

CITY OF LONDON ACADEMY, ISLINGTON
MATHEMATICS PROJECT

City University and the City of London Corporation working to improve mathematical ability and numeracy of students at the City of London Academy Islington

**Evaluation Year 2
(2013/2014)**

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1. Introduction

This report provides an evaluation of the second year of a City of London funded project - providing support for the City of London Academy - Islington by utilising the academic strength of the Centre for Mathematical Sciences at City University London. The project deploys undergraduate student tutors studying a math or math related subject to The Academy where they provide direct support to students in Year 7, 10 and 11. This project seeks to contribute toward the Academy's extensive work in achieving step change improvements in numeracy - visibly demonstrated through improved attainment in Mathematics. Year 2 of the project has also been a success and this evaluation details implementation, evaluates impact, addresses issues and the remedial actions taken to ensure successful completion of the second year.

The Academy and City University is grateful to the City of London for their considerable financial support, oversight and input throughout the course of the project, without which, the project would not have been successful.

2. Project Aims

The project has duration of 3 years and the aims over this time frame are to contribute towards:-

- **Better Academy Results:** To improve levels of attainment in Mathematics and numeracy within the Academy, Islington - working with able students and identified (borderline) students who were not fully realising potential to achieve better results at GCSE examinations.
- **More Academy students studying Mathematics:** To encourage and route greater numbers of Academy students towards the study of Mathematics in Further and Higher Education (City University and/or other FHE institutions).
- **Utilising City University's strength in Mathematics for the Academy:** To direct City University and other specialist HE Academic expertise in Mathematics to support teaching staff in the Academy - further developing subject knowledge and enhancing teaching practice.
- **City University Students routed towards teaching:** To actively support and develop City University students towards careers in the teaching of Mathematics.
- **Opportunities for City University students to make even greater contribution to the Community:** To offer City University students opportunities to enhance their skills and make a significant contribution to education within local communities.

3. Highlights from Year 1

The first year of the project proved to be a successful start in providing a helpful addition to the range of work undertaken by the Academy to support improved attainment. Academy GCSE results over this period showed significant improvement from previous years.

The number of students achieving 5 A*-C grades, inclusive of English and Maths, almost doubled, rising from 33% last year to 61%.

4. Summary Description of Project

4.1 Changes from Year 1

- Tutoring for Year 7 was introduced which increased the number of year groups taking part in the project (Year 7, 10 and 11). This addition helped to broaden the teaching experience for the tutors as well as encourage students to develop an interest in math at an earlier age
- The number of sessions delivered increased; Year 7 and 10 spanned across the entire Autumn and Spring terms with a total of 21 sessions – this is a major improvement from the previous year where Year 11s were taught during the Autumn term and Year 10 during the Spring term for 10 sessions each.

4.2 Delivery of student tutoring

Summary of Tutoring			
Year Group	Year 7	Year 10	Year 11
Number of Students	111	116	14
Number of Sessions	21*	21*	5**
Residential			16
Master Class		28	

*Originally 23 sessions - session one cancelled due to Academy preparing for an open morning. Session 18 cancelled due to strike action by the National Union of Teachers (NUT).

**Tutoring for the Year 11s began at the end of April close to their final GCSE math examination.

Year 7

Students were tutored in groups of 4-6 supervised by a member of Academy staff. The tutoring sessions were scheduled on Wednesday afternoons during timetabled numeracy lessons. During each session students were set tasks which they had to complete with the help of their tutors. The objective of these sessions was to give students extra practice in solving problems with guidance from their tutors.

Year 10

Tutors adopted the role of teaching assistants - they were present during Year 10 math classes and would provide support, answer questions and assist in solving problems after class teachers had explained the lesson plan and set the work.

Year 11

Students received one-to-one tutoring in March/ April before sitting their GCSE exams. These sessions were crucial in helping with their revision and preparation for their exams. Struggling students were identified and then given the option of having a personal tutor to work with them on areas they felt they were struggling in. As these sessions were voluntary, the sessions were very focussed with deep 1:1 learning.

