



## **Maths Attainment Project Evaluation – 2019-20**

Education Liaison and Outreach Team

10 March 2021

### **Introduction**

The Maths Attainment programme was designed to build mathematical resilience amongst a cohort that had previously failed to complete mathematics GCSE qualifications to the standard required by most universities, and through this, to improve attainment within that cohort.

### **Objectives**

- To enhance mathematical resilience among targeted learners
- To improve attainment in GCSE Maths among targeted learners

(Maths resilience' is a term pioneered by Johnston-Wilder and Lee (2010) to describe a positive stance towards learning mathematics.)

### **Programme Design**

We collaborated with a tutoring company called Tutorfair Foundation who provided experienced tutors to tutor college students.

First cohort: The programme ran from March to May 2020 for the first cohort. We had 15 students initially on the programme from Barnet and Southgate College (BSC) and 25 students from Leyton Sixth Form College (LSFC).

One tutor worked at BSC and two tutors were at LSFC. Tutors delivered face-to-face sessions in the college for the first week.

From the perspective of LSFC the timing of these sessions – March to May - was good as students are more focussed working towards their exam in May.

Student/staff ratio: the student to staff ratio for the first cohort was 2:1 or 3:1 at most.

According to the project coordinator at LSFC, this was seen as being “a good ratio as it allows students to not feel pressured just working individually with the tutor but is small enough for the tutor to pick up on individual issues. It also means that if there are absences there will be at least one student attending.”

However, due to the lockdown right after the start of the project, we were unable to continue with face-to-face tutoring. We suggested continuing with virtual sessions but Barnet and Southgate College pulled out of the project as they thought that their students would not engage in an online version.

Out of the 25 students at LSFC, only 5 agreed to continue with online tutoring from home, but two of them joined the programme much later. Their attendance was however inconsistent.

- 1 student had 0% attendance (dropped out after missing 2 sessions)
- 1 student had 50% attendance
- 2 students had 75% attendance
- 1 student had 100% attendance (2 sessions only)

The average attendance for these students was 60%. This could have been mainly due to the fact that exams had been cancelled and there was no incentive for students to attend.

Second cohort: Since the project was not completed as intended by July 2020 due to cancellation of exams, we extended the project in the autumn term. The second phase ran from mid-September until end of October 2020 over a 6-week period. Again, the college thought this was a good timing for these sessions as students were highly focussed on passing their resit exam in November.

22 students joined from LSFC. They received online tutoring in pairs whilst at the college. Each student received 6 hours of tutoring in all or 1 hour per week. All IT equipment was provided by the college. 4 students dropped out from that cohort either at the beginning or after a few sessions. However, they were replaced by another 4 students who joined the programme later. Nearly 80% of students were in Year 13 and the remaining in Year 12. They were all due to take a maths GCSE resit exam in early November.

Number of weeks	Number of students attending	Attendance rate
Week 1 (at college)	20	91%
Week 2 (at college)	19	86%
Week 3 (at college)	16	66%
Week 4 (at college)	17	77%
Week 5 (at college)	20	91%
Week 6 (at home)	12	55%
<b>Average attendance over 6 weeks</b>		<b>78%</b>

### **Evaluation methodology**

We gathered feedback from the different stakeholders i.e. partners at Tutorfair Foundation including their tutors and the project coordinator at Leyton Sixth Form College. Students had to fill in a pre and post-survey questionnaire where we measured their maths confidence before and after the programme. We also looked at their interest in going to university from the 'outcomes framework' for sixth formers.

Evaluation is focused specifically on the 2<sup>nd</sup> cohort. As the initial cohort engaged weakly with the programme, we made the decision to pause tuition. The college told us that the students were mostly disengaged because of the cancellation of exams.

### **Tuition overview from Tutorfair Foundation**

- At Tutorfair, some tutors are regular tutors whilst others are ex-tutors or university students.
- 85% of them have significant experience whilst 15% do not have much experience.
- All tutors were fully aware that students were resitting exams and the aim of the tutoring was to get them to pass their exams.
- All tutors had a one-to-one training session with Tutorfair including safeguarding training and use of the online platform, Bramble. This gave them the opportunity to know each tutor individually prior to the start of the programme.
- Tutorfair was communicating with their tutors regularly and occasionally were monitoring lessons by dropping into the classroom or listening to the recording.
- Byron from LSFC emailed past exam papers to Tutorfair every week requesting that tutors used them as part of their lesson, which they did.
- They thought that the college was very good in chasing students to attend their online sessions, which reflected in very good attendance for the project overall.

