of recorded visits to the MSC for the past thirteen years is given in Figure 1 below. In August and early September of 2017 the MSC supported 619 visits from 361 distinct students on the HEAR (Higher Education Access Route), DARE (Disability Access Route to Education), Access (Access to Science, Engineering & Agriculture), QQI/FET (Quality and Qualifications Ireland/Further Education Training, formerly FETAC), International and Mature route entries to UCD. **These visits are not recorded** on the MSC database as these students do not yet have their UCD student numbers at this time and so cannot log in to our system. Thus Figure 1 relates only to the number of recorded visits/visitors to the MSC each year during the teaching and revision periods of each semester.
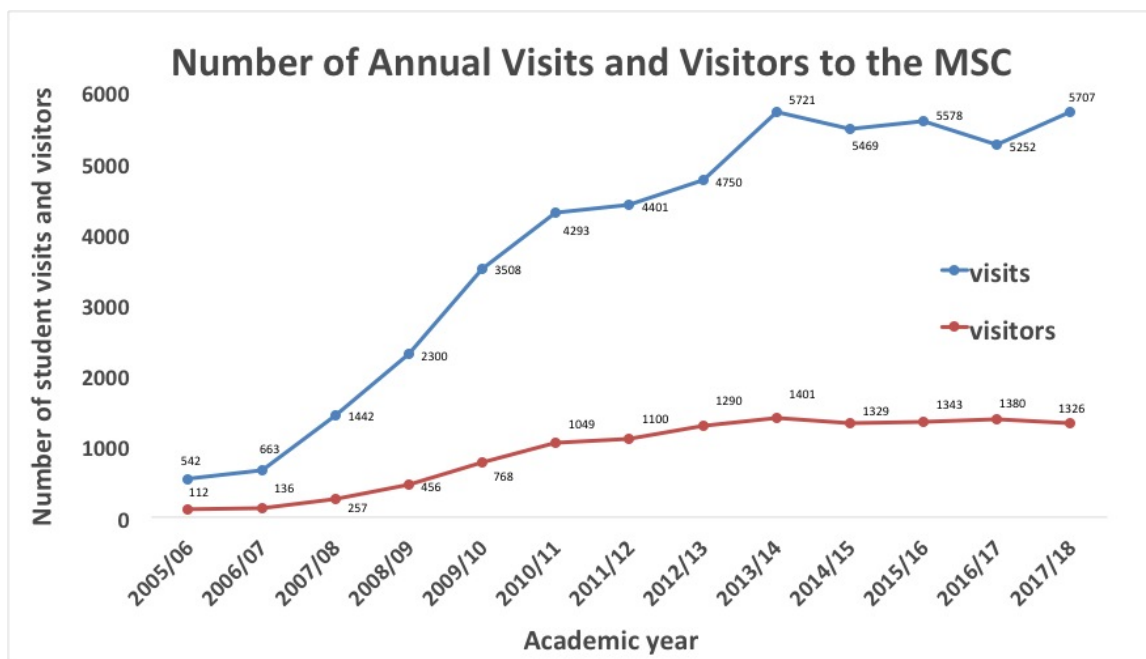
Figure 1: Annual number of visits and visitors to the MSC from 2005 to 2018

5   How MSC Data is Recorded

In 2017/18 the MSC further developed its data capture process. The MSC data management software system links directly to the UCD student records database so that an accurate record of each student's registration and MSC session details can be captured. This means the data collected at the MSC is robust and accurate allowing for detailed analysis. The visiting student enters his/her student number at a terminal upon log in and then he/she is given a place in the queue (displayed on the centre's projector screen) by the automated process. The feedback from each student visit is then anonymously recorded (with the consent of the visiting student) by the attending tutor(s) and uploaded in real time to the MSC database. Module Coordinators and lecturers have access to the MSC feedback for their respective module(s) and this feedback is also sent to them each Friday afternoon via an automated email. This process has proven an effective source of feedback for lecturing staff, MSC tutoring staff and management. With the help of MSC tutors a short video has been produced explaining the MSC feedback system from the perspectives of the student visitor, the MSC tutor and the module lecturer, available at http://www.ucd.ie/msc/mscvideos/

6   Wait Times to see a MSC tutor

For the past three years the median wait time to see a MSC tutor has improved from 29.2 minutes (2015/16) to 13.6 minutes (2016/17) to **6.7 minutes** in 2017/18 without an increase in tutor expenditure. These improvements are largely due to the implementation of a forecast model based on both historic data and real-time wait durations taken live from the MSC queue, which have allowed us to predict peak times so as to increase staff levels appropriately.

The *time spent with a tutor* statistic has greatly improved also, from 16.2 minutes in 2015/16 to 21.4 minutes in 2016/17 to **22.6 minutes** this year. Figure 2 below shows the quartile distribution for wait times e.g. 50% of students waited 7 minutes or less to see a tutor. Figure 3 displays a histogram of semester one wait times and shows that in excess of 1,750 visitors (or 53% of all semester one visits) waited at most 10 minutes to be seen by an MSC tutor. Similarly Figure 4 shows that over 1,300 visits (or 54% of all semester two visits) waited 10 minutes or less.

These quartile figures include all recorded visits, however, the wait-time data show that 4.6% of values (over 100 wait times, in each semester) are greater than 60 minutes and so the 60-minute mark is a natural cut-off as we know from experience that students don't tend to stay waiting in the MSC after a certain point. Many such recorded wait times are due to (a) the student logged in, left before they were seen and the tutors on duty noticed this later, or (b) the tutor forgot to start the session with a student at the appropriate time. When we remove all wait times above 60 minutes (see Figure 5) we get a more realistic picture of the true wait times. Hence, to mitigate these outliers, the median is a better estimate for the average wait time a student spends to see a MSC tutor, and it equals 6.7 minutes.
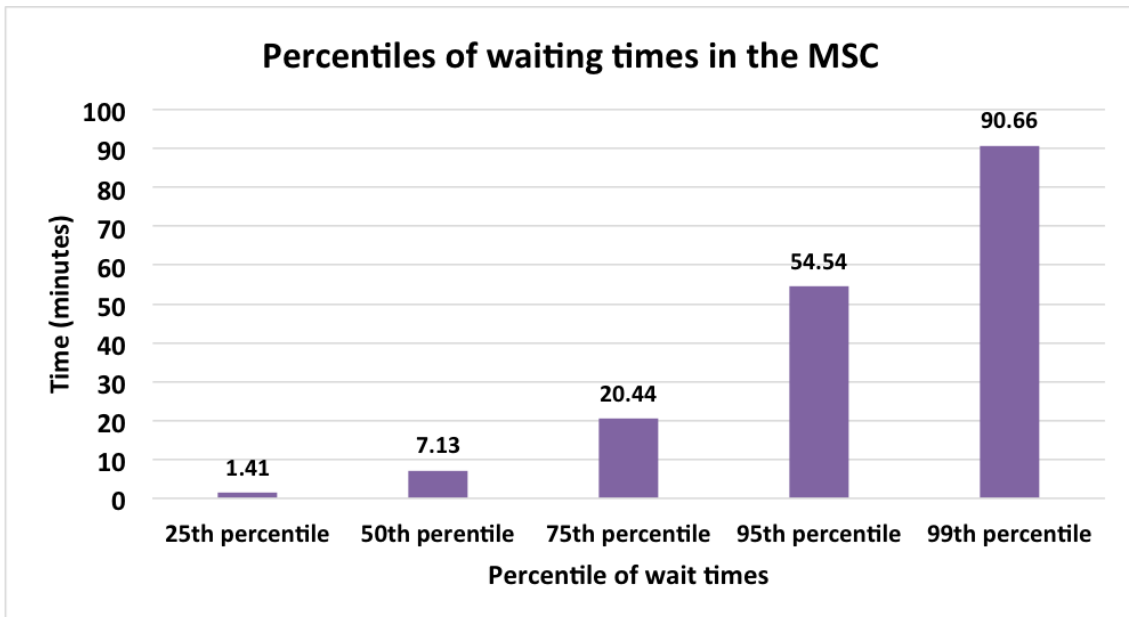
Figure 2: Wait time to see MSC tutor in percentiles for 2017/18