4.3 Mathematics Residential

In addition to receiving 1:1 support, 16 Year 11 students were taken on a mathematics residential weekend with 5 of their teachers on 31st October – 2nd November prior to sitting their mock GCSE examination. The students spent the weekend at Kingswood Education Centre, an establishment that provides educational and recreational support for schools. During the residential, Academy pupils received over 24 hours of Mathematics revision.

As well as improving attainment, the goal of the residential was to boost self-esteem and confidence in preparation for the upcoming exam.

A range of topics were covered based on past exam papers. The pupils were divided into three groups: all following the higher tier GCSE math syllabus. Students were taught in carousel style where each teacher was assigned to teaching a set block of topics. On the final day of the Mathematics Residential the pupils sat a practice mock exam to assess and monitor progress.

4.4 Teach First Sessions

Teach First; an organisation that promotes leadership in teaching provided three bespoke workshops throughout the course of the project. The aims of these workshops were to provide tutors with teaching tools and support whilst providing them with an avenue to pursue a career in teaching.

1. Tutoring and Mentoring

The skills session explained the principles of one-to-one and small group tuition and provided tutors

with a toolbox of techniques transferable for any age group. The practical session better enables tutors to understand their tutees' misconceptions and provide solutions to overcome this.

2. Effective Teaching Skills and Behaviour

This session explored the various things that influence children and how this is manifested in their behaviors. It offered some theory and positive strategies to understand and deal with these behaviors as and when they happen. The effective teaching element draws on practical tools to take teaching forward in the classroom.

3. Assessment in the Classroom

This session provided tutors with the tools to assess the learning of their tutees in the classroom and provided them with some practical tools to help measure progress. The end of the session provided a valuable insight into teaching for anyone considering it as a career.

4.5 Math Master Class

Staff from City University's Mathematics department delivered a workshop on mathematics to top-tier Year 10 students. The topics covered were: Origami and Mathematics; Probability, Statistics and Gambling; and Ciphers and Coding. These topics, outside the usual school curriculum gave students a taste of what mathematicians practise in the real world. The objective of this master class was to give those students, most likely to study mathematics at a higher level, an insight to what a potential career in Mathematics looks like.

The Master Class took place on 1st July 2014 where Academy students were able to spend the day at the City University. In total, 28 students attended the workshops delivered by a senior lecturer at the University.

Origami

Dr. Silvers delivered an engaging origami workshop where students were encouraged to think like mathematicians by using origami to prove the Four Colour Theorem. They were tasked with folding sheets of paper in certain angles to create a specific shape, unfold and colour the shapes created by the folds ensuring that no two colours were adjacent to one another. This was followed by a similar but more difficult task using maps of America and United Kingdom.

Probability, Statistics and Gambling

Professor Broom provided students with a brief overview of the origins of probability and gambling. From a mathematical perspective – taking a calculated risk rather than leaving things to chance. They were shown how using three important, very simple facts, could be used to calculate the probability of an event occurring. They put this theory in to practise by analysing a version of Penney's game; where a coin is continuously flipped until a specific sequence appears. Students found that one outcome was more likely to occur than the other and that if one outcome was known; it would be possible to choose other outcomes that are more likely. This showed the students that mathematics can be applied in the real world and how to take a calculated risk that works in their favour.

Ciphers and Coding

Dr. Castro-Alvaredo delivered a presentation on how mathematics is applied in cryptography which is used in securing electronic communications. Students were introduced to modular arithmetic which is key to understanding how coding works and understood how it was applied to a widely used key cryptosystem.

Students particularly enjoyed the Origami presentation because of its hands-on approach which involved practical exercises in problem solving, working in groups and discovering for them how a problem is solved. Majority of students agreed they had learnt things about math that they did not know before. 18% felt they saw math in a different way and 27% felt that the day made them think more about attending university.