### **Feedback from tutors**

There were 9 tutors on the programme and each tutor answered a series of questions we asked them. Below is an overview of their responses for each question.

#### *How well did students respond to online teaching?*

- 100% of students responded very well to online tutoring. Although it was a new process for them, students overcame any difficulties quickly. They portrayed a good attitude and communicated very well, even through a screen. Most of them asked questions when they needed clarification.

#### *According to you, what barriers were your students facing while on the project?*

- 5% of students lacked motivation on the project despite being capable.
- 10% of students lacked awareness of using a methodology in answering questions. Because students were unable to use the virtual whiteboard, tutors could not assess where they had gone wrong.
- 10% students lacked some basic concepts in GCSE maths dating back from Year 11 (these were either not taught or skipped over at school), leading in gaps in maths knowledge. This meant they struggled to understand the more complicated topics.
- 10% of students had trouble applying their knowledge to exam questions mainly with material that they had not covered since Year 10 or 11. These students did not seem to practise much at home which meant that they could not embed the learning as it was taught at school or in college. The lockdown did not help with this situation either.

- 21% of students confessed having difficulty understanding their maths teacher at college who explained things in a confusing manner, resulting in students thinking that they were wrong. Consequently, this confused their learning even more.
- 21% of students did not have the exam papers they were meant to cover during a lesson so no preparation could have been done.
- About 50% of students had internet issues and logging into the online platform, Bramble.
- One tutor mentioned that his two students were in a room which was quite busy and noisy, so not having an appropriate quiet space did not help.

*Did you notice students' progress during their Maths tuition over the 6 weeks?*

- According to tutors, 76% of students had progressed over the 6 week programme. They seemed to recognise the areas where they needed to improve and gained more confidence in their ability. Progress was slower when tackling the harder questions, but they were still progressing.

*What motivated your students to attend the sessions - or what could have motivated students to attend?*

- 66% of students displayed a personal motivation to succeed, either because they wanted to go to university, get a pass grade in their exam, recognised the importance of maths in life or realised that they were getting a lot out of these sessions. Students were also motivated because they were able to tailor these sessions according to their needs.
- The fact that the sessions took place at college and were part of students' scheduled timetable meant that they were more likely to attend as they were already in a working environment. Attendance was only 55% when students were at home during the last week of tuition.

### **Students survey results**

The pre and post-survey were meant to demonstrate the level of progress students had made in their maths confidence or 'maths resilience' (Johnston-Wilder and Lee (2010)) and ability during the tutoring project. We also wanted to find out if their interest in going to university had increased during that period. Below are a few examples of statements we asked students.

Key facts:

Student statement	% change over tuition period	Analysis
I have usually been at ease in maths courses	120%	A significant number of students felt more at ease during their maths lessons after their tutoring sessions compared to before. Similarly, they felt more able to solve
I usually don't worry about my ability to solve maths problems	83%	

I almost never get uptight while taking maths tests	125%	<p>maths problems and felt less anxious while taking math tests. This definitely shows an increase in their maths confidence over that period of time resulting in a greater aptitude to tackle maths problems, which should translate in a better performance in their maths exams. 'Maths resilience' is a term pioneered by Johnston-Wilder and Lee (2010) to describe a positive stance towards learning mathematics. Their research focused on helping students to overcome barriers and develop more resilient approaches for working with mathematical ideas, rather than on memorising mathematics content. There is a growing body of research that indicates that supporting learners to build mathematical resilience can result in an increase in attainment (Lee, 2016).</p>
I intend to go to university	6%	<p>There was only a slight change in students' aspiration to attend university as most of them had already made up their mind prior to the tutoring programme whether they would go to university or not. The tutoring had a very low impact in helping them make that decision. We were pleased to see that the initial resolve for HE progression hadn't waned despite the increasing blended learning approach in HE and that the increase represented the only "undecided" student indicating they intended to go to university. Since so many of them have the ambition to progress to HE, it looks like they could have been positively influenced by their peer group to progress to HE, which is a very good outcome for students from that cohort.</p>