Figure 3: Wait time histogram for Semester 1 2017/18

Histogram of Semester 2 waiting times
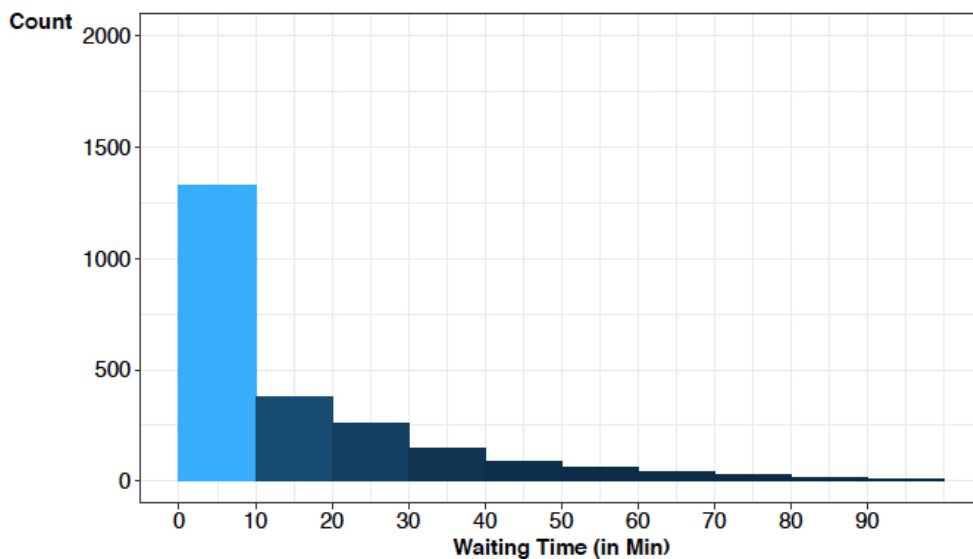
Figure 4: Wait time histogram for Semester 2 2017/18

Semester 1 waiting times

```
##    Min. 1st Qu. Median   Mean 3rd Qu.   Max.
##    0.10    1.40   6.90  12.63   19.10  60.00
```

Semester 2 waiting times

```
##    Min. 1st Qu. Median   Mean 3rd Qu.   Max.
##    0.00    1.40   6.60  12.55   19.70  59.90
```

Semester 1 Density Plot
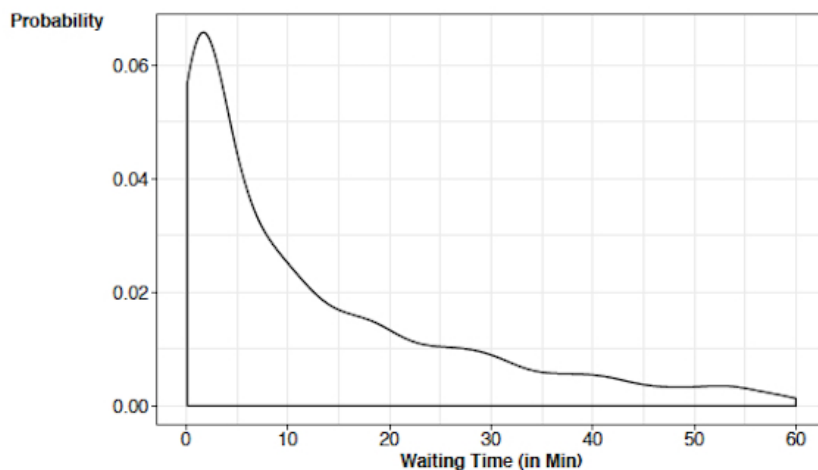
Figure 5: > 60-minute Wait time exclusion statistics for 2017/18

The addition of the *expected time to see next tutor* display on the large projector screen in the MSC space has also helped MSC visitors. Since September 2017 the MSC has implemented a live feed on the MSC website and on the projector in the MSC which displays (i) the number of students curently in the MSC queue, (ii) the number of tutors on duty and their mathematical expertise and (iii) the expected wait time to see a tutor in minutes. Thus a student not located in the library can check online if they are likely to get sufficient time with a tutor before their next appointment.


Maths Support Centre **10:47:57**

Tutors on Duty		
Tutor	ACM	MATHS
Jack O Connor	✔	✔
Kevin Sewell	✔	✔
Silas O Toole	✔	✔

Ticket	Student Name	Time	Ticket	Student Name	Time	Ticket	Student Name	Time

EXPECTED WAIT TIME: 1.5 MINUTES

Figure 6: **Tutors on duty** & **Time to see next tutor** graphic displayed in MSC

7 Student Session Lengths and Students per Session

The average time spent with a tutor (excluding the time spent paused between tutors) for semester one was 22.63 minutes while in semester two the time was 16.51 minutes. Table 1 below shows a table of the average time duration with an MSC tutor for the more common module visits by subject and stage, with the number of tutorial sessions in brackets e.g. STAT1 denotes students in stage 1 taking a statistics module, for which there were 20 (83) MSC tuition sessions in semester one (two). The top section of the table refers to modules delivered by SMS and the bottom section describes modules taught outside of this school.

"The fact that there are tutors for specific topics like calculus or statistics is very good as tutors are more enthusiastic about their own fields and the teaching is more expert."

