

Online Synchronous Maths Support Attendance Post-Covid

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In the autumn semester of 2021, Dublin City University's (DCU) students returned to campus after just over a year of remote learning. This return had some caveats: COVID-19 restrictions limited how students could interact with lectures, tutorials and maths support. To continue catering to students during this period, the Maths Learning Centre (MLC) provided support both in-person (at a reduced capacity to accommodate COVID-19 restrictions) and synchronously online via bookable Zoom sessions — a continuation of the support provided during COVID-19 lockdowns. As Covid restrictions were lifted in September 2022, and the MLC drop-in service returned to its pre-Covid operation, the MLC continued to provide this online support. In this paper, we will examine the online MLC attendance over the last few years and discuss this in the context of in-person attendance.

Keywords: COVID-19, online support, mathematics learning support, student engagement

Introduction

The Maths Learning Centre (MLC) is a free additional support available to all DCU students studying any kind of mathematics (Jacob & Ní Fhloinn, 2018). This service is built to work alongside lectures and tutorials, so that students can address mathematical difficulties they may have. Outside of extraordinary circumstances, the MLC operates as a drop-in service in the main library on DCU's Glasnevin campus. The room can hold about forty students, and is staffed by two to three tutors, depending on how busy the room is at that point in the semester. Students register their attendance by scanning a QR code, located on each desk in the room. Students attending the MLC can avail of one-to-one and group help from the tutors, as well as having access to a small textbook library and a library of photocopied take-home revision sheets (mainly comprising revision sheets from mathcentre.ac.uk).

In March 2020, the MLC was forced to rapidly change tack in order to provide maths support in an online environment. For the first time, the MLC offered synchronous online maths support, via Zoom drop-in sessions. Howard and Ní Fhloinn (2022) report on the attendance of the online support provided during the 2020–2021 academic year. There was a considerable drop in student engagement when maths support moved to being solely online. The attendance patterns were similar to those generally observed in the drop-in centre, in that the peaks in attendance happened at the same usual points during the semester. They hypothesise that the demand for online maths support would likely continue alongside that for the more traditional in-person support.

In the 2021–2022 academic year, DCU made a tentative return to in-person learning, with the caveat of COVID-19 restrictions. In order to accommodate these restrictions, the MLC reopened its in-person service on a reduced timetable, and required that students book their attendance in advance in order to ensure that the number of students in the room stayed below 24 (an approved number which allowed adequate spacing between students in the

room). Alongside this in-person support, the MLC continued to provide online support in the form of evening Zoom sessions, which remained well attended despite the in-person return.

In September 2022, DCU returned fully to in-person learning, dropping its COVID-19 restrictions. The MLC followed suit, returning the drop-in centre to its original operation pre-Covid (ie. pre-booking was no longer necessary, and students once again registered their attendance by scanning a QR code in the room). The online synchronous support, however, continued at designated times in the evening. The attendance for online support dropped significantly in Semester 1, which prompted a change in how this support was offered. Consequently, in Semester 2, the MLC offered online support by asking students to send an email directly to organise a session, which could then take place at a time that suited both the student and tutor. It appears from attendance data that student engagement has grown since, and so this paper serves to examine these changes in support with a view to providing best practice and engaging students.

Literature Review

Owing to the rapid shift online in early 2020, many publications sought to explore these changes in higher education in Ireland. Some outline the experiences of moving education online (Casey, 2020; Ní Fhloinn & Fitzmaurice, 2022) while others discuss student/teaching perspectives (Hyland & O’Shea, 2021; Mac an Bhaird et al., 2021; Meehan & Howard, 2020). O’Shea (2022) gives an overview of much of this research, broken into the broad themes of student/lecturer perspective, maths support, and assessment.

Hodds (2020) details some of the early major changes to maths and stats support that happened as a result of COVID-19 lockdowns in an international setting, with a focus on the UK. They found that most institutions provided some form of online support, but a huge number of institutions saw a major reduction in the number of students engaging with support once support had moved online. Many practitioners felt uneasy or underprepared for providing online support of a similar standard to traditional support methods. Ní Fhloinn and Fitzmaurice (2022) echo this in their discussion of lecturers’ experiences moving online; lecturers felt more pressured to improve their performance in 2020-2021. The general consensus was that the future of maths and stats support would be hybrid, with more resources put into in-person support.

