



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.

University of Manchester, 2024



The University of Manchester got involved in *Levelling Up: Maths* alongside Manchester Metropolitan University (MMU) and University of Salford. This cross-Manchester collaboration made the running of the scheme much easier, spreading the organisational workload between each University. In addition, the University of Manchester was keen to support the recruitment of lower tariff universities and *Levelling Up: Maths* was an excellent mechanism for doing so. The scheme helps to increase the participation of disadvantaged students and undergraduate tutors are good role models. Manchester note that *Levelling Up: Maths* stands out from other outreach initiatives because it takes place over a period of time instead of being a one-off event. Students are supported throughout the whole year by helping them improve their maths as well as getting them excited about it.

"We need more students doing maths, so we are trying to encourage students who were only aiming to get grade B or C at A Level to also think about studying maths at university if they enjoy the subject."

Although the scheme requires a significant amount of administration, Manchester feels that the operational load is "100% worthwhile" given the benefit to all involved. One key to Manchester's success is building goodwill with school teachers to make sure local arrangements for the sessions are suitable, such as scheduling them during the school day, to encourage the most engagement. Forming groups of students from the same school or college is an essential part of the planning to facilitate this. Collaboration with teachers also means they can advise on specific examples and adaptation of the teaching materials to suit their students.

Manchester reports that the participating school students have had a very positive experience on the scheme. Teachers have reported that students enjoy interacting with undergraduate students and finding out what it's like to be at university. This is particularly valuable to students who do not have family members at university.



Students enjoy the informality of the sessions compared to their regular classes, forming peer groups that are useful beyond the sessions. They have not collected data to assess whether the sessions have affected students' grades, but having the chance to practise mathematics has certainly increased their confidence.

"We're not trying to replace the teachers. A lot of it is about confidence-building."

Undergraduate tutors are close in age and experience to the school students, so are well-placed as role models. The tutors also improve their confidence through leading sessions and feeling like they have achieved something beyond their own personal performance. Some tutors apply for the scheme because they are interested in teaching careers, so their experience on the scheme provides important information on whether teaching is a viable pathway for them. An important feature of the scheme is that tutors are paid, putting genuine value on their time and incentivising them to remain engaged over a long period of time.

Sonia, University of Manchester

Sonia is a first year Mathematics student, who got involved in *Levelling Up: Maths* after seeing it advertised in the departmental newsletter. Sonia was excited by the idea of supporting students from under-privileged backgrounds, recognising the value of a university student acting as a mentor to school students, transferring her passion for mathematics to her tutees.

Sonia highly recommends being a tutor on the scheme, as it is an opportunity to develop key academic and employability skills that are useful throughout a mathematics degree and beyond. Sonia found the structure of the scheme immensely helpful. The sessions and resources are organised very well, but tutors have enough freedom to adapt their teaching to suit their own style and the needs of their tutees. The quality of the supporting materials was particularly helpful to Sonia as an international student with little knowledge of the UK A Level curriculum. Sonia gave high praise to the interactive activities involving graphical calculators, and the inclusion of problems from university admissions tests which her students found very engaging and helpful.

"It involves more skills than one would think, like organisation and especially communication, and I find that's very important."



Sonia appreciates that the sessions can be done online as it makes it easier for all students to be involved without needing to be in one location. Online sessions create some engagement issues in the initial stage, with many students keeping cameras switched off, but an advantage of the scheme is that it takes place over several weeks, giving plenty of time to break the ice and for sessions to become more discursive as everyone gets to know each other.

The tutors receive comprehensive training, including input from tutors on previous iterations of the scheme. Tutors are given detailed guidance on what they are expected to do to facilitate sessions and support their tutees, including the use of the online resources and relevant technologies for online learning, such as interactive whiteboards. Tutors are signposted to other training courses offered by the Institute of Mathematics, such as Python in schools.

Sonia has found the experience highly rewarding. She has had the opportunity to share her love of mathematics as a creative discipline with her tutees and her self-confidence as a professional has grown as a result. Sonia has particularly developed her communication skills, as students are not always forthcoming with feedback, so she developed a discussion-based style in tutorials to draw out questions and identify areas requiring more explanation. The scheme has reinforced Sonia's desire to pursue a career in academia, either as a teacher or an academic.

Sonia hopes she has had a positive impact on the students. Some of the sessions were gave them a head start with mathematical skills such as proof-writing. However, she believes the most important thing to get across to them is that maths is not a cold science; it is full of creativity and imagination, with beautiful concepts that are a joy to study.

"Only knowing maths does not make a good tutor. The skill of explaining concepts is just as important as knowing it yourself."