	ACM1	ACM2	MATH0	MATH1	MATH2	MST0	MST1	MST2	STAT1	STAT2
SEM 1	14.5 (112)	16.2 (153)	26.5 (103)	20.6 (1,129)	15.5 (356)	30.8 (15)	24.2 (130)	18.8 (88)	15.2 (20)	79 (121)
SEM 2	23.1 (153)	14.5 (138)	32.5 (50)	20.5 (492)	16.7 (199)	45.0 (2)	17.0 (160)	18.2 (278)	20.9 (83)	13.1 (179)
	ECON1	ECON2	PHYC1	PHYC2	FOR2	MIS1	MIS2			
SEM 1	13.2 (22)	88.7 (45)	17.4 (56)	28.0 (28)	18.7 (59)	13.1 (67)	16.2 (44)			
SEM 2	10.9 (21)	9.1 (9)	22.4 (49)	15.0 (10)	-	-	-			

Table 1: Time duration with MSC tutor by subject and level

While the majority (87%) of MSC sessions are one-on-one sessions, where we define a session to be an interaction between a tutor and a student or students, there were 560 sessions with two or more students. These support sessions with two or more students demonstrate the popularity of this small-group peer support approach to learning, a trend we see increasing each year. The 23 sessions with 7 or more students represent "Hot Topics" (tutorial sessions dedicated to a particular topic of difficulty as identified by students and/or their lecturer) and were not held during regular MSC drop-in hours - see Figure 7 below. These targeted sessions allow the MSC to run more efficiently and effectively. On average an MSC tutor saw 1.25 students per session.
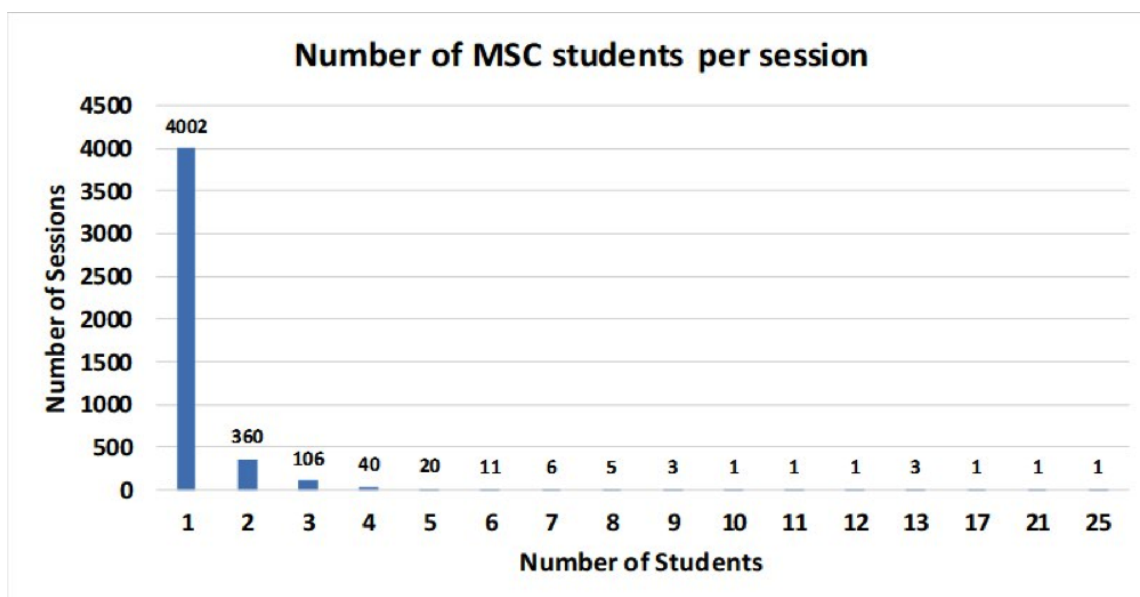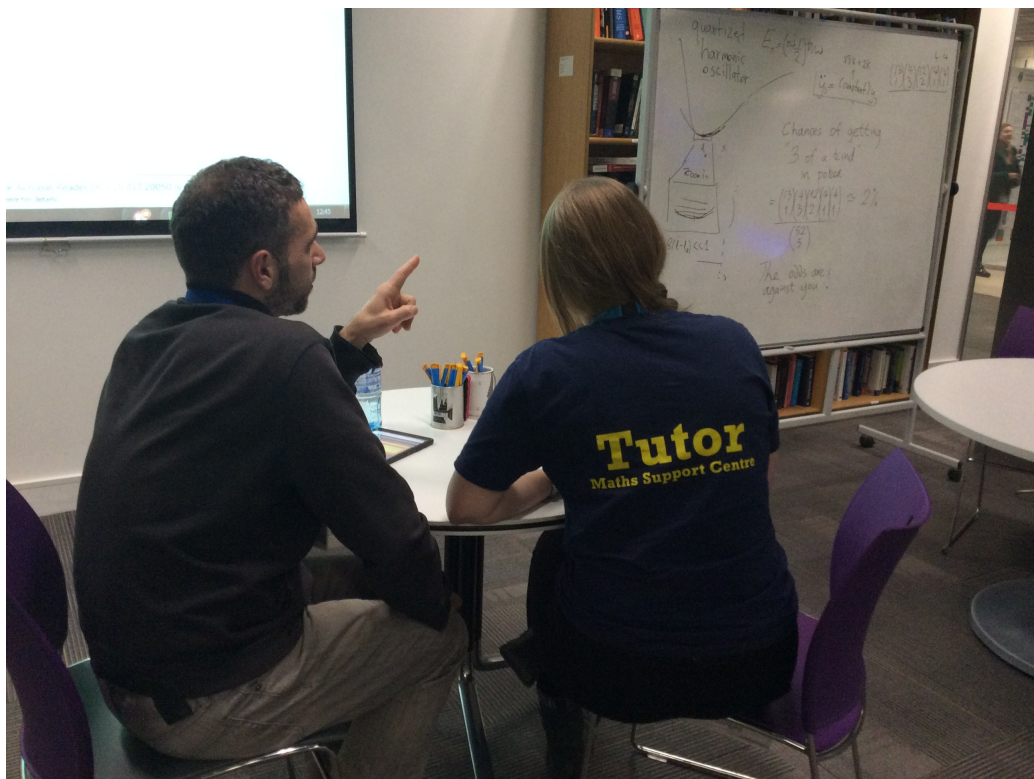

Figure 7: Number of students per MSC session in 2017/18

One-on-one tuition at the MSC - still the most popular form of support

8   Student Return Rate and Peer Support

Some 5,227 (or 91.6%) of all MSC visits were return visits with the median number of visits per student being two and the mean number of visits per student being 4.3 - see Figure 8 below. A recent piece of research from the DCU MSC [Jacob and Ni Fhloinn, 2018] suggested that students who visit the MSC 15 times or more are almost 14 times more likely to pass their module than those who didn't visit the MSC at all.