### Learnings and recommendations

Learnings	Stakeholder	Recommendations	Stakeholder
Tutors could not see what students were writing on their sheet so could not assess if the way they solved problems was right. Students could	Tutor	We would recommend if the college could provide a mouse as part of the equipment provided which will make a big difference	Middlesex University - Action: college

only give their answers to the tutor. There was a possibility for students to use the interactive white board but since they did not have access to a mouse whilst using equipment from the college, they could not write on the white board. I believe some students used the white board during the last week when they were at home and had a mouse to use.		in the way students communicate their workings with tutors.	
The platform used was Bramble which worked well for this type of lesson. The tutor can go through questions and explain the method of solving problems on the board. However, it's uncertain how much the students looked back on the saved workbooks that got sent to them after the lesson.	Tutor	We recommend tutors to stress to students the importance of reviewing these workbooks at home at the end of each session, to really embed their learning.	Middlesex University - Action: tutors
Students do not have the habit of practising maths at home, meaning that they cannot cement their learning and progress sufficiently over time.	Tutor	Students need to be encouraged by tutors to practise at home, maybe through homework that should be given to them.	Middlesex University - Action: tutors
Not all students felt at ease asking questions and some students were quieter than their peer during sessions.	Tutor	I would suggest that tutors have their cameras on at least at the beginning and end of each session. This will allow them to build rapport with their tutees quite quickly. Consequently, students will feel much more comfortable to ask questions during each session to really address their needs.	Middlesex University - Action: tutors
Some students did not have the exam papers they were meant to cover during a lesson so no preparation could have been done beforehand.	Tutor	College should ensure that each student is sent the exam papers to be covered in a session prior to the start of that session.	Middlesex University - Action: college
Some students did not seem to have a personal motivation to attend tutoring sessions.	Tutor	MDX could create a motivation video with one of their student ambassadors to talk about the importance of achieving GCSE maths, which would be shown to all students at the beginning of the programme.	Action: Middlesex University
Six sessions was not enough for this programme and having more	Tutors/	With exams being cancelled for summer 2021, we will consider running the project	Middlesex University

hours would have been beneficial, especially in the week that students were taking exams. LSFC believes 1 session per week per student was enough as the college would find it hard to support students doing more than 1 session per week, although some of their more dedicated students were eager for more regular sessions in the last few weeks.	Tutorfair Foundation  LSFC	in the autumn with each student getting 6 sessions in all.	
It is uncertain if students' progress made during tuition was being monitored by their class teachers.  LSFC mentioned that class teachers find it hard to gauge students' progress as they had only started working with them since September and did not know students' ability as such. However, a few staff had noticed improvement in subject confidence and increased topic knowledge in their students.	Tutor  LSFC	Although it would have been useful to give feedback to teachers so there can be a follow-up of the students' progress or areas of need in the classroom, this will add an additional layer of management on the college staff which is not sustainable for that project.	Middlesex University
The timing of sessions for the first cohort – March to May - was good as students are more focussed working towards their exam in May.	LSFC	Sessions will be delivered closer to exam dates with the last week of tutoring coinciding with the first maths paper.	

### GCSE maths results (November retake)

- 22 students took part in the tutoring programme
- Out of those, 2 decided not to take the exam at the last minute i.e. 20 took the exam

### Grades achieved

Current grade	No. of students	Previous grade	Percentage
2	3	3	15
3	8	3	40
4	7	3	<b>35</b>
5	2	3	<b>10</b>
Total	20		100

**Pass rate (grade 4 and 5): 45%**

### Comparison of pass rate

	Pass rate for whole cohort	Pass rate for cohort tutored by Tutorfair Foundation	Percentage increase
November 2020	30%	45%	+50%
November 2019	25%		
November 2018	26.4%		
Average pass rate for past 3 years	27.1%		

It is worthwhile to note the significant increase of 50% in the pass rate for tutored students in November 2020 as compared to the non-tutored students. The correlation between attendance at tuition sessions and the maths retake grade further reinforces the evidence that the programme provided a significantly higher chance of passing the maths retake.