4.6 Weekend Revision

The University also hosted an intensive weekend revision session for Year 10 students just before they sat their GCSE exams. Staff members from The Academy delivered the revision sessions on the University campus which further encouraged students to think about higher education.

The two sessions took place on a weekend and were optional to targeted borderline students. 18 attended session one and 20 attended session two. All students were glad that weekend revision sessions had been organised for them and 90% said they were pleased to be able to cover topics with assistance from their teachers that they would not have covered by themselves at home. 71% felt more confident about sitting their Math GCSE and 57% admitted that they wouldn't have covered as much revision at home. 43% are confident they will achieve minimum Grade C.

4.7 Project Steering Group/ Governance

The steering group committee consisted of the following members:

- Angela Murphy, City of London
- Eamon Martin, Director of Educational Relationships, City University London
- Zohra Moledina, Partnerships Officer, City University London
- James MacNaughton, Deputy Head of Mathematics, City of London Academy Islington
- David Lee, Head of Mathematics, City of London Academy Islington
- Zara Tippey, Head of Partnerships City of London Academy Islington
- Dr Anton Cox, Head of Centre of Mathematics, City University London
- Danielle Russo, Deputy City University London
- Jenny Tait, City University London
- Danielle Russo, Widening Participation Outreach Manager, City University London
- Jenny Tait, Widening Participation Projects Officer, City University London
- Karan Pattni, Project Evaluator, City University London
- Leyla Gadid, Teach First

The steering group is in charge of making sure the project is running smoothly and make necessary amendments to ensure that it continues to do so. The meeting minutes are available.

5 General Feedback and Statistics

Student attendance improved significantly:

-Average attendance for Year 7 was just below 90% and 93% for Year 10.

Year 7 - Positive impact on attainment in mathematics

- 66% of Year 7 students said tutors have helped them make more levels of progress
- 65% said they would like to have a tutor again next year
- 56% said that they should always be given step-by-step explanations
- 38% expected to improve their grade / do better in mathematics
- 50% said tutors played a very important role in encouraging them to achieve
- 45% said tutors played a very important role in improving their understanding of mathematics

Year 10 - More productive learning in the classroom

- 71% agreed they were given help more quickly when teaching assistants were present
- 60% emphasised the importance tutors played on their classroom learning
- 38% of students described tutors as being patient and interactive

Year 11 – Direct impact on learning

-50% of tutors felt tutoring Year 11 had a direct impact on their learning

Impact and effectiveness of Teach First

- 94% of tutors said that the Teach First sessions were scheduled at the right time to have maximum
- 20% of tutors opened applications for Teach First

Invaluable insight into teaching as a career for tutors

- 72% of tutors said they are considering a career in teaching
- 78% said that the tutoring project influenced their decision

Tutors – Floaters ensured tutor attendance

- Absent tutors affected Year 7 the most
- Number of tutoring hours increased from 20 hours to 47 hours
- Missing sessions was sometimes beyond a tutors control
- Apart from illness, the primary reason for absence was the rescheduling of lectures to Wednesday afternoons (note that university timetabling keeps Wednesday afternoons free for other activities, however at the discretion of lecturers, that time is occasionally used to cover missed lectures)
- To deal with this, floating tutors were hired. These tutors were scheduled to attend every week and were assigned to tutees whose tutors were absent.
- The floating tutors began tutoring from week 12
- Between week 12 and week 21 the number of tutees without tutors was significantly reduced

Weekend Revision

- 71% felt more confident about upcoming exam
- 90% covered topics they wouldn't have covered at home

Tutor Feedback

"The advice given through the Teach First sessions were extremely useful"

"I saw a huge difference when I applied the skills I learnt from Teach first into the classroom"

"The Teach First session taught me how to interact with students by using different techniques and constantly encouraging and motivating them"