Jacob, M., Ni Fhloinn, E. (2018). A quantitative, longitudinal analysis of the impact of mathematics support in an Irish university. *Teaching Mathematics and its Applications.*

"A major struggle with a problem became as clear as day with thanks to the tutors in the MSC. Each time I visited one or occasionally two tutors would be on hand to help with the initial dilemma and would continue to check up while I attempted other questions. I am very thankful to have had the help of these dedicated tutors".
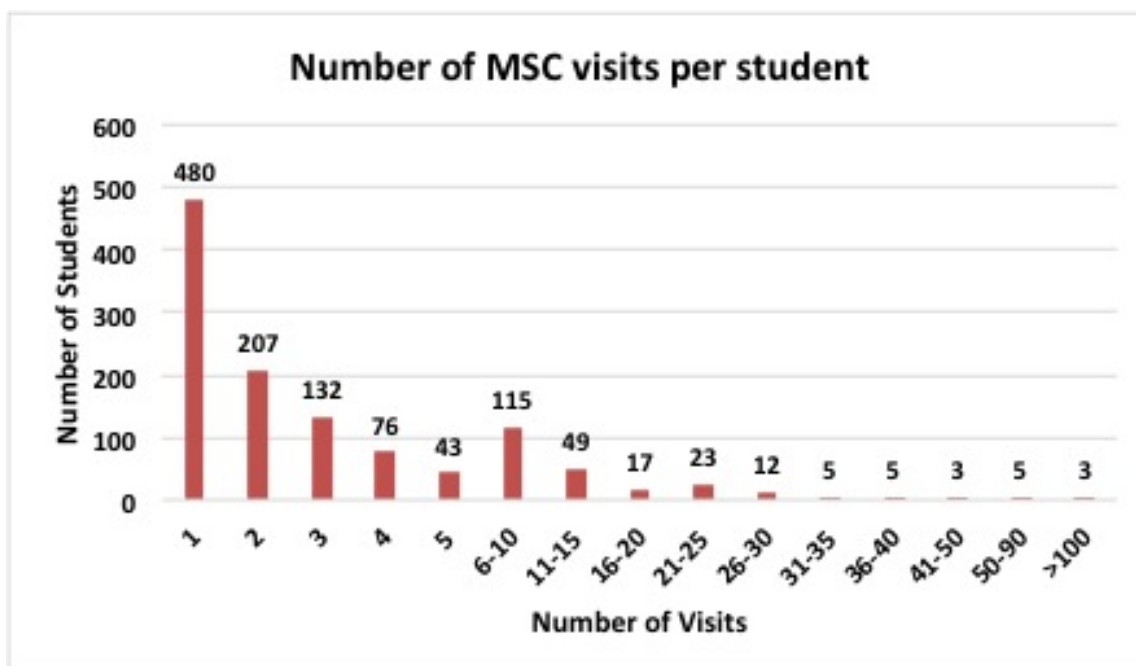
Figure 8: Number of MSC visits per student

9   MSC Visits by the Week

The number of MSC visits by week is given in Figures 9 and 10. As we can see there are no quiet weeks in the MSC (apart from week 1 of semester 1 when the MSC opens for two days only), with 267 weekly visits on average for semester one (excluding week 1) and 198 weekly visits, on average, for semester two. This year the number of visits during revision weeks was 560 (331 in semester one and 229 in semester two), accounting for 9.8% of all visits. As usual there is a peak in week 7 of both semesters coinciding with midterm examinations and multiple continuous assessment due dates, with a slight lull the following week (for both terms) before picking up again to peak attendances in weeks 10-13 of both terms. As usual semester one is the busier semester for the MSC and hence over 60% of the tutor expenditure budget is used in semester one.

"The tutors were fantastic! Can't rate them highly enough. It can be a daunting task when you're close to being clueless in maths but they helped me immensely at the start of the year, thank you".
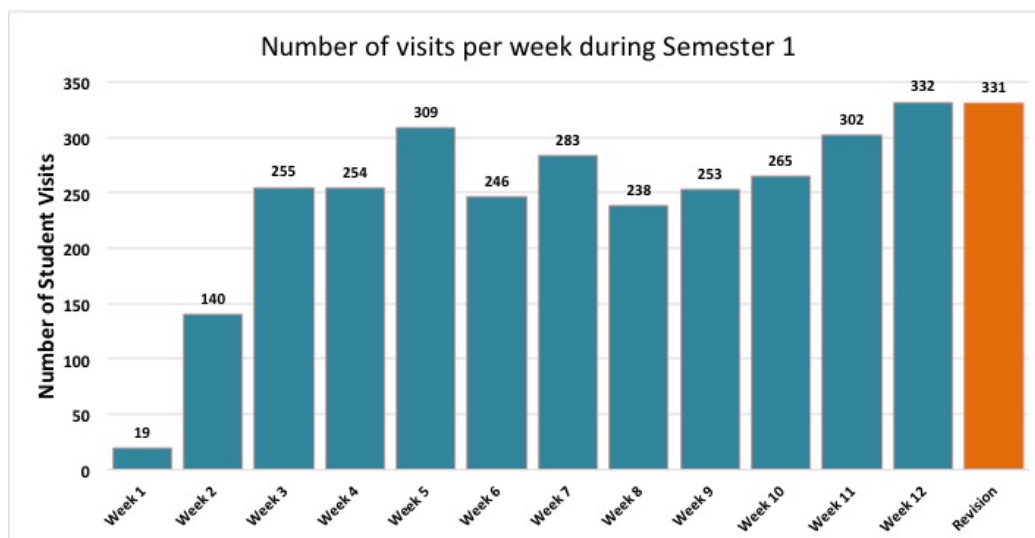
Figure 9: Number of visits per week to MSC for semester one of 2017/18
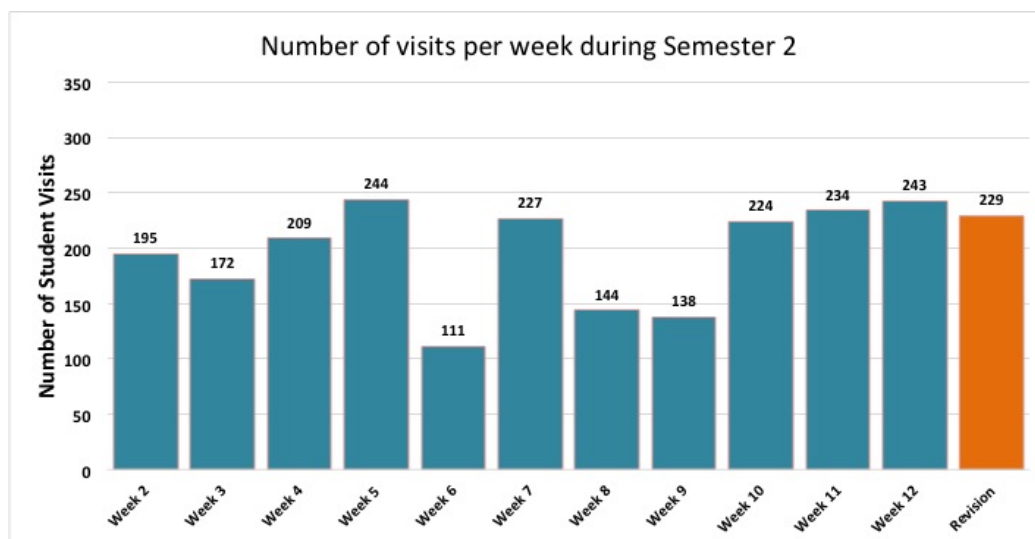
Figure 10: Number of visits per week to MSC for semester two of 2017/18