Mullen et al. (2022) go into further detail and discuss some of the pedagogical changes that happened in the provision of maths support as tutors moved online, via a series of interviews with tutors and students in University College Dublin (UCD), Ireland and Western Sydney University (WSU), Australia. Some of the tutors interviewed noted the difficulty that came with the “lack of body language or non-verbal communication” (p. 73); tutors found it harder to properly diagnose students’ problems both due to this communication problem and since students often could not share their work for technical reasons. Gilbert et al. (2021) found similarly that communication issues constituted a huge drawback to online support — practitioners were not getting the usual visual feedback from students, and there was a “loss of the personal connection” (p. 4). Mullen et al. note that tutors found themselves

talking more in online sessions; one tutor worried that they were “talking at, rather than to, students” (p. 74). Some UCD tutors noted that students tended to prepare more for online than for in-person. This was also acknowledged by tutors in DCU (Howard & Ní Fhloinn, 2022).

On January 13th 2023, the Irish Mathematics Learning Support Network (IMLSN) hosted a workshop to explore the experiences of maths support centres in semester 1 of the 2022-2023 academic year (IMLSN website, 2023). Of the eleven Irish Higher Education Institutions (HEIs) represented, nine provided a hybrid support of online and in-person, one institution provided solely online support, and one provided solely in-person support. Generally, online attendance was not very high. The rapid student return to in-person over online support came as a surprise to some of the workshop attendees. Indeed, this general preference for in-person support over online support appears to be present in DCU.

Methodology

From September 2020 to December 2022, the online support scheduling was handled by the in-built appointment scheduling feature of Loop, DCU’s virtual learning environment (VLE). This feature allows the user to book a given slot, where that slot is attached to a given tutor. These data were exported from Loop to include student numbers and dates and times of appointments. Since these data come directly from student logins on Loop, there is no need to validate student names and numbers. For Semester 2 of 2022-2023, bookings were made via email and so the attendance data were collated manually by the first author, who staffed those appointments. Names and emails were cross referenced with Loop to validate them.

For the in-person data: in the 2021-2022 academic year, in-person attendance was booked in advance via a Google form, which asked students for their student number and degree programme, as well as time and date of the booking. These data were collated into a spreadsheet, and the data were cleaned and validated by cross referencing with Loop. Drop-in attendance data from the 2022-2023 academic year (where students scanned a QR code to register their visit) were tracked using Loop, in the same way that online sessions were tracked in previous years. As such, these data could again be directly exported from Loop without validating student name and numbers. Some students double or triple booked themselves at some points, and so these data were cleaned to remove the duplicate bookings.

Pivot tables were used in Excel to organise the data for use in tables and charts.

Results

Structure of Online Support

During the lecture terms of 2020-2021, four appointment slots were made available every weekday before 2pm, and a further four slots available four days per week in the evening. Slots were also available in the study week before Semester 1 exams, and in the weeks leading up to Semester 2 exams and the resit exams in August 2021.

In September 2021, the MLC continued its online support alongside the newly restricted in-person support. For the online support during Semester 1, two appointments were available four evenings per week. This was halved in Semester 2 to only two evenings. Again,

appointments were made available during the various study periods before the Semester 1, Semester 2 and August resit examinations.

Coming into September 2022, the MLC again ran a hybrid service of online and in-person support, with the in-person support returning to its pre-Covid drop-in format. Two online appointments were available two evenings per week, starting in week 6 of the semester. The online support was only offered from week 6 onwards due to the expectation that online engagement would be low, owing to the return of unrestricted in-person support. This expectation seemed to come true, and only five of these appointments were booked. However, engagement increased in the two study weeks before the Semester 1 exams began, and more appointments were made available to accommodate this influx. Note that the in-person support was only available during the first study week, and not the second.

During Semester 2, online support was offered from week 2. No appointments were made available via DCU's VLE; instead, students were asked to email to request an appointment. Despite fewer students in Semester 2 taking maths modules (a consequence of how DCU's maths modules are timetabled), more bookings were made during this semester than in the previous one. In anticipation of the same influx of appointments as during the study weeks of Semester 1, appointments were once again made available through the VLE to accommodate students for the study week before the Semester 2 exams. However, the appointments were much less sought after than expected, and only six of the fourteen made available were booked. Table 1 gives a breakdown of the number of appointments made available over the three years in question.

Table 1

Numbers of online appointments made available by time period

	S1 Lectures	S1 Study	S2 Lectures	S2 Study	Resit Study	Total
2020-2021	368	60	424	160	196	1208
2021-2022	70	16	44	4	40	174
2022-2023	28	52	17*	14	—	94

Note. S1 and S2 refer to Semester 1 and Semester 2 respectively. 'Lecture' refers to the lecture term, and 'Study' refers to the study period leading up to exams. This paper is written following the Semester 2 exams in 2023, and so no data are given for the 2023 resit study period.

