

The Impact of Mathematics Support upon Student Retention: The Student Voice

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A student survey undertaken by the Irish Mathematics Learning Support Network (IMLSN) in 2014 found that students reported a positive impact from mathematics support upon student retention. However, during the COVID-19 pandemic and subsequent university campus closures, engagement with mathematics support reduced greatly. To ascertain whether students still perceive that positive impact from mathematics support, an anonymous student survey was carried out with Dublin City University, with a total of 492 responses received. Of these, 164 students had used the services of the Maths Learning Centre. These students were asked about whether they had considered dropping out of their programme due to mathematical difficulties. Just under a third of students stated that they had thought about this, but two-third of these students credited the Maths Learning Centre with influencing their decision not to drop out. In this short paper, we give voice to their words in relation to these struggles, and consider the ongoing impact of mathematics support following the COVID-19 pandemic.

Introduction

In 2014, the Irish Mathematics Learning Support Network (IMLSN) undertook a national survey investigating student perception of mathematics support in higher education (O’Sullivan et al., 2014). The survey received responses from 1,633 first-year students across nine higher-education institutes (HEIs). One of the questions they considered related to the reported impact of mathematics support upon student retention (Ní Fhloinn et al., 2014). They found that, of the 573 responses, 125 (21.8%) students stated that they had considered dropping out of their course or college due to mathematical difficulties. Students were then asked if mathematics support had influenced their decision not to drop out, and of the 110 responses, 69 (62.7%) felt that it had.

During the university campus closures that took place due to the COVID-19 pandemic, the vast majority of mathematics support services continued to provide support in an online format. However, engagement fell dramatically, with 82% of Irish HEIs reporting lower numbers than usual (Hodds, 2020). Within DCU itself, in the four days leading up to the campus closures in March 2020, there were 256 visits to the Maths Learning Centre (MLC), where there were only 98 online visits between 19th March and 5th May 2020 in total (Howard & Ní Fhloinn, 2022). Since the return to in-person learning, engagement with mathematics support has increased, although there has been some (as of yet anecdotal) evidence that student attendance on campus is lower, resulting in fewer in-person visits. Therefore, the research question we aim to revisit in this short paper is “Did students report that mathematics support has an impact upon student retention?”, in order to ascertain if students still report a positive impact between mathematics support and retention, as we have returned to in-person learning.

Methodology

An anonymous student survey was designed, based largely on the questions asked in the IMLSN survey (O’Sullivan et al., 2014). An MLC tutor visited first and second year mathematics modules during semester 2 2023 and asked students to complete the survey. It could be completed either online (via a Google Form) or paper-based, as student preference dictated. All students opted to complete it online. In addition, QR codes linking to the survey were posted on desks in the MLC. The quantitative data was analysed using Excel.

Results

There were a total of 492 responses to the survey, of which 164 students had used the MLC services (either the drop-in centre, or online Zoom sessions). 56.2% of respondents identified as male, 43.1% as female, and 0.6% as non-binary or other. Almost 4% self-classified as mature students (meaning they were over the age of 23 when they began their studies). Two-thirds of respondents were in first year, with a further 30.3% in second year, 1% in third year and 2.2% in fourth year. This was largely due to how the survey was distributed, and also because a high proportion of students in DCU do not study mathematics beyond the first or second year of their degree programme.

There were 158 responses (from those who had attended the MLC) to the question “Did you ever consider dropping out of your course/college because of mathematical difficulties?” with 31% stating that they did. Of these, 37% were undertaking a mathematics degree programme (either Actuarial Mathematics, or Common Entry into Actuarial and Financial Mathematics), with a further 6% studying a concurrent mathematics post-primary education degree. Students commented on the level of mathematics within their module (“*Felt like cannot cope with difficulty of material*”), their fear of failure (“*I feared that I would never pass my modules and be forced to leave*”), falling behind (“*Wish to drop out absolutely all the time. Cannot keep up with the maths*”), problems with lecturers (“*lecturers can lack empathy, hardly any female representation*”), and the knock-on effect on their other modules of struggling with mathematics (“*I struggle with my physics module also and I believe that this is because of my difficulty with maths*”).

Of these, two-thirds (33 students) stated that the MLC influenced their decision not to drop out. Students mentioned the support they receive from tutors (“*They can help explain difficult stuff*”), how it encouraged them to study with their peers (“*It’s huge to have somewhere to work with my peers with guidance from experienced tutors*”), and how it has increased their mathematical understanding (“*The MLC has helped with understanding*”). They also spoke of how it helped them to put their concerns into perspective (“*it made me realise that I just needed someone to help me understand the questions that I had*”). In addition, a further 10 students, who said they did not consider dropping out at any point, stated that this was because of the MLC in the first place (“*I know there’s someone to go to*”).