10 First Time Student Visit Rate

The number of first time visitors attending the MSC per week for both semesters is given in Figure 11 below. We see that the number of first time visitors to the MSC in the revision weeks of semester one and two was 61 and 18 respectively. This represents just 6% and 3% of first time visitor figures for each semester - compared to 5% and 7% of first time visitors in 2016/17 and 13% and 15% for these semesters in

2015/16. This decrease suggests that the MSC opening hours (including late night openings and closing during examination weeks) has changed the behaviour among MSC visitors from one of last-minute cramming to a more sustained and consistent usage of the service throughout the teaching semester.

"I wouldn't have passed my exams without the help of the MSC tutors, not only did I pass but got a B+ thanks to them, really appreciate the work done".
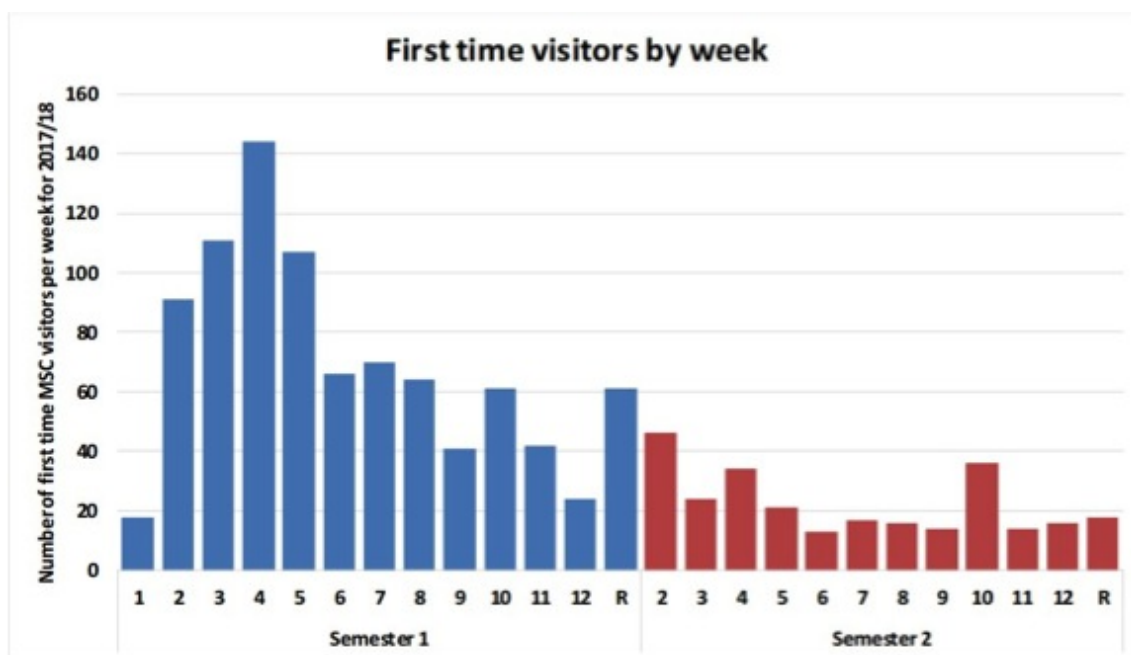
Figure 11: Number of first time MSC visitors per week for 2017/18

11   Late Night Opening and Busiest Times

From October 2017 until May 2018 the MSC experimented with extending its opening hours to include a 6-7.30pm slot Monday through Thursday. There were 568 visits made during this time slot meaning the proportion of students who visited during these later opening hours accounted for 10% of all visits, a statistic which suggests that this development was welcome. Based on tutor and student feedback, particularly the mature student cohort, we will experiment next academic year opening until 8.30pm each night (Mon-Thurs) for both semesters. The breakdown for the number of visits by day and by hour were also analysed. For example, Thursday (815 visits) is the busiest day in semester one and Tuesday (599 visits) is the busiest day in semester two and the time periods of 11am-1pm (836 visits) in semester one

and 10am-12pm (701 visits) in semester two are the busiest in terms of student log ins.

"I am a mature student on the access course and have found it [the MSC] to be an invaluable resource and will continue to take full advantage of its supports".

12   Programme Levels and Colleges in the MSC

The MSC received visits from 61 different programmes at UCD in 2017/18 which included all six of the university's colleges, with Science (21% - down 1%), Health and Agricultural Sciences (23% - up 3%), Engineering and Architecture (8% - down 9%), Social Science and Law (8% - up 3%), Arts and Humanities (23% - up 12%) and Business (10% - up 2%) accounting for the largest proportions of visits respectively (see Figure 12 below).
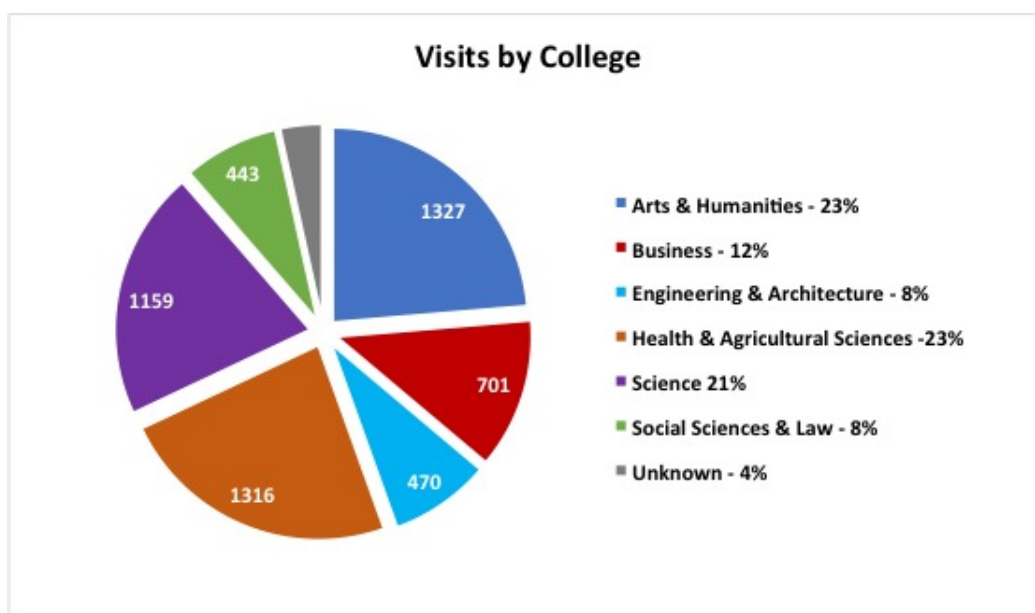
Figure 12: MSC student visits and percentages by college

