London Schools Excellence Fund

Self-Evaluation Toolkit

Final report

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Evaluation Final Report Template

Introduction

The London Schools Excellence Fund (LSEF) is based on the hypothesis that investing in teaching, subject knowledge and subject-specific teaching methods and pedagogy will lead to improved outcomes for pupils in terms of attainment, subject participation and aspiration. The GLA is supporting London schools to continue to be the best in the country, with the best teachers and securing the best results for young Londoners. The evaluation will gather information on the impact of the Fund on teachers, students and the wider system.

This report is designed for you to demonstrate the impact of your project on teachers, pupils and the wider school system and reflect on lessons learnt. It allows you to highlight the strengths and weaknesses of your project methodology and could be used to secure future funding to sustain the project from other sources. All final reports will feed into the programme wide meta-evaluation of the LSEF being undertaken by SQW. Please read in conjunction with Project Oracle's **'Guidance to completing the Evaluation Final Report'**.

Project Oracle: Level 2
Report Submission Deadline: English for Integration - 9 June 2015 / Round 1 and Round 2 - 30 September 2015 *(delete as appropriate)*
Report Submission: Final Report to the GLA / Rocket Science *(delete as appropriate)*

Project Name: **Enhancing Mathematical Learning through Talk**
Lead Delivery Organisation: Brunel University London
London Schools Excellence Fund Reference: **LSEFR1157**
Author of the Self-Evaluation: **Professor Valsa Koshy (Brunel University lead), Davina Salmon (LA lead) and Christine Mitchell, CPD lead (Exeter University)**
Total LSEF grant funding for project: **£275, 400**
Total Lifetime cost of the project (inc. match funding): £275400
Actual Project Start Date: **February 2014**
Actual Project End Date: 30th September 2015

1. Executive Summary

This should be a brief summary of what information is included in the report, the evaluation methods and analysis used and a summary of the key findings from your project evaluation. (maximum 500 words)

The unique and innovative 'Enhancing Mathematical Learning through Talk' project aimed to develop two interacting strands of expertise in teachers (1) **mathematical subject knowledge** and (2) **pedagogical expertise** of KS1 teachers. This evaluation shows that both aims have been achieved through offering professional development in both strands in parallel – each enriching the other. **Subject knowledge** sessions were designed for teachers to acquire practical knowledge in teaching mathematics. An audit of the teachers' existing subject knowledge and confidence in teaching key topics in mathematics was carried out via a test on the 1st day of the Continuing Professional Development (CPD) programme. Based on the results, the teachers set targets for improving their subject knowledge and extensive support modules and individual tutorials were offered. The modules were designed to encourage thinking about mathematical ideas in depth with a focus on facts, skills and conceptual understanding, and highlighting interrelationships and connections between mathematical ideas. Activities at the teachers' own level (which could be adapted for children) to promote problem solving and reasoning (useful for challenging children's thinking and a key component of the National Curriculum) were also provided. An end of project subject knowledge audit was carried out and the results of both pre- and post tests were analysed - the results have been extremely encouraging. The second strand, developing the **pedagogical expertise** of KS1 teachers, focused on the use of language and talk-in-interaction about mathematical concepts. The central theme was to encourage 'mathematical talk' and discussion in the classroom. During the CPD sessions, teachers were introduced to alternative approaches to developing high quality interaction in the classroom (underpinned by research evidence) via an exploration of i) mathematical tasks for children with an emphasis on reasoning ii) teacher talk iii) the revised NC requirements iv) organizing classrooms for maths talk. Teaching approaches were modelled and key readings and a range of resources to promote mathematical talk and discussion were provided. Pre-project observations of 16 teachers teaching mathematics in KS1 were carried out. A set of assessment tasks for the teachers to use with their class was also devised (based on the revised NC). Teachers monitored the children's mathematical achievement in September 2014 with their new classes and again in June 2015. Two non-project teachers also undertook the monitoring tasks with their classes thereby providing the project with a small control comparison group.

There has been a high level of enthusiasm and active participation amongst the project teachers as evidenced in their detailed evaluations; excellent attendance at CPD sessions across a significant period of time (17 months); their appreciation of the opportunities for reflection and discussion with the project team, the research readings, and the availability of high quality resources enabling them to immediately put into practice some of the CPD ideas.

Robust evidence on all aspects of the intervention has been gathered and the results demonstrate the significant impact of our activities on the teachers, children and the wider community. We have established a website for public use. One of the highlights of the project was a pan-London Conference, attended by 200 delegates from schools and Universities across London.

To conclude, during the last visit to a participating school, Nadia (6 years old) told one of the project team members:

'My mum could only talk Polish before, now she can also talk maths'.

2. Project Description

Much of the detail for this section can be drawn from your Stage 2 funding application. Please note that if you do copy this information from your original application, funding agreement, or interim report, be sure to update it as appropriate (e.g. including tense change).

Provide a full project description (approximately one side of A4), in particular:

- *Why was the project set up? / What need was it seeking to address? (e.g. because teachers lacked confidence in their subject knowledge? Because pupil attainment was lower in this subject area in this borough/cluster/school/than in other boroughs/clusters/schools?).*
- *What were the circumstances into which it was introduced (e.g. existing networks of schools/ expert partner offering a new approach etc.)?*
- *What project activities have been put in place?*
- *Where has the project been delivered geographically?*
- *Who delivered the project?*
- *Who were the target beneficiary groups of the project and why?*

The ultimate aim of our project was to raise the quality of mathematics teaching through developing teachers' subject knowledge and pedagogical skills, with an emphasis on maths talk. Nationally, there is a paucity of professional development in mathematics teaching for Key Stage One teachers. The perception that teachers at Key Stage 1 don't need a high level of subject knowledge is challenged in our project as we believe that the first years of schooling are vital for developing children's positive attitudes towards learning thereby ensuring their future achievement (Alexander, 2008). Research evidence shows that in order to provide children with robust learning frameworks and conceptual understanding, the teacher needs to enhance his or her own practical knowledge in mathematics as well as pedagogical skills in the teaching of mathematics. And so, children should be taught by teachers who are confident in both content knowledge *and* pedagogical skills. The project seeks to address both of these aspects.

The core project team includes Professor Viv Ellis, Dr Deborah Jones and Professor Valsa Koshy from Brunel University, Davina Salmon from Wandsworth LA , Christine Mitchell, honorary fellow at Exeter University, and Kylagh Thompson, a lead practitioner and expert in KS1. A number of expert consultants were also involved in the planning and delivery of the project.

In order to achieve our aims we provided six face-to-face CPD days with sessions on:

- mathematics subject knowledge including an audit tool (as a pre- project test) for establishing teachers' baseline knowledge and skills and for tracking progress;
- the importance of developing children's mathematical facts, skills and conceptual understanding;
- the role of language and classroom interaction in the development of mathematical concepts and understanding;
- how to involve parents in their children's mathematical learning (a framework and sample resources were provided in the 2nd year of the project);
- lesson planning including mathematics through children's story books and role play with a focus on discussion, problem solving and reasoning as well as content (2nd year of the project);

In addition to the CPD days, the project provided the teachers with key readings; resources, and distance learning tasks which were recorded in a personal learning journal. The project website and pan-London conference enabled ideas, materials and effective practice to be shared.

In the various sections of this report, we describe how the planned the outcomes and impact of the project have been achieved, but a short summary statement is also included in this section as follows:

For teachers

- enhanced **mathematical subject knowledge** and higher confidence to explain and teach mathematical ideas.

We have evidence of increased scores in content knowledge and confidence to teach the various topics

- higher quality **pedagogical approaches***,* with a strong focus on mathematical language and quality of interaction as monitored through lesson observations.

There has been a significant change in the quality of talk in the interactions between teacher and pupils and pupils and pupils in the classroom

For children

- higher levels of attainment and progression in mathematics.

A significant increase in children's attainment in monitoring tasks (pre- to post monitoring September 2014 to June 2015)

- greater enthusiasm and enjoyment in learning mathematics evidenced through classroom observations and teacher feedback.

Continuous teacher feedback suggested noticeable changes in children's attitudes and motivation to be engaged in mathematical activities.

For schools

- establishment of frameworks for high quality mathematics lessons.

Changes in teaching styles and quality of interaction are reported in the observations section 8 Strand 2

- teaching materials to support and promote high quality mathematics talk in the classroom*.*

A substantial amount of tried and tested resources and materials was given to teachers after their uses were exemplified and modelled in the CPD sessions

- A framework for increased parental involvement in children's learning.

Alternative approaches to parental involvement in mathematics learning were explored and a framework for engaging parents modelled with sample resources and additional frameworks provided.

We worked with 33 schools in Wandsworth and Merton LAs, 29 of them remained on the project until the end (one teacher moved school). At the outset, a Steering Group was established to discuss issues arising from the project and any recommendations were followed up immediately. The Steering Group comprised two LA advisers, teachers attending the training programme, a Head teacher from each LA, and the Brunel University team. The project delivery team included 3 senior academics from Brunel University, a Wandsworth LA adviser, an expert in Key Stage 1 Education and Mathematics from Exeter University and a KS1 practitioner with substantial experience of working both in HE and schools.

The target groups were practising Key Stage 1 teachers from the two Local Authorities.

2.1 Does your project support transition to the new national curriculum? **Yes**

If **Yes**, what does it address?

The project addressed selected elements of the overarching aims of the National Curriculum as described below.

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Particular attention was given to the following key message in the Mathematics National Curriculum which informed our planning and content for the intervention programme.

Spoken language

The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

2.2 Please list any materials produced and/or web links and state where the materials can be found. Projects should promote and share resources and include them on the LondonEd website.

The programme website, www.talkmathstalk.co.uk , including the full range of programme presentations, recommended reading, CPD tasks and classroom resources has been available to project schools throughout the programme through the use of a username and password. Work to develop the site so that it is openly available to all schools will be undertaken in the Autumn of 2015.

This can be cross referenced on the LondonEd website.

3. Theory of Change and Evaluation Methodology

Please attach a copy of your validated Theory of Change and Evaluation Framework.

Throughout the report it would be useful if you make reference to these documents. Where appropriate we would also encourage you to include any assumptions you have made from previous research.