### Correlation between attendance and grade

Current grade	Student's initial	Attendance Note: session 6 was during half-term (x: present; a absent)						% attendance over whole programme	Notes
2	Isabella.R	x	x	a	x	x	a	67	
2	Elizabeth.S	x	x	a	x	x	x	83	
2	Anmbreen.I	x	a	x	x	x	a	67	
3	Firaz.S	x	x	a	x	a	a	50	Just missed grade 4
3	Ameera.A	x	x	x	x	x	x	100	
3	Maryam.B	x	x	x	x	x	x	100	Just missed grade 4
3	Lajay.B		x	x	x	x	a	80	Joined from week 2
3	Asani.N	x	x	x	a	x	a	67	
3	Jorge.J			x	a	x	a	50	Joined from week 3
3	Janice.ML		x	a	x	x	a	60	Joined from week 2
3	Reece.B			x	x	x	x	67	Joined from week 3
4	Juliana.T-M			x	a	x	x	50	Joined from week 3
4	Dallel.G	x	x	x	x	x	a	83	
4	Nazifa.H	x	x	x	x	x	x	100	
4	Bernadette.E-A	x	x	x	x	x	x	100	
4	Adikalie.C	x	x	x	a	x	x	100	
4	Caua Felipe.VDS	x	x	a	a	a	a	33	
4	Iqra.A	x	x	x	x	x	a	83	
5	Shiala.R	x	x	x	x	x	x	100	
5	Gulcan.G	x	x	x	x	x	x	100	

70% of those who attended at least 5 out of 6 sessions achieved a pass grade showing a direct relationship between high attendance and achieving a grade 4 or above.



### Proposal for project delivery for academic year 2020-21

- The tutoring programme to run for 6 weeks as a shorter programme has encouraged higher attendance to sessions which in turn correlates with improved likelihood to pass their retakes.
- Programme to run in the autumn of 2021 for those resitting in November.
- Online tutoring during college hours so college can easily monitor attendance. With online tutoring, it will be less likely to have to cancel or postpone the programme. However, we will give each college the choice of face-to-face tutoring (depending on the situation them), depending on what works best for their students.
- Partner with a tutoring company who would provide experienced tutors. Tutorfair Foundation managed this project very well and demonstrated high professionalism so would be keen to deliver project with them again.
- Student to staff ratio: 2:1 to be maintained. If one student is absent, the tutor has another student to work with.
- Work with a maximum of 60 students from two different institutions, one being Leyton Sixth Form College (LSFC) as they are one of our top feeder colleges. Their students' attendance was also very good for the last cohort and the enthusiastic collaboration with LSFC staff also contributed to the programme's success .
- For the second institution, we have a few in mind that we could partner with:

Name of institution	Benefit	Drawback
Havering Sixth Form College	- A feeder college so would meet Recruitment objective - GCSE maths department has already expressed an interest of being involved in this project.	-Cohort very similar to LSFC so no scope to compare cohorts
London South East Colleges (LSEC)	- Part of NCOP so possibility of project being partly funded by NCOP - Cohort from FE college provides scope for comparison - Additional possibility of raising our profile with this college	-Contact person at LSEC is the NCOP engagement officer. There will be a need for a Maths teacher to be the project coordinator to: 1) find a cohort of students for the project and prepare a timetable for tutoring sessions

		<p>2) remind students to attend sessions weekly</p> <p>3) liaise with the tutor company when required</p> <p>- LSEC has four campuses and managing students from various campuses is challenging</p>
Into University	<ul style="list-style-type: none"> <li>- Building our relationship with this organisation</li> <li>- Possibility of raising our profile with a different cohort of students</li> <li>- Contact person has already expressed an interest in this project.</li> <li>- Possibility to compare cohorts v/s LSFC</li> <li>- Would help us meet OfS objectives</li> </ul>	<ul style="list-style-type: none"> <li>- The logistics involved in this project makes it too demanding to manage for themselves and the college staff.</li> <li>- They have a very small cohort of sixth form students (about 5-6) who regularly attend their centre. They are mostly academic students who do not require this support.</li> </ul>

- Our preference for the second institution would be Havering Sixth Form College as they will be able to manage the logistical demands of this project.
- Programme to be open to Year 12 students who have achieved a grade 3 in their previous exams and will be retaking their GCSE Maths exams.
- Students need to meet a widening participation criteria and show a personal motivation to achieve a pass grade.
- Students have to demonstrate an interest in progressing to higher education.
- We suggest to include a control group from Leyton SFC (and the 2<sup>nd</sup> institution) who we could compare cohorts with.