Students were asked what week they first used the MLC. Of the students who considered dropping out due to mathematical difficulties, 3 students did not fully provide information on when they first used the MLC, and only 6 students first used the MLC in

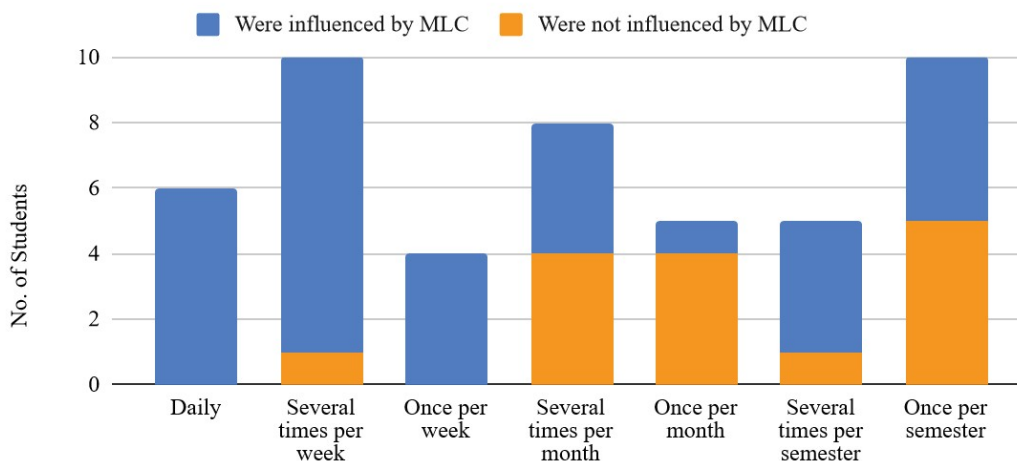
semester 2. The following analysis therefore only considers students who considered dropping out who first used the MLC in semester 1. On average, students who stated that the MLC influenced their decision not to drop out first used the MLC two weeks earlier than students who stated that the MLC did not influence their decision. A two-tailed t-test was performed to ascertain if this data was statistically significant. The null hypothesis was rejected at the $\alpha=0.05$ level ($p=0.013$).

Students were asked how often they use the MLC, on a 7-point scale from “Daily” to “Once per semester”. Of the students who reported wanting to drop out, almost all students who used the MLC once per week or more frequently stated that the MLC influenced their decision not to drop out, with only one outlying student (see Figure 1). A two-tailed Mann-Whitney U test was performed to ascertain if this was a statistically significant result. The null hypothesis was rejected at the $\alpha=0.05$ level ($p=0.008$). This significance is also evidenced in student comments: students who came more frequently were more likely to mention specific tutors (“*[Tutor] helped me infinitely*”, “*MLC saved me, [Tutor] and [Tutor] especially*”), with students who came daily or once a week constituting the vast majority of these comments.

It is worth noting that there was no significant correlation between these statistics (when a student first used the MLC, how frequently a student used the MLC) and whether or not the student considered dropping out of their course programme.

Figure 1

How often students who considered dropping out used the MLC in Semester 1 and how much the MLC impacted their decision to remain



Note. Students who were not influenced by the MLC to not drop out (orange) mostly used the MLC infrequently.

Discussion and Conclusions

The results of this survey undertaken in DCU echo the previous results of the IMLSN survey (O’Sullivan et al., 2014), but in fact, are more stark than the earlier findings, in that a total of 31% of respondents had now considered dropping out as a result of mathematical difficulties, compared with 22% in the (albeit larger) earlier sample. Many of the themes that

emerged from the national survey could also be found in the smaller sample of comments from DCU students, with a similar frequency distribution, although there was a noticeable absence of anyone mentioning the gap between mathematics in school and higher education. That said, it was striking that 43% of these DCU students were in programmes that they knew would contain all, or a high proportion of, mathematics, having chosen to be actuaries, work in financial mathematics, or become post-primary mathematics teachers.

There was no evidence of a reduction in the percentage of students who credited mathematics support with their retention in higher education, with 67.3% agreeing in our sample, compared with 62.7% in the national sample in 2014. The strong link between this positive influence and students' early and frequent engagement reinforces the validity of this result. This is a positive outcome in terms of providing evidence of the ongoing impact of mathematics support for students. In the words of one survey respondent who is undertaking a Physics degree,

I have had a little bit of confidence for my maths abilities while doing the course, at times I felt like I would be more suited for a business course. But using the MLC, I can achieve greater things in the course I'm in now.

The challenge now remaining for mathematics support practitioners is to continue to reach out to those who do not engage but could benefit from mathematics support, particularly if lower student on-campus attendance becomes a part of our "new normal".

References

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