Appendix 1 presents the Theory of Change and Appendix 2 provides the Evaluation Framework. Please note, data from the evaluations of the CPD sessions, the pre-and post subject knowledge audits (which also monitored teachers' confidence to teach different mathematical topics) along with the lesson observations, demonstrate that the first three assumptions have been effective. Children's mathematical knowledge and skills have been enhanced, as demonstrated in pre- and post monitoring tasks taken in September 2014 and July 2015.

3.1 Please list **all** outcomes from your evaluation framework in Table 1. If you have made any changes to your intended outcomes after your Theory of Change was validated please include revised outcomes and the reason for change.

Table 1- Outcomes

Description	Original Target Outcomes	Revised Target Outcomes	Reason for change
Teacher Outcome 1	Improved subject knowledge in terms of depth, structure and content in mathematics. Greater awareness of interconnectedness between mathematical topics and increased confidence to explain mathematics content to children – facts, skills and concepts.		
Teacher Outcome 2	Higher quality maths teaching through improved pedagogical skills; facilitating mathematical talk and interaction and improved questioning.		
Teacher Outcome 3	Improved teacher confidence in subject knowledge and the ability to explain mathematical concepts.		

Pupil outcome 1	Improved attainment and progression in mathematics.	Improved attainment and progression in mathematics measured against new curriculum.	To ensure programme was most current and useful to schools in transition to new curriculum and assessment requirements
Pupil outcome 2	Enhanced pupil engagement in mathematics lessons.		
Pupil outcome 3	Capacity building within project schools including Inter-school collaboration through establishment of hub schools with a larger number of teachers taking up a new model of teaching and resources.		
Wider system outcome 1	Teachers/ Schools involved in the project making use of resources provided.		
Wider system outcome 2	Improved parental involvement in mathematical learning of their children.	Model programme and resources to enable schools to improve parental involvement in mathematical learning of their children.	To enable the project team to maintain quality of provision in the time allocated to this strand within the whole programme.

3.2 Did you make any changes to your project's activities after your Theory of Change was validated? **Yes**

Extra consultants had to be recruited to design the children's monitoring tasks. Extra days also had to be provided for schools to carry out the detailed and therefore, time-consuming, monitoring tasks. A decision was made for schools to present at the pan-London conference, the cost of which also had to be covered. Selected examples of teachers' planning and work with their classes was showcased at the pan-London conference. We purchased a range of sample resources and provided these for the conference delegates in order to initiate activities in the delegates' school setting.

If **Yes**, what were these changes (e.g. took on additional activities?)

After consultation with schools, a change in the way we supported the teachers in engaging parents in mathematics was made. We provided CPD sessions for all attending teachers so that more schools could be supported in a shorter time-frame and also to facilitate discussion and sharing of ideas.

3.3 Did you change your curriculum subject/s focus or key stage? **No**

If **Yes**, please explain what changes you made, why, and provide some commentary on how they affected delivery.
n/a

3.4 Did you evaluate your project in the way you had originally planned to, as reflected in your validated evaluation plan?

Consider changes to evaluation tools/methods, sample sizes, and anticipated outcomes. If applicable, please explain what changes you made and why, and provide some commentary on how they affected your evaluation.

4. Evaluation Methodological Limitations

All the original plans were implemented. Also, owing to changes in the National Curriculum and assessment requirements, additional data was collected by using an assessment system based on a set of monitoring tasks designed by the Project team. Owing to practical considerations, the number of control schools was reduced to 2.

4.1 What are the main methodological limitations, if any, of your evaluation?

This can include data limitations or difficulty in identifying a comparison group. In order to get a realistic idea of the strength of your evaluation, and identify possible improvements, it is essential that you reflect on the strengths and weaknesses of your evaluation.
You should address limitations of the evaluation only, not the project itself - *Every evaluation has limitations, so please be honest. This could include limitations relating to:*

- *The kinds of data you could/ could not collect (and the response rate for surveys)*
- *The size of the sample/ group you are evaluating*
- *The extent to which you felt able to assess the impact of activity on beneficiaries (what changes in attitudes/behaviours/attainment were caused by the intervention and what has been caused by other factors)*
- *Also include mitigating actions for methodological limitations where possible – e.g. alternative approaches or solutions and also how these limitations will affect the evaluation of the project (particularly pupil and teachers outcomes).*

Section 4 – Methodological Limitations

Some methodological limitations are evident in our evaluation. Some of these are general and others relate to specific aspects in the conduct of our data gathering.

1. The analysis of the different sets of data gathered in the project show an impressive level of impact but we are aware of the relatively small number of schools in the cohort.

2. The original intention at the start of the project was that we would use historical data using National test results for analysis. However, changes in the National Curriculum and testing arrangements made this impossible. Alternative arrangements were made which were found to be effective.

3. For practical reasons, we could not recruit a comparison group of teachers for the pre- and post- audits/tests of subject knowledge or for the lesson observations.

4. We had originally planned to recruit 12 schools, which were not in the project to carry out the pupil progress/attainment monitoring but only two schools were able to engage with the monitoring. Reasons given were work pressure and report writing during June/July 2015.

Robustness and Usefulness

Although our methodological process has limitations, there has been only one change from our original plans. This related to the number of comparison schools carrying out the children's assessment being reduced from 12 to two.

With regard to the usefulness of the outcomes of the project, we believe that our CPD programme, activities and resources, provide a reliable framework for other teachers and schools to follow. The outcomes also fulfil the aims of the LSEF funds, especially in the creation of useful models to drive up standards in London and in the wider systems. In this respect our project can be viewed as a documentary which raises issues and discussions and, at the same time, illuminates the possibilities of effective practice in Key Stage One classrooms in London and universally.

4.2 Are you planning to continue with the project, once this round of funding finishes? Yes/~~No~~

We hope to continue to update and make the website available for up to a year. Subject to *additional funding being made available we will disseminate the findings of the project through national and international practitioner research journals.*

If **yes**, will you (and how will you) evaluate impact going forward?

5. Project Costs and Funding

5.1 Please fill in Table 2 and Table 3 below:

Table 2 - Project Income

	Original[1] Budget	Additional Funding	Revised Budget [Original + any Additional Funding]	Actual Spend	Variance [Revised budget – Actual]
Total LSEF Funding	£275,400			£275,400	
Other Public Funding	£11,000			£11,000	
Other Private Funding					
In-kind support (e.g. by schools)	£20,000			£20,000	
Total Project Funding	£306,400			£306,400	

List details in-kind support below and estimate value.

- *Venue and refreshment costs – Brunel University*
- *Venue and Refreshment Costs - Hub schools*
- *Venue costs – Wandsworth LA*
- *Administration and printing costs – Wandsworth LA*
- *Supply cover for additional teachers to attend CPD*
- *Supply cover for in school dissemination*

Table 3 - Project Expenditure

	Original Budget	Additional* Funding (additional)	Revised Budget [Original + any Additional Funding]	Actual Spend	Variance Revised budget – Actual]
Direct Staff Costs (salaries/on costs)	£137,000	£0	£137,000	£126,735	£10,265
Management and Administration Costs					
Direct delivery costs e.g. consultants	£47900	£0	£47900	£63,556	-£15656
Training Costs (Venue, catering, consumable and conference)	£30,000	£0	£30,000	£13,556	£16,444
Participant Costs (e.g. Expenses for travelling to venues, etc.)	£0	£0	£0	£0	£0
Publicity and Marketing Costs	£10,000	£0	£10,000	£10,512	-£512
Teacher Supply / Cover Costs	£36000	£0	£36000	£39,498	£3498
Other Participant Costs	£0	£0	£0	£0	£0

[1] Please refer to the budget in your grant agreement

Evaluation Costs	£5500	£0	£5500	£6,840	-£1340
Website	£9000	£0	£9000	£10,060	£1060
Total Costs	**£275,400**	**£0**	**£275,400**	**£270,762**	**£4638**

5.2 Please provide a commentary on Project Expenditure
This section should include:

- *commentary on the spend profile*
- *budget changes that have occurred, including the rationale for any changes*

(Maximum 300 words)

With Catherine Knivett's approval we made significant changes to the items listed in the original budget for the following reasons:

- Davina Salmon's time was partly paid for by Brunel University and paid to Wandsworth LA through invoice.
- A larger amount of supply cover was needed to enable teachers to attend further CPD, to carry out monitoring and assessment tasks with pupils, and to make presentations at the Pan-London conference. This was in addition to the matched funding provided by schools (in the original budget) for capacity building and implementing new teaching approaches.
- Some changes had to be made within the conference budget.
- *In-kind funding from Brunel University, project school and Wandsworth LA is not included in Table 3. No other additional funding was used.

6. Project Outputs

Please use the following table to report against agreed output indicators, these should be the same outputs that were agreed in schedule 3 of your Funding Agreement and those that were outlined in your evaluation framework.

Table 4 – Outputs

Description	Original Target Outputs	Revised Target Outputs *[Original + any Additional Funding/GLA agreed reduction]*	Actual Outputs	Variance [Revised Target - Actual]
No. of schools (core)	30	30	33	33
No. of schools (including dissemination)	Approx.130	Approx.130	Approx.130	Approx.130
No. of teachers (core)	30	51	51	51
No. of teachers (including dissemination)	Approx.240	Approx.240	Approx.240	Approx.240
No. of pupils (core schools)	800	800	800	800
No. of pupils (including	Approx.6240	Approx.6240	Approx.6240	Approx.6240

dissemination)				
Teacher subject knowledge support materials and pedagogical skills training.	6 days of CPD (4 days with all the schools together and, 2 days for targeted support for groups of schools on subject knowledge and for providing established tried and tested materials from previous successful programmes run by the University.	6 days of CPD (4 days with all the schools together and, 2 days for targeted support for groups of schools on subject knowledge and for providing established tried and tested materials from previous successful programmes run by the University	6 Days of CPD, 10 Subject knowledge hubs/surgeries . Blend of tried and tested, and newly created resources made available to teachers.	6 Days of CPD, 10 Subject knowledge hubs/surgeries . Blend of tried and tested, and newly created resources made available to teachers.
Website	Establishment of project website.	Establishment of project website.	Establishment of project website.	Establishment of project website.

7. Key Beneficiary Data

Please use this section to provide a breakdown of teacher and pupil sub-groups involved in your project.