The percentage of each module level visiting the MSC is given for 2017/18 in Figure 13. In total the percentage of level 0, level 1 and level 2 visits was 5.4% (down 1.6%), 53.6% (down 3.4%), and 40% (up 7%) respectively. The 1% of visits from stage 3, stage 4 and postgraduate students refer to those students who logged in to the MSC system but were referred back to their lecture. 35 of these visits were from SMS while 27 were non-SMS. The sustained annual increase of level 2 students attend-

ing the MSC from 25% back in 2012/13, to 32% in 2015/16, and now to 40% this year where 2 in every 5 MSC visits are from stage two modules is an interesting trend.
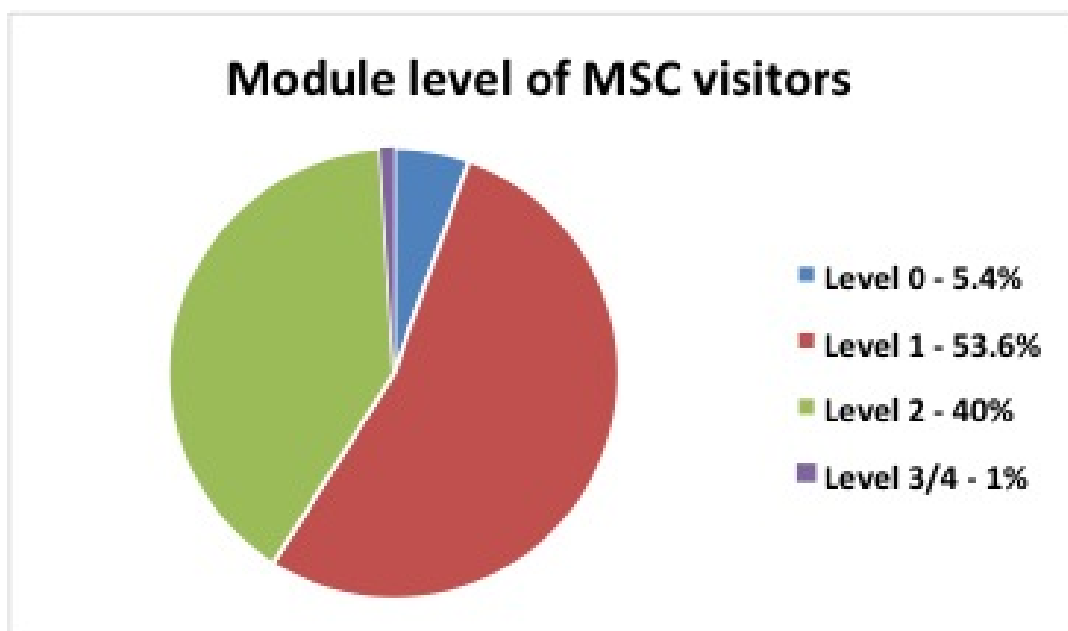
Figure 13: Percentage of MSC visits by module level for 2017/18

13   Modules served by the MSC

Students from 108 distinct modules attended the MSC during semester one, traditionally the busier semester for the MSC, while 57 modules were represented during semester two (or 111 modules including repeat/resit visitors from semester one). The MSC received visits from 66 modules taught by the School of Mathematics and Statistics (SMS), equating to 4,908 (or 86%) of the total visits. The 99 non-SMS modules assisted by the MSC accounted for 799 visits (a decrease of 21% on last years figure). There were 52 modules for which there was just one visit and 45 of these were from non-SMS modules. Visits related to statistics modules or modules with a statistics component accounted for 14.5% of all MSC visits this year (down 0.8% on last years figure). Of these 828 statistics visits, 527 (or 64%) were from statistics modules delivered by SMS.

"Maybe a tutor more familiar with statistics in social sciences and arts programmes could help".

14 MSC-Module Coordinator Partnerships

This year saw the further development of the MSC-Module Coordinator (MSC-MC) Partnership Agreement. Designed to ensure an alignment between the support offered at school level and at the MSC this agreement keeps all stakeholders (students, MSC tutors, teaching staff and management) informed of student learning. This year saw the signing of 30 MSC-MC Partnership Agreements relating to the modules most frequently represented at the MSC - see Appendix 1 for more detail.

Module Coordinators have online access to the MSC (anonymous) feedback in real time that relates to their module(s). Module Coordinators and lecturers also receive an automated email each Friday afternoon detailing (i) the number of visits and unique visitors the MSC has received from their module(s), (ii) the duration of each visit, (iii) a running count of the total visits over that particular semester and (iv) the nature of the student query (as interpreted by the attending MSC tutor(s)) and how it was remediated. As part of the Module Coordinator-Maths Support Centre Partnership (see Appendix 1 for what the Module Coordinators actually sign), this feedback is sent to over forty lecturers both prior to the start of the new academic year and in advance of semester two teaching in January. Included in this report are the following summary statistics:

- Summary stats for MSC visits from last academic year e.g. no. of visits, no. of distinct visitors, no. registered to sit terminal examination and no. of students that subsequently failed this exam

- A time series graph for the number of visits and distinct student visits per week of semester

- A chart showing the most commonly occurring difficulties

- A summary of the issues raised by MSC visitors and finally

- All the documented visits as recorded by the MSC system (and attending tutors).

These discussions help both parties to provide the best mathematical educational experience for the university's undergraduate students and ensure that sufficient support is offered at school level before the MSC is utilised by a particular student.

15   MSC Tutors

As always the success of the MSC is due to its committed staff. This year the MSC hired 21 tutors over both semesters, ten of which were re-hired from 2016/17 and eleven of which were interviewed and trained in September. Six of this years' MSC tutor cohort have doctorates in Mathematics or Mathematical Physics. Six tutors were completing their PhD studies in the School of Mathematics and Statistics, one was doing a research MSc in Mathematics Education and another was completing an MA in Mathematics. Five of our tutors were undergraduate students in 2017/18 and came through our tutor training programme in September 2017. Two of these undergraduate tutors are starting PhD programmes in September 2018, both on funded projects in the UCD School of Mathematics and Statistics, one an IRC funded project on EMRI waveforms, and the other a UCD funded project on solar harvesting. The remaining tutors were sourced from outside UCD and included a mathematics lecturer from DIT and Maynooth University, and a civil engineer working in Dublin. All MSC tutors undergo vetting, interviews, extensive training and mentoring throughout their time at the MSC. Every year the tutor turnover is high at the MSC where tutors either move to industry or high calibre educational institutions and so sourcing and retaining high quality mathematics tutors remains a significant challenge for the UCD MSC. Tutors have moved on to take up positions including a post doc at the University of Jena (Germany), a post doc in Trinity, a masters in Health Economics at Erasmus University Rotterdam, a job in an educational software company in Dublin and the first permanent university tutor position at Maynooth University.