"The project gave me an immersive sight into teaching as a career"

"I hadn't considered teaching until I became part of the Math Project and I now realise that it is quite fulfilling and rewarding"

"When tutoring Year 7, I had to think on my feet to come up with ways to keep their attention on the work. This helped me learn how to incentivise them and keep them focussed"

"It was a good opportunity for me to see teaching first hand. I picked up some useful hints"

"Tutoring Year 7 was daunting at first because I was solely responsible for a group of students. Being on my own made this challenge much more interesting"

"The experience was much more structured and I was able to help students individually and so I felt I had a bigger impact as there was less behaviour management as the teacher ensured students were working"

6 Progress

General progress at The Academy is expected to take place gradually from Year 7 – 11. Generally students are expected to make three levels of progress however The Academy pushes for students to make four levels of progress. The attainment of a student in any given subject is measured by 'levels' which begin from 1. On average, a student should make one level of progress each school year.

6.1 Progress Year 7

The progress report issued by The Academy (Dec 2013) showed 55% (20/11) of students moved up one level of progress. Out of the 11 groups, 5 groups moved up from level 1 to level 2 (28 students) and 6 groups moved up from level 2 to level 3 (32 students). The latest statistics (March 2014)

<i>Year 7</i>	<i>Number</i>	<i>%</i>
On Target	53	47.75
Made Progress	24	21.62
No Progress	34	30.63

The table above shows over 50% of students are on target to make four levels of progress and just over 20% have made at least one level of progress. The 30% not on target are down to attendance and behaviour issues. Despite this, the tutoring sessions complement the Year 7s four math lessons per week and homework. The data and statistics are reasonable at this stage and The Academy is happy with it. The Academy Math Department confirmed that the Math Project is an element that adds greatly to students' progress. Comparing Year 7 data with previous years, the rate of progress is significantly higher. Although the project is one aspect to a range of changes being made, it is certainly a major contribution. The Academy are pleased to be in a position where students' are not falling behind and there aren't any major gaps in progress.

6.6 Progress Year 11

The latest statistics for Year 11 progress show 42.86% of students that are on the national target to make three levels of progress and 4.76% are on The Academies personal target of four levels of progress.

<i>Progress</i>	<i>September 2013 %</i>	<i>August 2014 (Predicted) %</i>
Three Levels of Progress	42.86	73.81
Four Levels of Progress	4.76	23.81

<i>Grade</i>	<i>Predicted %</i>
A to A*	4.76
A* to C	33.33
A* to D	100.00

The tables above show that 100% of the 42 students on the project are predicted to achieve A* - D at GCSE and 33% will achieve A*-D. Year 11 were engaged for short periods of time three times during the academic year and The Academy are pleased with their future predictions.

6.3 Progress Year 10

27% of students achieved four levels of progress and 48% achieved three levels of progress. Comparatively, this data shows that figures are still significantly higher than previous years.

<i>Year 10</i>	<i>Number</i>	<i>%</i>
Four Levels of Progress	30	27
Three Levels of Progress	54	48

7. Conclusion

The second year of the project has been an improvement from Year 1. The major change this year; moving tutorials to curriculum time has had a significant impact on student attendance and has enabled tutors to work closely with their students consistently throughout the year. The Math Project has provided a helpful addition to the range of work undertaken by the Academy to support improved attainment. Academy GCSE results over this period are expected to show significant improvement from the previous year. The credit for which rests with the Academy students; together with the Senior Leadership Team and staff members. The project has played its part - as one component of a raft of actions taken to help students succeed.

Feedback shows that the project has made an impact in enthusing Academy students towards the study of Mathematics and provided tutors with an avenue to pursue a career in teaching as well as enhancing their tutoring skills; encouraging them to think positively of a career in teaching; and in enabling them to make a real contribution to education within the local community in Islington.

We look forward to delivering the final year of the project in 2014/2015.