Data must be provided at project level. However, if you wish to disaggregate data by school then please add additional rows to the tables below. Please also confirm at what point this data was collected.

Please add columns to the tables if necessary but do not remove any. N.B. If your project is benefitting additional groups of teachers e.g. teaching assistants please add relevant columns to reflect this.

7.1 Teacher Sub-Groups (teachers directly benefitting counted once during the project)

Please provide your definition for number of benefitting teachers and when this was collected below *(maximum 100 words).*

a) Enhanced subject knowledge
b) Pedagogical skills

Please see section 8

Table 5 – Teachers benefitting from the programme

The following
Knowledge transfer and dissemination
In addition, 200 schools/teachers attended the pan–London conference where principles, research, readings and resources were provided and thereby raising the number of teachers.

	No. teachers	**% NQTs** ***(in their 1st year of teaching when they became involved)***	**% Teaching 2 – 3 yrs** ***(in their 2nd and 3rd years of teaching when they became involved)***	**% Teaching 4 yrs +** ***(teaching over 4 years when they became involved)***	**% Primary (KS1 & 2)**	**% Secondary (KS3 - 5)**
Project Total	*51*	*6*	*15*	*30*	*51*	
School 1	*1*		*100%*		*100%*	
School 2	*1*			*100%*	*100%*	
School 3	*2*	*50%*		*50%*	*100%*	
School 4	*2*			*100%*	*100%*	
School 5	*1*		*100%*		*100%*	
School 6	*2*			*100%*	*100%*	
School 7	*2*		*50%*	*50%*	*100%*	
School 8	*2*		*50%*	*50%*	*100%*	
School 9	*1*			*100%*	*100%*	
School 10	*1*	*100%*			*100%*	
School 11	*1*		*100%*		*100%*	
School 12	*2*	*50%*	*50%*		*100%*	
School 13	*1*	*100%*			*100%*	
School 14	*1*	*100%*			*100%*	
School 15	*1*			*100%*	*100%*	
School 16	*1*			*100%*	*100%*	
School 17	*1*			*100%*	*100%*	
School 18	*2*			*100%*	*100%*	
School 19	*2*			*100%*	*100%*	
School 20	*1*			*100%*	*100%*	
School 21	*1*			*100%*	*100%*	
School 22	*1*			*100%*	*100%*	
School 23	*2*		*50%*	*50%*	*100%*	
School 24	*1*		*100%*		*100%*	
School 25	*1*	*100%*			*100%*	
School 26	*1*		*100%*		*100%*	
School 27	*2*		*50%*	*50%*	*100%*	
School 28	*1*		*100%*		*100%*	
School 29	*1*		*100%*		*100%*	
School 30	*3*		*33%*	*66|%*	*100%*	
School 31	*1*		*100%*		*100%*	
School 32	*1*			*100%*	*100%*	
School 33	*1*		*100%*		*100%*	

7.1.2 Please provide written commentary on teacher sub-groups e.g. how this compares to the wider school context or benchmark *(maximum 250 words)*

Teacher sub groups are comparable to the wider school context for Wandsworth and Merton schools.

7.2 Pupil Sub-Groups (these should be pupils who directly benefit from teachers trained)

Please provide your definition for number of benefitting pupils and when this data was collected below *(maximum 100 words)*

Whole school

Tables 6-8 – Pupil Sub-Groups benefitting from the programme

The table below only includes information about pupils where schools submitted both baseline and final attainment data.

	No. pupils	**% LAC**	**% FSM**	**% FSM last 6 yrs**	**% EAL**	**% SEN**
Project Total						
School 1						
School 2	*24*		*13%*		*29%*	
School 3	*27*		*4%*		*26%*	*4%*
School 4	*26*		*15%*		*29%*	*19%*
School 5	*29*		*3%*		*69%*	*3%*
School 6						
School 7	*28*		*7%*		*43%*	*3%*
School 8	*30*				*60%*	*20%*
School 9						
School 10	*20*		*20%*		*30%*	*25%*
School 11						
School 12	*86*		*59%*		*65%*	*23%*
School 13	*26*		*23%*		*69%*	*19%*
School 14	*25*		*44%*		*52%*	
School 15						
School 16	*28*		*14%*		*17%*	
School 17						
School 18	*25*		*44%*		*20%*	*20%*
School 19	*57*		*37%*		*58%*	*16%*
School 20						
School 21	*49*		*2%*		*77%*	
School 22						
School 23	*51*		*10%*		*33%*	*5%*
School 24						
School 25	*29*		*3%*		*7%*	
School 26						
School 27	*25*		*32%*		*32%*	*4%*
School 28	*24*		*8%*		*45%*	*12%*
School 29						
School 30	*24*		*8%*		*58%*	
School 31						
School 32						
School 33	*23*		*78%*		*43%*	*4%*

Pupil data for all project schools

School	Total Roll	% LAC	FSM Eligible %	% FSM last 6 years	EAL %	Yes SEN Provision %
School 1	239		5.00%	7.11%	11.70%	10.50%
School 2	307		25.40%	33.10%	43%	9.80%
School 3	427		13.80%	18.27%	21.10%	19.90%
School 4	601		5.70%	14.50%	27%	9.20%
School 5	255		11.80%	21.00%	80%	13.50%
School 6						
School 7	527		3.60%	4.30%	37.10%	2.50%
School 8	449		44.10%	54.79%	63.70%	22.90%
School 9	207		42.50%	51.69%	42.50%	11.60%
School10	504		29.20%	43.45%	62.50%	22.40%
School 11	517		20.90%	27.47%	33.80%	18.00%
School 12	318		45.00%	56.60%	63.80%	19.50%
School 13	475		27.20%	41.89%	55.60%	24.40%
School14						
School15	378		37.30%	47.62%	64.80%	21.40%
School 16	334		4.50%	5.39%	27.80%	13.80%
School 17	286		18.90%	28.50%	43.30%	11.30%
School 18	486		20.80%	38.80%	34.70%	8.20%
School19	249		23.30%	27.50%	40.80%	8.20%
School 20	264		9.10%	15.53%	51.50%	24.60%
School 21	523		11.10%	19.70%	54.70%	8.80%
School 22	230		35.20%	46.96%	54.80%	21.30%
School 23	438		7.30%	11.30%	31.20%	4.40%
School24	260		38.10%	49.23%	26.90%	21.50%
School 25	289		8.00%	6.92%	42.90%	8.30%
School 26	484		12.40%		43&	
School 27	188		33.00%	43.62%	39.90%	23.90%
School28	453		3.10%	6.10%	33.30%	9.30%
School29	229		20.50%	30.57%	62.00%	14.00%
School 30	480		9%	16.90%	59.60%	7.30%
School 31	61		11.50%	13.11%	1.60%	4.90%
School 32						
School 33	218		53.70%	66.06%	49.50%	16.10%
	10676					
			21.03%	29.24%	43.49%	14.19%

School	Indian %	Pakistani %	Bangladeshi %	Other Asian %	Caribbean %	African %	Black African Other %	White & Black Caribbean %	White & Black African %	White & Asian %
School 1	0.40%	0.80%	0.00%	2.90%	0.80%	1.30%	0.00%	0.80%	1.30%	2.10%
School 2	2.80%	2.30%	2.30%	11.70%	7%	13.30%	x	5.10%	1.90%	2.80%
School 3	0.90%	2.60%	0.20%	2.10%	4.70%	1.40%	1.20%	4.70%	1.40%	0.90%
School 4	2.40%	4.70%	x	7.60%	1.70%	2.60%	0.70%	1.40%	2.10%	2.10%
School 5	3.80%	10.80%	x	41.60%	4.90%	11.40%	1.60%	x	0%	1.60%
School 6										
School 7	3.80%	3.30%	x	3.50%	X	0.80%	0	x	0.80%	2.20%
School 8	1.10%	3.60%	0.20%	5.60%	6.00%	0.70%	6.90%	6.00%	0.70%	2.20%
School 9	1.40%	1.90%	0.00%	1.90%	6.80%	1.90%	8.20%	6.80%	1.90%	1.00%
School10	2.20%	6.30%	0.60%	7.10%	6.50%	1.00%	3.20%	6.50%	1.00%	1.20%
School 11	1.50%	7.20%	1.50%	1.90%	3.10%	1.90%	2.50%	3.10%	1.90%	1.40%
School 12	0.30%	4.70%	2.80%	5.70%	4.70%	1.30%	5.00%	4.70%	1.30%	0.90%
School 13	6.30%	11.20%	2.50%	11.80%	5.30%	1.90%	0.80%	5.30%	1.90%	1.10%
School14										
School15	0.00%	3.20%	4.20%	4.00%	4.20%	0.50%	5.30%	4.20%	0.50%	0.00%
School 16	1.20%	0.30%	0.00%	0.90%	1.80%	0.90%	0.30%	1.80%	0.90%	3.60%
School 17	x	4.60%	0	7.70%	2.10%	3.60%	x	2.60%	x	1.50%
School 18	1.10%	5.20%		14.90%	2.30%	6.30%	0.90%	7.70%	0.90%	2.60%
School19	4%	7.50%	2.90%	16.10%	2.90%	8.60%	2.30%	3.40%	x	2.90%
School 20	0.40%	0.80%	0.00%	3.00%	7.20%	0.40%	3.80%	7.20%	0.40%	3.00%
School 21	3.50%	17.10%	3.70%	13.60%	0.80%	3.50%	1.10%	2.10%	0.80%	x
School 22	0.90%	13.50%	0.00%	6.10%	4.30%	0.90%	4.80%	4.30%	0.90%	0.90%
School 23	2.70%	x	0	10.70%	1.20%	2.70%	0.90%	1.20%	1.20%	4.20%
School24	0.00%	1.20%	0.40%	3.50%	9.20%	2.70%	5.00%	9.20%	2.70%	0.40%
School 25	1.00%	8.70%	0.00%	2.80%	0.30%	0.30%	0.30%	0.30%	0.30%	2.10%
School 26	2.80%	7.60%	0	12.60%		16.60%	3.40%	3.70%	2%	0
School 27	0.50%	13.30%	0.00%	3.70%	8.50%	2.10%	0.50%	8.50%	2.10%	1.10%
School28	1.70%	0	x	3.70%	1.10%	4.60%	1.40%	2%	0.90%	2%
School29	0.90%	2.60%	0.00%	0.40%	2.20%	2.20%	14.80%	2.20%	2.20%	1.30%
School 30	3.30%	0	0	30.90%	0.80%	13.10%	1.10%	1.70%	0.80%	1.10%
School 31	1.60%	14.80%	0.00%	1.60%	1.60%	1.60%	0.00%	1.60%	1.60%	1.60%
School 32										
School 33	0.90%	1.40%	0.50%	3.20%	6.00%	0.50%	4.60%	6.00%	0.50%	0.90%
	1.84%	5.56%	0.87%	8.09%	3.86%	3.69%	2.88%	4.08%	1.25%	1.68%