*Since students emailed to request appointments in Semester 2 of 2022-2023, no explicit number of appointments was made available; the figure supplied is the number of bookings made.

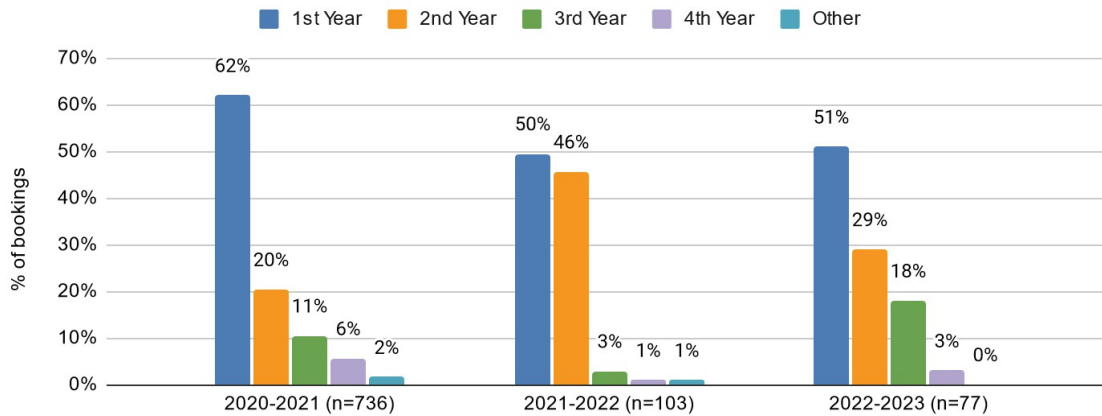
Overall Engagement with Online Support

Over the course of the 2020-2021 academic year, 736 (61%) of the available 1208 appointments were booked. Most of the bookings were made by first-year students, and nearly 30% of the first-year bookings were made by Actuarial Mathematics (ACM) and Common Entry into Actuarial and Financial Mathematics (CAFEM) students, whose course

programmes contain only mathematics modules. See Figure 1 for a breakdown of the appointments booked by different year groups.

Figure 1

Breakdown of bookings for online support by year group



There are several significant contrasts between these statistics and those of the 2021-2022 academic year (Chi-square test, $p < 0.001$). A similar proportion (59%) of the available appointments were booked over the year. The second-year students made up an unexpectedly large portion of the overall bookings (Figure 1), and nearly half (45%) of all second-year bookings were made by ACM or CAFM students. In contrast, only two of the first-year students who attended were ACM or CAFM students.

This contrasts again significantly with the 2022-2023 academic year (Chi-square test, $p = 0.003$). An unexpectedly large portion of all bookings were made by third-year students (Figure 1). Only one of the fifty-eight total first- and second-year bookings was made by an ACM or CAFM student (one student in ACM1). Over one third (38%) of the bookings made by third- and fourth-year students were made by students in ACM or FIM (Financial Mathematics: the CAFM common entry cohort splits after two years into ACM and FIM).

A total of 240 distinct students engaged with online support in the 2020-2021 academic year. Due to Covid lockdowns, there was no in-person support against which to compare this figure. For the 2021-2022 and 2022-2023 academic years, the engagement of students with in-person and online supports is shown in Table 2. In both years, roughly one tenth the number of students engaging with in-person supports engaged with online supports.

Table 2

Breakdown of students who engaged with MLC supports in-person, online or both.