	2017/18	2016/17	2015/16	2014/15	2013/14	Totals
Tutors newly hired	11	9	12	13	15	60
Tutors re-hired	10	13	13	10	3	49
Totals	21	22	25	23	18	109

Table 2: The number of new and re-hired MSC tutors for the past 5 years

"The maths support centre is in my opinion the best thing UCD offers, all the tutors are very helpful and attentive and it's definitely making life easier."

Most of the MSC tutor team for 2017/18

15.1   Continuing Professional Development of MSC tutors

Twenty MSC tutors and four lecturers from the School of Mathematics and Statistics took part in a one-day workshop event given by Ellen Marshall of Sheffield Hallam university on the statistical software packages Excel, SPSS and R held in the MSC on September 15 2017. MSC tutors are often asked for statistical software support and some of the tutors felt unqualified to offer such support, hence the strong engagement with this workshop from MSC tutors and SMS lecturing staff.

On January 17th 2018 the MSC hosted a Numbas workshop with Dr Christopher Graham and Dr Christian Lawson-Perfect from Newcastle University. The Numbas event was attended by three maths lecturers from Cork Institute of Technology, one from Maynooth University and MSC tutors from Trinity, DCU, MU, the OU and UCD. Numbas is a free and open source mathematical e-assessment system, which allows the authoring of questions which include randomised content and LaTeX rendering of mathematical notation. Tests provide instant feedback to the student, including rendering of the student's answers in mathematical notation while they type, and a practice mode which lets students regenerate randomised questions for further practice without starting a new session. Numbas can be made available

to students on the web, or integrated with a VLE. The MSC has now embedded Numbas tests in to the MATH00010, MST00050, MATH00030 and MATH00040 mathematics modules. Both of these events were chosen by the tutors themselves to continue their professional development and were paid for from the Teaching and Learning Award the MSC tutors won in the previous academic year.

16   Expenditure and Income

Tutor expenditure was the main expense totaling €72,118 with €43,240 spent in semester one and €28,948 in the typically quieter semester two. Significant savings were made by utilising the MSC forecast model developed by Emma Howard (PhD student in mathematics education) and Associate Professor Andrew Parnell. This model, based both on historical data and live data scraped from the current student queue, accurately predicted the peak times and the lulls so management could assign appropriate staff at the MSC according to both the number of tutors and the requisite tutor strengths (Stats vs Maths for example). These savings allowed the MSC to invest in furniture upgrading (€330), painting two walls with whiteboard Smarter Surface paint (€1,297), mathematical art manifestations on the glass panels of the MSC (€551), promotional stationary including pencils, highlighters, bookmarks and posters (€1,996), a large banner (€313) advertising the space outside the library, tutor t-shirts (€150) and catering for staff training (€111).

The MSC also received an income of €1,020 from the joint Library/MSC Leaving Certificate Programme run in May and June of 2018. This scheme is offered free of charge to any 6th year student from a DEIS designated school and such students are encouraged to attend as many of the two-hour sessions as they wish.

17   Research and Communications at the MSC

A number of research projects were conducted at the MSC in 2017/18 including:

- An MSc in Business Analytics capstone project, completed by Li Chen and Xun Yao, two students from the Michael Smurfit Graduate School of Business. They conducted their thesis on "Developing a forecast model for the time spent with a tutor at the UCD Maths Support Centre".

- Kevin Sewell from the School of Mathematics and Statistics conducted his MSc thesis on "Effective Maths Support Tutoring at the MSC".

- Nuala Curley, previous MSC manager will defend her thesis, in November 2018, on the "Collection, analysis, and utilisation of detailed recorded data on students' mathematical difficulties in a university mathematics support centre" based on data she collected from MSC students and tutors at the MSC in 2014.

The MSC management presented information on MSC usage statistics and the lecturers' feedback system to delegates who visited the UCD MSC in 2017/18 including:

- Dr Fiona Lawless, Head of Mathematics in the School of Informatics and Creative Arts at Dundalk Institute of Technology.

- Gillian Boland, Manager of The Learning Development Centre at the Institute of Art, Design and Technology in Dun Laoghaire.

- Karin Walker, Education Project Co-ordinator for the new Maths and Software Academy at the Faculty of Engineering and Physical Sciences at Queens University Belfast.

Other events the MSC management presented at or attended include:

- July 2018 - Supporting Traditional and Non-traditional Learners at Ireland's Largest University. NACADA International Conference on 16-19 July, 2018 UCD Dublin.

- September 2018 - Annual CETL-MSOR conference at the University of Glasgow, September 5-6, 2018.

- December 2017 - IMLSN annual conference, Northwest Regional College in Derry.

- November 2017 - SFI Connect 2 Communicate Academy. UCD.

- March 2018 - Interview panel for Access and Lifelong Learning Outreach Officer.

18   Outreach Activities at the MSC

18.1   UCD Library-MSC Leaving Certificate Programme

From May 29th to June 2nd the MSC assisted 61 students in preparation for their Leaving Certificate Mathematics Examination with free maths support sessions being provided for 27 students from five DEIS schools (Delivering Equality of Opportunity in Schools): Loreto College Crumlin; Mount Carmel Secondary School; Marian College Ballsbridge; St Laurence College; and, Ballinteer Community School. The

following six non-DEIS schools - Oatlands College, Muckross Park College, Coláiste Íosagáin, Mount Anville, St Michael's College and St Gerards School in Bray also participated in this scheme.

18.2 Maths Sparks, Maths Week, Engineers Ireland

From April to October 2018, the fourth installment of the SFI Discover-funded *Maths Sparks* took place. This is an outreach and public engagement programme designed and delivered by staff and undergraduate students from the School of Mathematics and Statistics to over 80 DEIS students from 12 local secondary schools with the voluntary assistance of MSC tutors.

MSC management and tutors presented at local primary schools for Maths Week in October 2017 including Code Breaking talks for 12 schools (both primary and secondary) at Engineers Ireland headquarters in Dublin and also assisted with the Future You, Science Ambassador and Peer Mentoring programmes.

MSC management at Engineers Ireland outreach event during Maths Week

19 Summer Courses at the MSC

In August 2017 the MSC designed and delivered four 3-hour workshops for the 38 students registered to the Access to Science, Engineering and Agriculture programme. Four 2-hour workshops were also given to 31 students registered through the Mature Students office. Five 2-hour sessions were delivered to students coming to UCD through the HEAR (Higher Education Access Route) programme and one "Introduction to the Maths Support Centre" session for the DARE (Disability Access Route to Education) students. The MSC also attends and presents at many orientation events in the preceding weeks of term, including the International Orientation Programme for incoming students in August and January. All these sessions are set to continue and grow in 2018/19.