School	Any Other Mixed Background %	Chinese %	Other Total %	White British %	White Irish %	White Other %
School 1	2.10%	0.40%	1.30%	77.80%	0.00%	6.70%
School 2	3.30%	1.90%	3.30%	26.60%	0	13.50%
School 3	4.00%	1.20%	1.60%	56.20%	0.70%	4.70%
School 4	1.90%	0.70%	4.30%	57.40%	0.70%	9.50%
School 5	x	0	4.30%	8.60%	0	8.10%
School 6						
School 7	3%	1.60%		55%	x	23.60%
School 8	3.80%	0.20%	5.10%	11.80%	0.00%	3.80%
School 9	6.30%	0.00%	2.40%	8.70%	0.50%	0.00%
School10	5.60%	0.00%	2.80%	8.30%	0.20%	1.60%
School 11	3.90%	0.00%	1.00%	43.90%	0.20%	2.90%
School 12	5.30%	0.30%	6.00%	11.60%	0.00%	0.00%
School 13	3.40%	1.50%	6.70%	11.80%	0.00%	2.30%
School14						
School15	5.80%	0.80%	4.80%	6.60%	0.00%	1.90%
School 16	4.50%	0.30%	0.90%	54.50%	1.80%	12.00%
School 17	5.20%	x	6.20%	37.10%	0	24.20%
School 18	2.90%	0.90%	1.40%	42.70%	0	9.20%
School19	2.90%	0		39.70%	0	4.60%
School 20	4.20%	0.40%	3.00%	32.20%	1.90%	6.40%
School 21	4%	1.90%	2.70%	32.50%	0.80%	11.50%
School 22	4.80%	1.30%	3.00%	19.10%	0.40%	6.50%
School 23	4.20%	0	10.40%	46.30%	2.10%	11.60%
School24	15.40%	0.80%	3.10%	26.90%	0.40%	3.80%
School 25	6.60%	0.70%	4.20%	45.70%	0.30%	7.30%
School 26	4.80%	1.70%	1.10%	26.10%		7.60%
School 27	4.80%	0.00%	0.50%	21.30%	0.00%	2.10%
School28	3.40%	3.20%	1.70%	47.40%	4.30%	22.10%
School29	3.90%	1.70%	4.40%	25.80%	0.90%	17.90%
School 30	4.20%	0	3.30%	23.40%	1.90%	13.90%
School 31	9.80%	1.60%	4.90%	27.90%	0.00%	14.80%
School 32						
School 33	3.20%	0.00%	2.30%	12.80%	0.00%	2.30%
	4.73%	0.80%	3.45%	31.52%	0.61%	8.55%

7.2.1 Please provide a written commentary on your pupil data e.g. a comparison between the targeted groups and school level data, borough average and London average *(maximum 500 words)*

Useful links: London Data Store, DfE Schools Performance, DfE statistical releases

Due to the limited availability of relevant pupil data available at local, London and National level for this project it was necessary for the project team to devise a standard way for teachers to monitor the children's progress in mathematics. This process and the analysis of data collected are described in full in section 8.

The Key Stage 1 Teacher Assessment of mathematics for the project schools compared to local, London and national data can be seen in figure 1. Analysis of this data shows that:

- The percentage of all pupils attaining L2+, L2B+ and L3+ in mathematics at KS1 increased from 2014 to 2015, with London mirroring the National trends.
- The attainment gains in project schools from 2014 to 2015 was particularly notable at the higher levels with a 3pp increase to 82% at L2B+ and 5pp increase at L3+ to 30%. Wandsworth project schools made a 6pp increase at L3+ to 30%, 4pp higher than the London and National average.
- The project schools significantly contributed to the positive gains in attainment with an additional 1pp at L2+ and L2B+ and 3pp at L3+. Merton project schools made greater gains than all Merton schools at every level.

Figure 1: Key Stage 1 Teacher Assessment of Mathematics 2014 and 2015

	Key Stage 1 Mathematics					
	L2+	L2B+	L3+	L2+	L2B+	L3+
* Provisional data	2014	2014	2014	2015*	2015*	2015*
National	92%	80%	24%	93%	82%	26%
London	92%	80%	24%	93%	82%	26%
Wandsworth	92.00%	81.00%	26.00%	94%	83%	27%
Wandsworth Project Schools	93%	80%	24%	95%	84%	30%
Merton	92.00%	79.00%	24.00%	92%	78%	26%
Merton Project Schools	91%	78%	22%	92%	81%	26%
All Project Schools	**92%**	**79%**	**23%**	**94%**	**82%**	**28%**

8. Project Impact

You should reflect on the project's performance and impact and use **qualitative and quantitative** data to illustrate this.

- Please complete the tables below before providing a narrative explanation of the impact of your project.
- Please state how you have measured your outcomes (e.g. surveys) and if you are using scales please include details.
- Please add graphical analysis (e.g. bar charts) to further demonstrate project impact on each teachers, pupils, wider system outcomes etc. If you use graphs, please ensure that all charts are explained and have clear labels for the axes (numeric data or percentages, for example) and legends for the data.

Please add columns to the tables if necessary but do not remove any. N.B. If your project is collecting data at more than two points and may want to add additional data collection points.

Collecting both qualitative and quantitative data and analysing them, has shown that there has been considerable impact on all aspects of the intervention. Short reports are presented below before the completed tables.

Strand 1: Subject Knowledge

A detailed analysis of the pre- and post project data can be seen in Appendix 3. A short summary follows.
One of the proposed outcomes of the project was '*enhanced mathematical subject knowledge*' for the KS1 teachers, leading to increased confidence in their teaching, in turn, leading to higher levels of attainment, progression and enjoyment in mathematics for the KS1 children. The focus was on facts, skills and conceptual understanding within mathematical topics.

The subject knowledge strand consisted of the following elements:

- An initial audit to establish baseline knowledge and skills. This was carried out as part of the first CPD day, not done at home.
- Subject knowledge support in CPD sessions, and support modules delivered as twilight sessions in local hubs.
- Supply of materials and resources aimed to increase teachers' knowledge and confidence (and easily adapted for use in the classroom as well).
- A final audit to assess teachers' progress both in terms of subject knowledge and in confidence to teach (also taken in session).

The teachers completed the initial audit on the first CPD day on 19 March 2014. The questions were in the four topic areas: Shape, space and measures; Handling data; Calculating (fractions, decimals percentages, ratio and proportional reasoning); and Algebra. The questions were set at NC levels 5 and 6. For each question, in addition to the answer, the teachers were asked to grade themselves on how confident they were in answering the question, and on how confident they were that they could teach a child so that he/she could understand the topic. The confidence ratings were on a scale from 1 (not at all confident) to 4 (very confident).

Analysis of the audit showed that the weaker areas both in answering questions and confidence were Calculating and Algebra. In the light of the analysis, a series of subject knowledge support modules were designed. These were delivered mainly as twilight sessions at the local hubs (geographically located so that teachers could get to one of them easily after school) at Merton, Honeywell and Chesterton Schools. Each module focused on one of the four subject areas and consisted of:

- "Sometimes, Always, Never" activity designed to encourage discussion and to highlight common misconceptions (see examples on the website).
- An explanation of the topic, with reference to further reading and reinforcement.
- A set of questions (with worked solutions) on the topic.
- Extended and practical activities designed to promote problem solving and reasoning skills in a fun and motivating way.

Both the "Sometimes, Always Never" and the extended activities were designed so that they could be easily adapted for classroom use.

Teachers were also provided with a subject knowledge book **Mathematics Explained for primary teachers** by Derek Haylock (a book used nationally to develop subject knowledge in Initial Teacher Training courses), a Children's Mathematical Dictionary, and a glossary of mathematical terms.

In addition to the subject knowledge support modules, the teachers were invited to a Subject Knowledge Day on 5 May 2015 for additional help with the final subject knowledge audit which was given to the teachers to complete at the final hub meetings during May and June.

Analysis of the final audit and comparisons with the initial audit showed significant increases both in scores and in confidence levels (please see appendix 3 for full analysis). The key findings were as follows:

- Overall, the average mark achieved in the final audit was 86%, 18 percentage points better than the first audit.

- The average confidence to teach and confidence to answer scores both rose, the former by 23% and the latter by 19%.

- Teachers with less than three years experience tended to score higher and were more confident in answering the questions in the first audit. However, the teachers with more experience had risen to become the highest attaining and most confident in both categories by the second audit.

Certain limitations to these findings should be noted:

- The sample size is not particularly large as there were only 26 teachers who completed both audits. 42 teachers completed the first audit, but 16 of these did not complete the second audit, usually because they had moved schools or had been promoted (the teachers were replaced by other teachers from the original school.)

- Every effort was made to ensure that the two audits had equal levels of difficulty. However, the general opinion of the teachers was that some questions in the final audit were harder. This was confirmed on closer inspection of the questions but only serves to further boost the programme's positive effect on subject knowledge.

Strand 2: Pedagogical expertise: observing classroom practice

At the outset of the project it was necessary to establish a baseline of mathematics teaching practice in the project schools and to record the teachers' pedagogical skills in teaching mathematics. Observations of the project teachers teaching mathematics were carried out in sixteen classrooms (50%) in May and June 2014.The teachers volunteered to be observed and, wherever possible, members of the project team worked in pairs to carry out the observations and a short post-observation discussion with individual teachers. In order to maintain some parity across school settings, the observations took place within the first 25 minutes of the mathematics lesson and the observers collaborated to record a post-lesson reflection. Data from this initial set of observations was used to inform the planning of subsequent CPD sessions.
In order to monitor the impact of the project, a second set of observations took place in May and June 2015 in thirteen schools and 14 classrooms. Wherever possible, the same pair of observers revisited the same school as previously and observed the same teacher(s) as initially. The procedures from the initial round of observations were replicated and the same lesson observation tool was used.