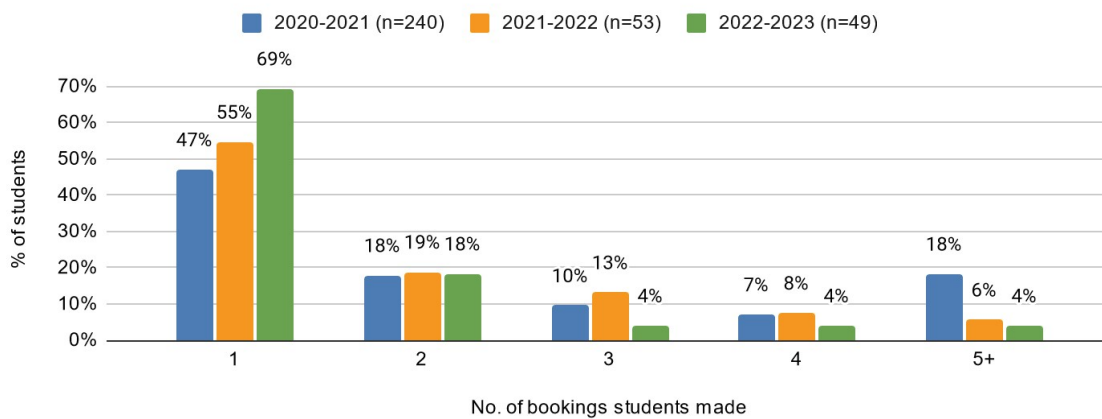
	In-person only	Online only	Both in-person & online	Total
2021-2022	518 (90.7%)	21 (3.7%)	32 (5.6%)	571
2022-2023	454 (90.2%)	34 (6.8%)	15 (3.0%)	503

Repeated Engagement with the MLC

Over half (53%) of the students who engaged with the MLC in 2020-2021 booked two or more sessions (Figure 2), which Howard and Ní Fhloinn (2022) note is in line with in-person numbers from previous years. This repeated online engagement drops significantly over the following two years (Chi-square test, $p=0.025$): most students in 2021-2022 only booked a single session, and no student booked more than six appointments. Again in 2022-2023, most students only booked a single session, one student booked six sessions, and no student booked more than six. This drop may be expected given the much smaller count of available appointments; that being said, in the 2020-2021 academic year there was a small cohort of students who booked upwards of twenty appointments over the course of the year. See Figure 2 for a visual representation of this shift towards fewer engagements.

Figure 2

Number of online appointment bookings made per student



On a broader timeline, some students engaged with online support over multiple years. In 2021-2022, of the thirty-one students who were not first-year students, just over half (52%) had engaged with the service in the previous academic year. There were also three repeating first-year students who had engaged the previous year. However, only three of the twenty-eight non-first-year students who engaged with online support in 2022-2023 had engaged previously, with an additional two repeating first-year students. There were three students who engaged with online support all three years in question.

Discussion

The most notable trend in the data appears to be the continued attendance of ACM and CAFM students, starting with first-year students in 2020-2021 through to third-year students in 2022-2023. In Figure 2 the impact of this can be seen, as it distorts the typical number of students from each year group usually seen in attendance at in-person support — more second-year students attended in 2021-2022 than would be expected, and more third-year students attended in 2022-2023 than would be expected. Where most course programmes that involve a mathematics module only do so in first-year, the ACM and CAFM students continue to have mathematics modules through all years of their course programmes.

The ACM and CAFM students in first-year in 2020-2021 appear to have become comfortable attending online support, doing so at high volume even when in-person support had returned. In contrast, first-year ACM and CAFM students in 2021-2022 seem to have had a strong desire to engage in-person and not online. This perhaps does not come as too great a surprise, given the now documented preference for in-person engagement over online.

One of the motivations for this paper was to analyse the effects of the changes made coming into Semester 2 of 2022-2023 as to how online support was offered. Despite typically higher engagement with support in Semester 1, nearly three times as many bookings for online support were made during the lecture term of Semester 2 when students emailed to book instead of booking through the VLE. Alongside this, the first author (who staffed the online support from the study period of Semester 1 onwards) found that students who had booked via the VLE were less likely to actually attend the session they had booked. Many students forgot they had made the booking despite email reminders, and some cancelled their session last-minute, meaning that other students would not have the opportunity to book that session. During the lecture term of Semester 2 when students emailed to book, only one student did not attend their appointment, and there were no cancellations.

Now that in-person support is back to its pre-Covid operation, it appears from these data that most students much prefer to attend in-person rather than online appointments. That being said, the repeated engagement of the ACM and CAFM students with online support highlights an addendum: it appears in their case that once the students had initially engaged online, they were comfortable continuing to engage online even when in-person supports had returned. The goal then would be to make online support accessible enough for a student to attend once; they may find the experience more worthwhile than they expect.

As we move further from the influence of COVID-19 lockdowns and restrictions, we may continue to see the dissipation of these lingering effects on the provision of maths support. The benefit of the new ubiquity of online support has yet to be fully explored, and so further research is warranted into what makes online support more alluring and accessible to new students. In addition, further investigation into the effects of online support on student engagement, performance and confidence — especially compared to the effects of more traditional in-person support — could help to illuminate how best to provide that support.

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