



Levelling Up: Case Studies

The London Mathematical Society (LMS) commissioned the Observatory for Mathematical Education to write this case study to highlight the impact and benefit of the Levelling Up: Maths scheme to participants with different roles.



Durham University, 2024

Durham was one of the first universities to run *Levelling Up: Maths*. They first became involved during the Covid-19 pandemic when in-person outreach activities were put on hold, whereas *Levelling Up: Maths* could be delivered online. The programme has since continued to be fully online as a way to reach students from across the North East region who might not be able to come in person. While other outreach activities tend to be one-off events, *Levelling Up: Maths* is ongoing across the academic year and therefore offers participants the chance to develop their confidence and problem-solving abilities over time.

The university takes part in *Levelling Up: Maths* to benefit the participants by enabling them to understand maths more deeply and be enthused about the subject. By keeping tutorial groups small, the hope is that every student will feel able to participate and share ideas, without fear of making mistakes. The graphics tablets given to all participants are key to this, since students can write maths collaboratively. An added bonus is that they can use the tablets for their A level studies, as well as for taking part in the programme.

"A big goal is to build up the students so that they would be able to cope with a maths degree when they start, rather than just get good results and get to university, end of story."

At Durham, there is a strong contingent of undergraduate *Levelling Up: Maths* tutors who are keen to teach and enjoy communicating maths, and Durham recognises the scheme's benefits to tutors as much as the impact on participants. Tutoring on the scheme sits well alongside Durham's "Mathematics into Schools" module, as well as opportunities given to fourth year students to run first-year tutorial sessions. The *Levelling Up: Maths* teaching materials are good at bringing out insights and presenting



maths from different angles. In addition, tutors have to thoroughly understand the maths in order to explain it and to deal with surprising answers from students. They therefore build their own maths skills through tutoring on the programme. On top of this, tutors have to be organised and reliable, and develop social skills to create a welcoming environment where all students take a full part in the session.

Durham's Department of Mathematics has a strong core of people who care about helping a wider spread of people to enjoy and engage with maths. *Levelling Up: Maths* fits well within this culture and has genuine backing within the department. The work of running the scheme is shared, with the academic lead responsible for interviewing and selecting tutors, while a central coordinator covers the day-to-day work of scheduling and communicating with participants, with support from the widening participation office and HR team. However, they are clear that *Levelling Up: Maths* is not a recruitment drive but it does communicate to participants that they would be welcome at Durham.

"Showing that Durham would welcome them and that they would deserve to go to somewhere quite ambitious like that is a good main point."

Hannah, Durham University

Hannah is just starting her 4th year of an integrated Master's in Mathematics at Durham University and is currently tutoring her second cohort of *Levelling Up: Maths* students. As the first in her immediate family to attend university, she was attracted to the programme by the opportunity to give back to future cohorts of students.

Hannah drew parallels between the skills that tutors and participants learn through the programme. She has seen the participants grow in confidence in communicating maths and sharing ideas with one another. Likewise, having never tutored before, she was initially nervous about teaching online and worried about making mistakes in front of the participants. She has since grown in confidence herself and finds that tutoring gives her opportunities to practice communicating maths regularly, whereas much of the work on her degree programme is individual. As a result of her experience on the programme, Hannah will be tutoring first year undergraduates next year, including potentially one of her former *Levelling Up: Maths* tutees who has a place to study maths at Durham. A further benefit for Hannah is that working with the *Levelling Up: Maths* materials has helped her reflect on her own learning and what works for her as a student, as well as thinking more critically about the different styles of teaching on her degree course.

"As a tutor you do a lot of reflection about how the students should learn and what's the best way to deliver material. And that gets you thinking a lot about what's taught well in my lectures or how can I be a better student?"



Working with the *Levelling Up: Maths* materials helps participants to shift to a university maths mindset, where understanding the process is more important than getting the right answer. One really helpful aspect is that they present familiar maths from the A level curriculum in an unfamiliar way. The questions are pitched at an appropriate level, so there are some easier questions to warm up at the start of the session and more challenging ones to really stretch students. Having this experience means that participants are likely to be better prepared both for university entrance tests and for questions in the A level exams that might present maths differently.

"I hope that where they're used to seeing materials presented in new ways and in challenging them, that it just gives them a bit more resilience if something comes up in an exam that surprises them."

Another similarity between tutors and participants is that *Levelling Up: Maths* provides a unique opportunity to gain insights into the possible next steps on your own journey. The tutoring sessions give participants a chance to ask questions about what it's like to study maths at university, university applications, and university life more generally, in an informal, natural setting. Hannah also tries to demystify university life by talking about her day or what she has been working on that week. In a similar way, Hannah has found that tutoring on the programme has enabled her to become more involved in her department, getting to know lecturers as well as creating a sense of community between the tutors. She was lucky enough to be invited to a London Mathematical Society dinner where she was able to network with academics and ask them about their careers in mathematics research. These experiences have given her a better understanding of what academics do and cemented her desire to pursue a career in academia herself.

"At its heart, it gets people talking about maths and really enjoying maths. That's something really beneficial."