The observation tool, which can be seen in Appendix 4, was designed to utilise elements of previous research linked to classroom talk (Myhill, Jones and Hopper 2006); teaching practices (Alexander 2008) and, teachers' subject knowledge (Rowland, Turner, Thwaites and Huckstep 2009). Each element was selected according to 'best fit for purpose' for the current research and development project to enhance mathematical learning through talk. The lesson observation tool was divided into seven sections and recorded:

- Section 1: the mathematics focus for the lesson
- Section 2: teacher-pupil interactions
- Section 3: teacher questions
- Section 4: teacher responses to pupils' answers
- Section 5: teacher feedback
- Section 6: post-lesson reflections from the teacher with particular reference to Myhill et al's categories of '*stick to your plans, bit of a muddle* and *go with the flow*"
- Section 7: post-lesson reflections from the observer(s) including an overall summation of the time (approximate) spent on *teacher-pupil talk, pupil-teacher talk and pupil-pupil talk.*

Sections 2-5 of the classroom observation tool focus on the **teacher's talk** throughout the lesson although inevitably some recording of the pupils' talk was necessary to contextualise the teacher's talk. After Alexander (2008) the focus for sections 2-5 was on the teacher's:

- **interactions** which encourage children to think, and to think in different ways;
- **questions** which invite more than simple recall;
- responses to children's **answers** that are justified, followed up and built upon (not just received)
- **feedback** to children which informs and leads thinking forward as well as encourages

Two members of the project team undertook an initial analysis of both sets of observation data with a particular focus on the teachers' interactions in relation to sections 2-5 of the observation tool. Comparing the initial and final observations provided evidence of the impact of the Project and the CPD programme in particular, as follows. These are based on detailed analysis.

Teachers' Talk Behaviour (sections 2-5 observation schedule)

In relation to the number of observed teacher talk behaviours (*interacting* to encourage children's thinking, *questioning* to prompt answers beyond simple recall, *responding* to children's answers, *feeding back* to inform and take children's learning forward) there was a significant difference between the initial and final observations:

- the average number of talk behaviours recorded per lesson increased from 12.1 to 20.4 (69% increase);
- *all* individual talk behaviour types saw an increase;
- the responses (answers) to children's interactions that were justified, followed up and built upon (and not just received) had the greatest impact, increasing from 2.3 to 7.3 instances per lesson (a 219% increase)

Teachers' overall reflection (section 6 observation schedule)
The final element of the teachers' post-observation reflection identified to what extent the teachers felt they had remained faithful to their lesson planning ('*stick to your plans')* or, got in '*a bit of a muddle'* (with their subject knowledge or children's ideas) or, tried to '*go with the flow'* of the children's thinking. The categories are not mutually exclusive and teachers were encouraged to reflect on the 'best fit' category or categories for the observed lesson. Overall,

- the largest impact was seen with the '*go with the flow*' perspective. This was present in 86% of the final lesson observations compared to 50% of the initial lesson observations (+36 percentage points);
- the '*stick to your plans'* perspective also increased from 50% to 57% as these two perspectives are not mutually exclusive (+7 percentage points) and the teachers were including more opportunities for talk in their lesson plans.

Observers' overall reflection on interaction time (section 7 observation schedule)
In relation to the observers' reflection on the percentage of time (approximate) spent during the lesson on *teacher-pupil talk* (teacher dominating and initiating); *pupil-teacher talk* (pupil leading and dominating) and *pupil-pupil talk,* the key pattern was less teacher-pupil talk, with this time largely being transferred to more pupil-pupil talk.

- Teacher-pupil talk decreased from an average of 61% to 44% of the interaction time (-17 percentage points)
- Pupil-pupil talk increased from an average of 21% to 34% of the interaction time (+13 percentage points).

Given that the observations took place in the first 25 minutes of each lesson where the teachers were often providing direct instruction, explanations and expositions, this trend towards both planning for, and delivering, more opportunities for the children to discuss their mathematical thinking is particularly significant.

Overall, the data analysis demonstrates a positive trend in the teachers' classroom practice in providing more opportunities for children to talk about their ideas thereby practising the use of mathematical vocabulary including the language of mathematical reasoning. In this way the teachers' talk behaviour is more focused on responding appropriately to the children's thinking in order to take their learning forward and to 'go with the flow' of their development.

'I was talking to my job share partner last week and she said that the turn around in maths has been powerful. I think it's the overall effect the project has had, doing all these activities

and having an open mind has changed not only the way we plan, deliver and teach maths but the way the children respond!' (Project teacher, Jenny L)

Strand 3: Monitoring Children's Attainment

As outlined in Section 2, two of the planned project outcomes for the children were i) higher levels of attainment and progression in mathematics and ii) greater enthusiasm and enjoyment in learning mathematics evidenced through classroom observations and teacher feedback.

Given the revisions to the National Curriculum and the as yet unknown revisions to the NC assessment requirements at the outset of the project, it was necessary for the project team to devise a standard way for teachers to monitor the children's progress in mathematics with their new classes in September 2014 and again in June 2015.

A monitoring tool to support teachers in tracking the progress of Year 1 and Year 2 pupils against *selected content* of the KS1 National Curriculum (DfE 2013) mathematics programmes of study was devised. As well as providing opportunities for pupils to use and apply their mathematical knowledge and skills to *solve problems,* the monitoring tasks also addressed pupils' level of fluency and their ability to *reason mathematically*. A booklet of tasks mapped against the strands of the NC was prepared for each Yr 1 and Yr 2 teacher with greater emphasis given to monitoring pupils' progress in number, place value (counting), calculating, fractions, money and shape and space. The monitoring tool was designed to complement and not replace all other forms of monitoring pupil progress in mathematics that schools already had in place.

Two members of the project team trialled the mathematics monitoring tasks and the final sets of tasks took into account any practical issues arising from the trialling process. The tasks were designed to be administered by the teacher with small groups of children (between 4 and 6) and to provide opportunities for children to share their thinking with the teacher. Detailed instructions for each task including a teacher 'script' were provided and, to make the whole process as manageable as possible, the teachers were also provided with many of the resources required for the tasks.
The teachers recorded the children's responses to the tasks and returned a whole class summary record of results to the project team for analysis. Anecdotal evidence of the impact of the project on pupils' progress was evident in the teachers' personal journals:

'This week we are in the process of doing the end of term project assessment with the children. At the start of the project, each class took approximately two days to complete. However, this time it is taking a lot longer as the children have far better, more detailed responses and won't stop discussing or sharing their ideas! A positive result of the project I think!'

'I found re-doing the assessments again very rewarding. I noticed in terms of my own professional development, how differently I delivered the questions and also how I interpreted the children's responses more clearly than back in September.

The formal analysis and comparison of the two sets of monitoring data (September 2014 and June 2015) was based on a group of 720 pupils - from 20 schools and 27 classes. Due to incomplete records (namely because of prolonged absences), 626 records were finally analysed. A control group of 55 pupils was also used to compare differences in attainment and reasoning scores.
The data analysis revealed the following impact of the project on pupils' mathematical attainment including reasoning:

- The percentage increase in mean attainment was nearly double for those pupils from project schools (81% vs. 43%), with an end-of-year mean attainment of 22.01. The control group's end-of-year mean attainment was slightly higher at 23.85, but their percentage improvement was comparatively less due to a higher baseline level within this group.

- A higher proportion of pupils in project schools improved their attainment over the year. Only 12 out of the 626 pupils had an attainment total which decreased or remained the same after the project had finished (1.9%). This applied to 3 out of the 55 pupils' in the control group (5.5%).

- All 3 of the most improved pupils in attainment from the project had English as an additional language. The most improved pupils on the project had consistently higher point increases (25-27 points) than those from the control group (17-20 points).

- The mean increase in average reasoning scores was higher in the project group (1.28 vs. 1.14 in the control group).

- The 2 pupils on the project with the most improved average reasoning scores had English as an additional language. Additionally, their improvement (3.5 points and 3.3 points) was greater than the improvement of the highest control group pupils (2.9 points and 2.3 points).

- A sub-sample of pupils from the project (52 pupils from 2 classes) - who followed a similar distribution of EAL, SEN and FSM pupils to the control group (55 pupils from 2 classes) - was also analysed, to eliminate any bias that these factors could have had on the results. Even in this case, the project pupils had greater improvement; their mean attainment rose by 77% (opposed to 43%) and their average reasoning score improved by 1.4 points (opposed to 1.1 points).

Out of the pupils who took part in the project;

- Year 2 pupils saw a greater percentage increase in mean attainment (90% and 94% for males and females respectively) than year 1 pupils (76% and 73%).

- There was a consistent improvement in average reasoning scores across year groups; 1.29 in year 1, and 1.28 in year 2.

- Pupils belonging to each of the three categories - SEN, FSM eligible, and EAL - had a greater mean attainment improvement than pupils' in the same group *who did not*. (For example, year 2 FSM eligible males experienced a mean attainment improvement of 113% compared to 84% in non-FSM eligible year 2 males). Pupils (across both year groups and genders) had a greater % increase in mean attainment if:
  - they had SEN vs. no SEN
  - they were FSM eligible vs. FSM not eligible
  - they did not speak English as a first language vs. English as a first language.

- There was a relatively mixed improvement in average reasoning scores across year groups and genders. There was an obvious improvement in the scores of pupils from

all categories, but trends were difficult to decipher. For example; year 1 females improved by the same average of 1.26 points if they had SEN or didn't have SEN, whereas year 1 males improved more, on average, if they did (1.32 points vs. 1.30 points). Small differences such as these occurred amongst pupils in the SEN / FSM categories.

- EAL students improved their average reasoning scores, on average, by more than English speaking pupils in both years**.** The largest improvement amongst EAL pupils came from year 2 females, who improved by an average of 1.60 points across the year (compared to 1.05 points from year 2 English speaking females).