20 Future Developments and Recommendations

20.1 Aims and Developments for 2018/19

1. From September 2018 the MSC intends to extend its opening hours from 41 hours per week to 45, for semester one, to include late opening until 8.30pm each night Monday through Thursday. The 6.30-8.30pm nightly slot will prioritise the Access, DARE, HEAR, Mature, QQI/FET, and International student cohorts. We also plan to open for the final two Saturdays of each term as student feedback has suggested there may be demand for such an initiative. The MSC aims to consolidate the 40+ existing partnerships with Module Coordinators from SMS and extend this to include more Module Coordinators and lecturers external to SMS.

2. The UCD MSC website is central to the service's profile and outreach potential. It hosts, among other things: several mathematics and statistics video resources, developed by lecturing and tutoring staff in SMS and the MSC; links to interactive e-learning applets and resources; the MSC tutor timetable, tutor strengths, expected wait times for students and indications of peak visit periods, the MSC User's Guide and FAQs. The existing MSC website at www.ucd.ie/msc is now out of date with the current UCD website structures and so we recommend that the MSC reserve sufficient funds next year to provide for an update to this vital operational service.

20.2 Recommendations

1. The MSC needs to strengthen its governance and oversight process, including developing terms of reference clearly indicating its composition, its purpose and function in assisting the MSC with its decision making processes, its developmental strategy and protocols for ongoing oversight and guidance.

2. Once again, despite the best efforts of library maintenance staff, the quality of the air ventilation, noise pollution and lack of natural light in the maths support centre continue to be significant problems. In 2017/18 visiting students and MSC tutors frequently complained of experiencing headaches, discomfort and fatigue due to the poor air quality and the unreliable heating system in the space. While efforts have been made to minimise these issues including the installation of further air vents the physical location of the MSC needs to be addressed and a larger space to accommodate more room for visiting students and their tutors with adequate fresh air and natural daylight are vital

requirements. Hence it is recommended that the MSC continues to advocate for a new home to include these important features.

21 Appendices

21.1 Appendix 1 - The MSC-Module Coordinator Partnership Agreement

The following page gives an example of the MSC-Module Coordinator Partnership Agreement which greatly facilitates MSC tutors and management to provide the requisite and appropriate support for our visiting students as desired by the module coordinator/lecturer(s).

Maths Support Centre-Module Coordinator Partnership Agreement - MATH10030 2018/19

Rationale: The purpose of this partnership agreement is to facilitate and streamline the communication between the Maths Support Centre (MSC) and Module Coordinator/Lecturer in order that students on the module are supported appropriately.

Do you object to students from MATH10030 attending the MSC?   Yes **No**

If not what level of support do you want the MSC to provide?

Details: **1.** If a MATH10030 student comes to the MSC, they should be encouraged to watch the relevant video for the topic that they are stuck on. If they say they have watched the video already, they should be encouraged to locate for the tutor, the point in the video where they got lost. No tutor should have to explain any MATH10030 topic "from scratch". We want to encourage students to take responsibility for their learning and the lectures and videos play a large role in this, placing the responsibility back to the student.

2. From Week 3, a dedicated drop-in for MATH10030 students will be held in **Q106 Quinn every Monday from 3-5pm**. Any student attending the MSC during these hours should be directed to this drop-in as we have three tutors on hand.

Do you want me to attend a lecture to advertise the MSC?   **Yes** No
When - Monday 10am
Where - Theatre M Arts

Will you put up a slide/announcement in the first week of lectures (and on Blackboard/Moodle) advertising the MSC and how you want your students to use it in terms of assignments, lecture material, notes etc?   **Yes** No

Do you agree to set up the MSC manager as a student/tutor on your Blackboard/Moodle page for access to the module's material?   **Yes** No

Can you provide the MSC with (approximate) dates of the CA, quizzes, midterm, etc?
Details: **Weekly quiz on Tuesday weeks 3-12 worth 5% each.
No Midterm exam.**

Do you agree to meet at the end of the semester to review this policy and discuss your second semester module(s)?   **Yes** No

Policy: If you agree to the above, the MSC will ask you to engage with the MSC feedback mechanism i.e. you will be sent a weekly email with details of the visits to the MSC from module MATH10030.

If a significant proportion of students from this module attend the MSC in a given week the MSC manager will inform the Module Coordinator of the issue.
If these visits continue the manager will inform the Module Coordinator again and if the issue persists we will agree on how to proceed regarding support from the MSC for this module.
The manager will ask the Module Coordinator to inform their students of this.

Signature:

MSC manager Anthony Cronin

Signature:

MATH10030 Module Coordinator & Lecturer – Maria Meehan & Rupert Levene

The Process

Early September/January - MSC manager meets Module Coordinator (and lecturer if different) to discuss MSC feedback from previous year and plans for the year ahead.

Same meeting - MSC manager runs through MSC-Module Coordinator Partnership Agreement form and discusses any issues arising.

MSC manager and Module Coordinator agree on the partnership document and both sign the MSC policy agreement.

A copy of the signed agreement will be forwarded to the Module Coordinator and the Module Lecturer after this meeting.

Notes
1. The MSC does not open during the examination weeks
2. The MSC opens in week one (two) in semester one (two) respectively
3. The MSC website is www.ucd.ie/msc
4. The MSC supports students registered to **level 0-2 modules only**.

21.2 Appendix 2 - MSC User Feedback

Management conducted a comprehensive feedback survey of 333 regular (students who had visited three or more times) MSC users in semester one of 2017/18, receiving responses from 193 students, a 58% response rate. Some interesting findings from this survey include:

- 56% of respondents were female, 42% were male and 2% were non-binary.

- 38 of 193 students survey (or 19.7%) said that they had considered dropping out of UCD due to the mathematical demands of their course but that the MSC had influenced their decision not to drop out.

- When asked "Why did you first attended the MSC?", 24% said they attended the MSC as they were struggling in general, 21% said they did not understand lecture material, while 19% and 10% respectively said they first attended the MSC for assignment and Webwork assistance.

- When asked "How do you generally use the MSC?", 74% said "To get help with assignment/homework", 56% said "To get help with lecture notes/material". Some 30% of students surveyed said they used the MSC "as a last resort", 14% said "To get help from a specific tutor", while 13% stated that they use the MSC "As a place to work with friends/classmates". Interestingly 15% said they use the MSC "As a space to study mathematics/statistics alone".

21.3 Open responses from MSC users

When asked what improvements could be made to the MSC the following are representative comments and it should be noted that this survey was conducted in week 14 of semester one following the busiest three weeks of the MSC service.

- More tutors available, sometimes it gets very busy.

- Shorter waiting times. I was waiting > 40 minutes without a table to study.

- More physics support.

- More tutors to help with statistics.

- Workshops using maths apps such as geogebra, sage and octave.

- Fresh air! the room is horrible and sticky.