Strand 4 – On going Evaluations of CPD sessions

- CPD attendance and evaluation data can be seen in Figure 1.
- CPD sessions were well attended, with the average attendance across the 4 core CPD days (1-4) being 95%. 7 schools self funded additional teachers to attend the programme.
- Evaluations of the CPD sessions were consistently positive. At each session participants were required to judge the useful ness of the day along side fuller qualitative feedback. Across the 4 core sessions 84% of participants checked the highest judgement 'very useful' and an addition 15% 'useful'. The lowest judgement 'not useful' was never awarded and less than 1% of the judgement OK.
- Two additional CPD events were added to the programme, the 're-energising event' at the start of the 2nd year of activity and an additional CPD day 5. Despite requiring additional time out of school, these events were still well attended at 85% over the two events.
- 10 Subject knowledge event were held throughout the project. These were made up of 9 twilight 'hub' events and an optional subject knowledge surgery.
- Open questions within the CPD session evaluations gave an insight into the participants views on the impact of the project for them. The responses to an 'open question' at the end of ore CPD Day 4 were analysed and could be categorised into four 'types':
    - 22/65 comments described the positive impact the project had on their expertise in facilitating quality talk interactions in the classroom.
    - 14/65 comments described the positive impact on the teachers or pupils attitude the mathematics
    - 18/65 comments noted how they had valued the opportunity for professional dialogue and sharing practice
    - 11/65 valued the availability of resources so ideas could be implemented immediately
    - The evaluative statements in Figure 2 were representative of those analysed

Figure 2: CPD Attendance and evaluation data

CPD Event	Date	Attendance	Evaluation			
			Very useful	Good	OK	Not useful
CPD Day 1	19th March 2014	93%	71%	26%	3%	0%
CPD Day 2	4th June 2014	100%	91%	9%	0%	0%
Re-energising CPD (Additional CPD day)	September 2014	95%				
CPD Day 3	16th October 2014	95%	80%	20%	0%	0%
Hub 1 Twilights (x3)	November 2014	87%				
Hub 2 Twilights (x3)	February 2015	78%				
Day 4	5th March 2015	92%	90%	10%	0%	0%
Day 5 (Additional CPD Day)	27th April 2015	75%	52%	40%	2%	0%
Hub 3 Twilights	June 2015	84%				
Conference	3rd July 2015	N/A	75%	25%	0%	0%

Figure 3: Example statements from CPD Day 4 evaluations

- *The programme has had a very positive impact on my teaching of mathematics. I am now more confident in allowing talk activities to flow naturally (before interfering) and this has enhanced the quality of talk in my classroom.*
- *The children are more confident in discussing their maths which has a knock on effect on their enthusiasm for the subject.*
- *Amazing course giving me loads of ideas to use in the classroom. I have seen a huge improvement with my children where they are talking about their learning and explaining their ideas and not just in maths.*
- *Best CPD ever! So useful and empowering, great to learn about the background research. I look forward to every session such valuable reflection time.*
- *A lot of resources (activity ideas, packs) given to us for us to implement I the classroom. The fact that they were made & used in CPD helped us to use them in classroom.*

8.1 Teacher Outcomes

Date teacher intervention started:

Table 9 – Teacher Outcomes: teachers benefitting from the project

The 1st Return will either be your baseline data collected before the start of your project, or may be historical trend data for the intervention group. Please specify what the data relates to.

Target Outcome	Research method/ data collection	Sample characteristics	Metric used	1st Return and date of collection	2nd Return and date of collection
e.g. Increased Teacher confidence	*e.g. E-survey*	*e.g. 100 respondents from a total of 200 invites.* *The profile of respondents was broadly representative of the population as a whole.*	*e.g. Mean score based on a 1-5 scale (1 – very confident, 2 – quite confident, 3 neither confident nor unconfident, 4 - quite unconfident, 5 – very unconfident)*	*e.g. Mean score- 3.7, collected September 2015*	*e.g. Mean score- 4.5, collected June 2015*
Improved subject knowledge in terms of depth, structure and content in mathematics. Greater awareness	Baseline and end of project subject knowledge audit in test conditions	82%project teachers completed subject knowledge audits. Analysis was undertaken of those who complete both baseline and end audit. (51%)	Mark achieved expressed as a percentage.	Average mark achieved was 68%	Average mark achieved was 86%
Higher quality maths teaching through	Lesson observation of teachers in 50% of	Project team completed pre and post observations	(1) Quantity of Talk behaviours (2) Type of talk classified as	(1) Average 12.1/lesson (2) Average	(1) Average 20.4 /lesson a 69% increase

improved pedagogical skills; facilitating mathematical talk and interaction and improved questioning	project schools using observation tool. (See strand 2 in section 8)	in 50% project schools.	'reasoning'	2.3/lesson	(2) Average 7.3/lesson a 219% increase
Improved teacher confidence in subject knowledge and the ability to explain mathematical concepts	Baseline and end of project subject knowledge audit captured "confidence to answer' and 'confidence to teach'	82%project teachers completed subject knowledge audits. Analysis was undertaken of those who complete both baseline and end audit. (51%)	Average score based on 1-4 scale (1= not at all confident to 4 = very confident)	(1) Average confidence to answer: 2.2 (2) Average confidence to teach: 2.1	(1) Average confidence to answer: 2.8 (2) Average confidence to teach: 2.8

Table 10 – Comparison data outcomes for Teachers *[if available]*

We did not recruit a comparison group for all the elements

Target Outcome	Research method/ data collection	Sample characteristics	Metric used	1st Return and date of collection	2nd Return and date of collection
e.g. Increased Teacher confidence	*e.g. E-survey*	*e.g. 100 respondents from a total of 200 invites.* *The profile of respondents was broadly representative of the population as a whole.*	*e.g. Mean score based on a 1-5 scale (1 – very confident, 2 – quite confident, 3 neither confident nor unconfident, 4 - quite unconfident, 5 – very unconfident)*	*e.g. Mean score*	*e.g. Mean score*

8.1.1 Please provide information (for both the intervention group and comparison group where you have one) on:

- Sample size, sampling method, and whether the sample was representative or not
- Commentary on teacher impact (please also refer to table 5 re impact on different groups of teachers)
- Qualitative data to support quantitative evidence.
- Projects can also provide additional appendices where appropriate.

(Minimum 500 words)

8.2 Pupil Outcomes

Date pupil intervention started:

Table 11 – Pupil Outcomes for pupils benefitting from the project

The 1st Return will either be your baseline data collected before the start of your project, or may be historical trend data for the intervention group. Please specify what the data relates to.

Target Outcome	Research method/ data collection	Sample characteristics	Metric used	1st Return and date of collection	2nd Return and date of collection
e.g. Increased educational attainment and progress in Writing	*e.g. Pupil assessment data*	*e.g. Characteristics and assessment data collected for 97 of 100. The profile of respondents matches that initially targeted in the Theory of Change.*	*e.g. mean score or percentage at diff National Curriculum Levels or GCSE grades*	*e.g. Mean score- 3.7, collected September 2015*	*e.g. Mean score- 4.5, collected June 2015*
Improved attainment and progression in mathematics	Pupil monitoring tasks to measure attainment against the new curriculum	Monitoring data collected for 720 pupils in Sept 2014 and June 2015	Percentage increase in mean attainment Mean increase in average reasoning score (Reasoning scale 0= incorrect answers, 1= some correct and no reasoning to 4= all correct	Mean baseline attainment for project group 12.13 (raw score) Mean baseline average reasoning score – 1.31	Mean percentage increase in attainment total – 81.48% Mean increase in average reasoning score 1.28

			and clear reasoning)		
Improved attainment and progression in mathematics	KS1 Teacher assessment data for project schools	Mathematics Key Stage 1 teacher assessment data for all project schools for 2014 and 2015	Percentage of pupils attaining: Level 2+ Level 2B+ Level 3	2014 data Percentage of pupils attaining: Level 2+=92% Level 2B+=79% Level 3=23%	Provisional 2015 data Percentage of pupils attaining: Level 2+=94% Level 2B+=82% Level 3=28%
Enhanced pupil engagement in mathematics lessons	Lesson observation data. Percentage of pupils' maths talk interaction	Project team completed pre and post observations in 50% project schools.	(1) Percentage of teacher to pupil talk (2)Percentage of pupil to pupil talk	(1) Percentage of teacher to pupil talk 61% (2)Percentage of pupil to pupil talk 21%	(1) Percentage of teacher to pupil talk 44% (2)Percentage of pupil to pupil talk 34%

Table 12 - Pupil Outcomes for pupil comparison groups *[if available]*

Target Outcome	Research method/ data collection	Sample characteristics	*Metric used*	1st Return and date of collection	2nd Return and date of collection
Improved attainment and progression in mathematics	Pupil monitoring tasks to measure attainment against the new curriculum	Monitoring data collected for 55 pupils in Sept 2014 and June 2015	Percentage increase in mean attainment Mean increase in average reasoning score (Reasoning scale 0= incorrect answers, 1= some correct and no reasoning to 4= all correct and clear reasoning)	Mean baseline attainment for project group 16.65 (raw score) Mean baseline average reasoning score – 1.96 (scale of 1 – 4)	Mean percentage increase in attainment total – 43.23% Mean increase in average reasoning score 1.14
Improved attainment and progression in mathematics	KS1 Teacher assessment data for LA, London and National	Mathematics Key Stage 1 teacher assessment data for LA, London and National sets for 2014 and 2015	Percentage of pupils attaining: Level 2+ Level 2B+ Level 3	2014 data Percentage of pupils in London attaining: Level 2+=92% Level 2B+=80%	Provisional 2015 data Percentage of pupils in London attaining: Level 2+=93% Level

				Level 3=24%	2B+=82% Level 3+26%
Enhanced pupil engagement in mathematics lessons	Lesson observation data. Percentage of pupils' maths talk interaction	Not collected for comparison groups			

8.2.1 Please provide information (for both the intervention group and comparison group where you have one) on:

- Sample size, sampling method, and whether the sample was representative or not Commentary on pupil impact (please also refer to table 6-8 re impact on different groups of pupils)
- Qualitative data to support quantitative evidence.
- Projects can also provide additional appendices where appropriate.

(minimum 500 words)

8.3 Wider System Outcomes

Table 13 – Wider System Outcomes

Target Outcome	Research method/ data collection	Sample characteristics	*Metric*	1st Return and date of collection	2nd Return and date of collection
e.g. Teachers/schools involved in intervention making greater use of networks, other schools and colleagues to improve subject knowledge and teaching practice	*e.g. Paper survey*	*e.g. Surveys completed by all participating teachers*	*e.g. average number of events attended per teacher per year before the project and over the course of the project*	*e.g. Average number of events attended in the academic year 2012-2013: 3.2*	*e.g. Average number of events attended in the academic year 2013-2014: 4.3* *Average number of events attended in the academic year 2014-2015: 4.5*
Teachers/ Schools involved in the project making use of resources provided.	Uptake of resources provided on CPD and hub days and website	Feedback collected on evaluation forms and surveys and school visits Website	References to use of resources on evaluation and feedback forms	N/A	80% of teachers provided feedback that they were using project resources
Capacity building within project schools including Inter-school collaboration through establishment of hub project schools	In school CPD Additional teachers attending CPD sessions Attendance at hub meetings Participant teachers contributing to local and pan London conference Attendance at local hub meetings	Survey completed by all project teachers about capacity building and dissemination activity. Attendance registers at hub meetings	Number of KS1 maths hub meetings available to project schools	Academic year 2013 – 14 Number of KS1 maths hub meetings available to project schools – 0 Attendance at hub meetings – N/A	Academic year 2014-15 Number of KS1 maths hub meetings available to project schools – 10 Attendance at hub meetings – N/A – average attendance 83%
Model programme and resources to enable schools to improve parental involvement in mathematical learning of their children.	Schools using model and resources to facilitate workshops for parents	Events for parents recorded on evaluations and surveys	Feedback from project teachers	N/A	Over 50% of project teachers have reported the use of parental resources provided

8.3.1 Please provide information on *(minimum 500 words):*

- Sample size, sampling method, and whether the sample was representative or not
- Commentary on wider system impact qualitative data to support quantitative evidence.
- Projects can also provide additional appendices where appropriate.

8.4 Impact Timelines

Please provide information on impact timelines:

- At what point during/after teacher CPD activity did you expect to see impact on teachers? Did this happen as expected?

We expected and could see gradual changes from the start of the project. Modelling teaching approaches and providing resources meant that the teachers could begin to explore the project ideas as soon as they had returned to school. Significant changes were noted in teachers' attitudes and confidence in teaching styles and the development of subject knowledge after the first 6 months.

- At what point during/after teacher CPD activity did you expect to see impact on pupils? Did this happen as expected?

We expected to see the impact right from the start of the project in terms of enjoyment, positive attitudes and higher quality interactions. Evidence of higher attainment emerged only after the pre- and post monitoring and assessment data were analysed.

- At what point did you expect to see wider school outcomes? Did this happen as expected?

Wider school outcomes were expected throughout the project. This happened as expected with teachers leading staff meetings to disseminate the project ideas and approaches.

- Reflect on any continuing impact anticipated.

We hope the impact will continue at school and LA levels as well as nationally through our website and disseminations including written articles.

9. Reflection on overall project impact *(maximum 1,500 words)*

In this section we would like you to reflect on:

- The overall impact of your project
- The extent to which your theory of change proved accurate
- How your project has contributed to the overall aims of LSEF
- Whether your findings support the hypothesis of the LSEF
- What your findings say about the meta-evaluation theme that is most relevant to you

Please illustrate using the key points from the previous detailed analysis.

All the evidence should be brought together here (achievement of outputs and outcomes, and the assessment of project impact) to produce well informed findings, which can be used to inform policy development in a specific area as well as the meta-evaluation of the LSEF.

The London Schools Excellence Fund (LSEF) is based on the hypothesis that investing in teaching, subject knowledge and subject-specific teaching methods and pedagogy will lead to improved outcomes for pupils in terms of attainment, subject participation and aspiration.

The aims of the Fund:
I. Cultivate teaching excellence through investment in teaching and teachers so that attention is re-focused on knowledge-led teaching and curriculum.
II. Support self-sustaining school-to-school and peer-led activity, plus the creation of new resources and support for teachers, to raise achievement in priority subjects in primary and secondary schools (English, mathematics, biology, chemistry, computer science, physics, history, geography, languages).
III. Support the development of activity which has already been tested and has some evaluation (either internal or external), where further support is needed to develop the activity, take it to scale and undertake additional evaluation.
IV. In the longer term, create cultural change and raise expectations in the London school system, so that London is acknowledged as a centre of teaching excellence and its state schools are among the best in the world.

In general the impact of the project has been manifest in the following ways:

- The subject knowledge strand has shown that the project has contributed to a substantial level of improvement in teachers' knowledge and understanding of different topics in mathematics. A confidence scale showed that their confidence to teach these topics increased. We were pleased that both the pre- and post project audits were done in CPD sessions which has given us confidence in their reliability. The option of teachers completing the audit at home was ruled out for this reason.
- As can be seen in section 8 Strand 2 there has been an impressive transformation in classroom practice and the use of key strategies and approaches for encouraging maths talk. This was observed in 50% of schools with teachers commenting that they had transferred their new practices to lessons in other curriculum areas to equally good effect.
- Changes to the national curriculum and assessment procedures from September 2014 meant that monitoring children's attainment was one of the most challenging aspects of this project. Nevertheless, this aspect was addressed through the team developing a unique monitoring and assessment system against the revised National Curriculum. As can be seen in section 8 Strand 3 there are several encouraging features regarding pupil attainment. In particular, the gains in reasoning for *all* children and in particular for some groups.

- Continuous formal monitoring of the CPD sessions has shown that our project strategy has had positive impact. We believe that the following strategies contributed to the success of our CPD model:

    - Encouraging teachers to take a deeper look at learning and pedagogy;
    - Face to face project support offered to the teachers with teacher accountability;
    - Diverse expertise of the project team both academic and practical;
    - Modelled on available evidence and best practice;
    - Encouraging continuous reflection.

In July 2015, the two expected outcomes of the original Theory of Change, *increased levels of pupil attainment in mathematics at KS1* and *higher quality mathematics teaching* were achieved through the various elements we addressed during the project. The assumptions we made in the Theory of Change have been shown to be valid and contributed to the positive outcomes. As noted elsewhere, the parental strand within the ToC was amended in line with consultation with schools and necessary project adaptations.

The Enhancing Mathematical Learning through Talk at KS1 project (referred to as Maths Talk) was set up in order to fulfil the aims of the LSEF as follows:

1. **Cultivating teaching excellence by improving teachers' subject knowledge**. One of the main aims of our project was to support classroom teachers in enhancing their subject knowledge about the teaching of mathematics. In particular, teachers needed greater understanding of the objectives of teaching the subject coupled with a broader understanding of a range of effective pedagogical approaches. Improving teachers' subject knowledge underpins the ultimate outcomes of improving children's enjoyment of the subject along with improved attainment thereby helping them to lay solid foundations for future learning and raising aspirations.

    Descripti*ons of how the objectives* of teaching mathematics can be addressed through classroom talk and interaction has been a constant theme throughout the CPD sessions

As advised by Catherine Knivet, we have included below, our descriptions of what we aimed to achieve and how we related the two strands within the project (from the original application).

Effective mathematics teaching should pay attention to all of the following:

Facts
Facts represent the basic 'atoms' of mathematical knowledge, e.g. terminology and symbols, with each one being a small and elementary piece of knowledge. Discussion of terms and symbols in small groups and with the whole class. Keeping 'fact books' and personalised 'glossaries'. The words and names (blobs) become part of the child's conceptual structures in time.

Skills
Skills are well-defined multi-step procedures, including commonly used skills such as basic number operations. Skills are most often learned with understanding through discussions, explanations and examples. Group discussions and conferences on strategies used and analysed. Discussing 'error' patterns. Using 'pretend' childrens' mistakes and seek explanations using 'Can you explain why...' as a strategy.

Conceptual structures

Conceptual structures consist of a set of concepts and their interrelationships. Discussions and explanations are necessary to help the learner to develop a robust conceptual structure. Focus on explanations .During practical tasks supporting formalisation. Create cognitive conflict with class activities including "I agree" & "I disagree" statements, structured games, and modifying closed lesson plans to generate discussions.

General strategies
General strategies are a range of problem-solving activities to develop processes of reasoning, conjecturing and communicating. Problem-solving activities based on both 'pure' and 'real-life' mathematics. Develop problem-solving processes of reasoning, conjecturing and communicating. 'Personal' and/or group diaries completed when appropriate (after discussions). Encourage children to record own methods using words and diagrams.

Attitudes to mathematics
Attitudes involve the learner's feelings and responses. They cannot be directly taught, and are the indirect outcome of a student's learning experiences. Teachers play a crucial role in helping students to build a positive attitude towards mathematics. Adopt an interactive teaching procedure. Make mathematics have relevance to real-life by using home-based tasks also involving parents. Structured games. Mathematics from existing stories and construction of new 'group' mathematical stories.

Appreciation of mathematics
Appreciation is the awareness of the role of mathematics in everyday life. Awareness of mathematics
is encouraged through problem solving and connecting it to other school subjects. Mathematics from stories.(Cockcroft Report (1982), HMI (1976), Koshy (1999; 2000)

2. **Establishing a community of teacher learners and researchers**.

A total of 17 CPD sessions were provided in the form of six full group face-to-face sessions, and the rest through local hubs and group tutorials. Face to face CPD sessions focussed on

- short presentations of theory and research into aspects of developing effective teaching skills relating to the implementation of talk and discussion in mathematics lessons;
- the practicalities of introducing high quality mathematics talk, focussing on different categories of interaction after Alexander (2008). Sessions modelled the use of different teaching resources as well as effective teaching strategies. Taking time to listen to children's responses was encouraged along with deeper analysis of children's progression in learning in order to plan the next steps in learning;
- opportunities for teachers to share their experiences and the outcomes of the distance learning tasks. Teachers were encouraged to set practical and manageable targets for themselves within sessions and to discuss the issues logged in their personal journals.

3. **The wider pan-London influence**. At the end of the project, a high profile pan-London conference was offered to London schools free of charge. 200 delegates from a wide range of schools and HE institutions attended the conference held at Brunel University, London. The content of the conference included presentations of tried and tested strategies and resources, short presentations from experts whose work had influenced the programme, and presentations from teachers about the

transformation in their mathematics knowledge, classroom practice and confidence as a result of participating in this LSEF programme. A number of resources were distributed and their uses exemplified. An impressive array of resources, and children's and teachers' work was displayed.

4. **Supporting self-sustaining school-to-school and peer-led activity.**

One of the most positive outcomes of the project has been the commitment of the schools and teachers at many different levels. The attendance at CPD was over 90%. Most teachers led school-based capacity building sessions disseminating teaching approaches and resources thereby enabling the project to impact on a much wider group of teachers and children.Teacher feedback showed that over 90% of the resources and ideas were used by practising teachers, who also shared with the rest of the staff in their school setting as well as across the schools in their cluster or community.

The project website, www.talkmathstalk.co.uk, which included information about the project, classroom resources, resources for parents, recommended readings and all the resources from the CPD sessions was available to teachers throughout the project duration. Following the conference, the website has been updated and will be openly available to all schools. In addition,the intention of the project team is to disseminate the findings and practices from the project through national and international publications, although this will be dependent on funding.

We believe that our project has contributed to the overall aims of the LSEF and supports the hypothesis. There have been some limitations to the project that are highlighted in section 4 of this report.

10. *Value for Money*

A value for money assessment considers whether the project has brought about benefits at a reasonable cost. Section 5 brings together the information on cost of delivery which will be used in this section.

10.1 Apportionment of the costs across the activity

Please provide an estimate of the percentage of project activity and budget that was allocated to each of the broad activity areas below. Please include the time and costs associated with planning and evaluating those activity areas in your estimates.

Broad type of activity	**Estimated % project activity**	**£ Estimated cost, including in kind**
Producing/Disseminating Materials/Resources/ Website	25%	£20,572
Teacher CPD (face to face/online etc) including conference/ Events/Networks for Teachers	30%	£86,610
Teacher 1:1 support (email/school visits/ subject knowledge)	15%	£10,000
Events/Networks for Pupils	0%	
Others as Required – Planning and preparation. Evaluation activity including data gathering GLA and team meetings	30%	£153,575
TOTAL	100%	£ £270,762

Please provide some commentary reflecting on the balance of activity and costs incurred: Would more or less of some aspects have been better?

We feel that there has been an appropriate balance of activity, although some of the budget changes were made to accommodate these, since the programme was refined after each CPD session based on evaluations we have achieved a carefully designed programme. A greater percentage of time and resources were put into creating resources and systems to monitor pupils attainment than first planned. This would not be necessary for any future project, those resources could then be channelled into other activity.

10.2 Commentary of value for money

Please provide some commentary reflecting on the project's overall cost based on the extent to which aims/objectives and targets were met. If possible, draw on insight into similar programmes to comment on whether the programme delivers better or worse value for money than alternatives.

10.3 Value for money calculations

Note: This section is only required for projects with control or comparison groups

In order to demonstrate the cost effectiveness of the project we would like those projects who had control or comparison groups to provide some value for money calculations. Further guidance will be issued to support projects with this.

N/A:
Due to practical issues we were only able to recruit two control schools to participate in some elements of the project.

11. Reflection on project delivery

This section is designed to allow for a discussion of wider issues relating to the project. (maximum 1,500 words)

Please include reflection on the following:

11.1 Key Enablers and Barriers to Achievement

- *Were there internal and/or external factors which appear to have had an effect on project success, and how were these responded to (if applicable)?*
- *What factors need to be in place in order to improve teacher subject knowledge?*

11.2 Management and Delivery Processes

- *How effective were the management and delivery processes used?*
- *Were there any innovative delivery mechanisms and what was the effect of those?*
- *Did the management or delivery mechanisms change during the lifetime of the project and what were the before or after effects?*

11.3 Future Sustainability and Forward Planning

- *Do you have any plans for the future sustainability of your projects?*
- *What factors or elements are essential for the sustainability of your project?*
- *How have you/will you share your project knowledge and resources?*

Reflection on project delivery

We believe that the following aspects of our project delivery contributed to the completion of a successful project:

- extensive review of existing research and theory to support our aims and activities;
- the balanced nature of the project team, comprising university academics with extensive research experience and knowledge, subject experts and classroom practitioners with significant experience of teaching at Key Stage 1;
- the interweaving and distribution of practical activities, key readings based on research and theory, and tried and tested resources;
- the establishment of a Steering Group from the outset, consisting of Head Teachers, Project Teachers, academics and practitioners who were not part of the project;
- continuous and detailed evaluations and prompt follow-up action in relation to any issues arising;
- listening to teachers formally during CPD sessions as well as conversations during school visits which made it possible for the team to refine content and teaching approaches as well as mentor individual teachers;
- distance learning tasks to follow up each CPD session to prompt further teacher reflection and understanding of key issues (utilising personal learning journals, readings and classroom based tasks.)

The enhancement of teachers' subject knowledge has been a delicate process as mathematics is a subject that can cause fear and anxiety amongst primary school teachers. Giving teachers an audit/test on the first CPD day was a risky strategy.

However, we believe that the following support systems helped to alleviate feelings of inadequacy:

- the provision of subject knowledge texts, glossaries and teacher-friendly mathematical dictionaries;
- activities and resources provided during local hub meetings;
- extra supply cover with approval from Catherine Knivett from the Mayor's Office.

Concerns

Although we are satisfied with the outcomes of the project, the project team has had the following concerns:

1. We felt we may have been over-ambitious in setting up monitoring systems for three strands in a relatively short project hence adding considerably to the teachers workload at a time of major educational revisions (rehearsed in 2 below).
2. The changes to the National Curriculum and new assessment and testing arrangements causing excessive pressure on teachers in schools at the same time as undertaking a major research and development project.
3. Providing sufficient mentoring opportunities for individual teachers including for the distance learning tasks was difficult within the constraints of a small project team and an ambitious agenda (point 1 above).

Sustainability

At present, we have established a website which contains a rich range of activities, readings and support materials for teachers to replicate the project.

We have no definite plans about future sustainability but discussions will be on-going with the LSEF.

12. Final Report Conclusion

Please provide key conclusions regarding your findings and any lessons learnt *(maximum 1,500 words)*.

Alongside overarching key conclusions, headings for this section should include:

Key findings for assessment of project impact

- *What outcomes does the evaluation suggest were achieved?*
- *What outcomes, if any, does the evaluation suggest were not achieved or partly achieved?*
- *What outcomes, if any, is there too little evidence to state whether they were achieved or not?*

Key lessons learnt for assessment of project delivery

- *What activities/approaches worked well?*
- *What activities/approaches worked less well?*
- *What difficulties were encountered in delivery and how could they be mitigated in the future?*
- *Were there any additional or unintended benefits (e.g. increases in student attendance as a result of an intervention aimed at teachers)?*

Informing future delivery

- *What should the project have done more of?*
- *What should the project have done less of?*
- *What recommendations would you have for other projects regarding scaling up and/ or replicating your project?*

Please note that many of the questions in this section have been addressed in other sections of this report. To avoid repetition, only the key issues are summarised here.

Reflection on the project has led us to believe that this has been a unique and innovative project for several reasons. Firstly, there is a notable shortage of effective models of CPD for KS1 teachers focussing on mathematics teaching and learning. Secondly, we believe that the two interacting strands (developing subject knowledge in mathematical topics alongside enhancing pedagogical strategies with a focus on talk in mathematics lessons) has contributed to the successful outcome of the project. Based on the data gathered during, pre- and, post project (using a mixture of quantitative and qualitative methods) we feel that the aims of the project have been achieved.

The key strengths include the expertise of the project team in being able to deliver effective professional development for teachers, drawing on established theory and research, practical knowledge of the elements that contribute towards effective CPD, and mathematical subject knowledge. We have been being advised by an external 'advisory evaluator', (**Professor Tim Rowland**, Cambridge University/ University of East Anglia) who has carried out extensive work with teachers on the development of both mathematical subject knowledge and pedagogy. Professor Rowland's work has provided a blueprint for effective mathematics teaching and the role of subject knowledge across the UK and internationally. Professor Rowland made presentations to the teachers at the CPD sessions

and at the pan-London conference. Selected extracts from his published works were provided as key readings to the participants throughout the project.
See Appendix 5 for Professor Rowland's evaluator's report on the project.

One of the problems we encountered was caused by the revisions to the National Curriculum and its assessment procedures during the project time-frame. Nevertheless, the project team rose to the challenge and addressed the issues arising from the changes to the statutory requirements by providing a monitoring pupil progress set of tasks for the teachers.

Throughout the project period we have been aware of the level of conflicting pressures on teachers and the need to be sensitive to these. Increasingly, schools were being offered a range of mathematics teaching models and initiatives – many by commercial firms - which in most cases seemed to consist of classroom activities for teachers to follow without much encouragement to explore at depth. We believe our project outcomes will provide a solid framework for in-school, LA and nationwide professional development for teachers in the teaching of mathematics and promote healthy professional debate.

Using a balance of qualitative and quantitative data gathering methods helped us to assess progress and impact across the various strands of the project, For example, classroom observations allowed us to establish the quality of teaching and interactions, whilst the use of tests and audits provided quantifiable data.

A welcome aspect reported by the project participants was the number of staff development sessions provided by the project teachers to their schools (and in some instances, to clusters of schools and also to parent groups) thereby achieving a high level of capacity building. The final project pan-London conference enabled wider dissemination of the project's principles and practice and further enhanced the professional development of the project teachers as over 80% contributed to the conference either in person or by providing material to be included in the presentations. As one conference delegate wrote in her evaluation: *" How can my school get involved in the project?"*
A number of teachers obtained promotions during the project, which they attributed to their participation in the project and gaining more expertise and confidence.

The project team found all aspects of planning, delivering and evaluating the project very rewarding and worthwhile and would like to acknowledge the LSEF for providing us with this opportunity.

And the final word must be from one of our project teachers:

Pupils' confidence has improved, parents have commented that the children have really enjoyed maths and are really engaged (pupils who had cried before about doing maths, now really enjoy it)

(Project teacher)