

## Improving mathematics through a Lesson Study approach to collaborative CPD

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### Introduction

#### What were your reasons for doing this type of development work?

The schools involved had access to a level of support which included: specific negotiated support in English or mathematics or in one other key area, plus £1000 to work with a primary national strategies consultant or leading teacher and carry out appropriate development work. The schools had all identified mathematics as an area of need within their school. As the schools were allocated limited resources to help develop mathematics, it was suggested that, for maximum impact, collaborative continuing professional development (CPD) through lesson study would be an appropriate way to build capacity.

#### Who might find this case study useful?

- Headteacher
- Middle leader
- National Strategies consultant
- Senior leadership team (SLT)
- Subject leader

#### Contacts

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## School or setting

*School:* 9 Primary schools in Leeds

*Type of school:* Primary

*Local Authority:* Leeds

*Region:* Yorkshire and the Humber

## Learners

*Year groups:* Year 1, Year 2, Year 3, Year 4, Year 5, Year 6

*Gender:* Both

*Whole school:* Yes

*People involved:* Senior leader, Senior leadership team (SLT)

*Number of classes:* 9

*Number of adult learners:* 27

## What

### What specific curriculum area, subject or aspect did you intend to have impact on?

- Mathematics

### How did you intend to impact on pupil learning?

Our aim was to accelerate the progress of identified groups of pupils, through the development of specific pedagogical approaches. As there were 9 different schools involved there were different underlying areas for improvement, which included developing the use of APP and accelerating the the progress of girls, the more able and pupils with EAL.

### What were your success criteria?

- Accelerated progress of focus group of pupils in each school (4 points – average point score)
- Improved teacher confidence with a pedagogic technique or in teaching a specific strand of mathematics (guided group work/Using and Applying Mathematics).
- Lesson Study used as a collaborative CPD model within the individual schools.
- Lesson study model shared with and developed in other schools not involved in project.

**PLEASE NOTE this page has three tabs - click 'Next tab' below or use tabs above to see Teaching approaches and CPD approaches**

### What information or data did you use to measure progress towards your success criteria?

- Data comparison of cohorts
- Observation outcomes
- Periodic teacher assessment

### What did you do? What teaching approaches (pedagogy) did you use to achieve the intended impact?

- Assessment for Learning (AfL)

- Problem solving
- Use of pupil talk for whole-class teaching

## **Describe the teaching approaches you used**

This is an extract from one of the schools working on the Lesson Study project. Other examples are available on the Summary page.

Meadowfield Primary School:

All staff took part in the planning process using the schools planning format. Particular attention was placed on activities that would address the learning objectives at each level. On the planning sheet expectations were added for each of the focus children so that we could ensure that the lesson objectives were being addressed.

The 3 observing members of staff were asked to focus on a specific child and to record their achievements and barriers to learning at various points within the session. The 3 children were chosen as a representative of the 3 levels of ability within the class, more able, average and lower ability. All observations were recorded on a sheet and the foci were key triggers and explanations that the child used. The observation findings provided the information for the teacher reflection session and also an aide-memoire to see if the separate parts of the lesson that were planned did meet the needs of all of the learners.

Straight after the lesson, staff involved in the Lesson Study group met in the staff room for a reflection session where information, observations and thoughts of the 3 representative children and the lesson were shared. One member of the group chaired the meeting to ensure that specific points and time were stuck to. Findings and information were recorded on a record sheet. Points that arose from the discussion included:

- Strengths - recall and use of number bonds and use of some models and images to support learning
- Weaknesses - communicating mathematical thinking and lack of variety of strategies for solving problems.

As a result of the discussion, the teachers agreed to ensure that mathematics lessons included:

- a stronger focus on developing mental strategies including visualisation and rehearsal
- the development of mathematical language and vocabulary in whole class sessions
- talk for mathematics as a feature of guided group sessions
- increased use of a variety of models and images.

After the lesson the 3 focus children were asked for their thoughts and feelings about the lesson.

## **What did you do? What approaches to CPD and learning for adults were used?**

- Lesson study
- Training

## **Describe the CPD approaches you used**

I as mathematics consultant to gathered information from the schools involved about individual issues with mathematics. This consisted of an initial meeting with Head-Teacher and Subject Leaders.

This was followed by training on Lesson Study for the schools and two Leading Teachers. The training was delivered by myself, another consultant with responsibility for leading teachers and a regional advisor. The meeting included sections from the Headteachers CPD materials outlining the lesson study approach to collaborative CPD. Schools were grouped into twos and threes at this meeting and worked alongside an assigned leading teacher to plan the study focus. We used the booklet 'Improving practice and progression through Lesson Study' to support the planning process.

The schools then went away and conducted at least one lesson Study cycle. Further support and training was offered to those schools that requested it. I delivered training on APP to some of the schools and others went to observe lessons delivered by leading teachers to support the process.

There was a follow up and feedback session where the schools involved presented to each other their findings, including success, areas for improvement and next steps. Some of the schools developed detailed case studies. (all materials available in summary section).

The Lesson study model and results of the project was presented to Headteachers and senior leaders at an ISP network meeting, where one of the schools contributed to the presentation. It was also shared with Subject Leaders at the Primary Mathematics Conference in Leeds, with contributions from some of the schools involved.

The following documents outline two schools' approach.

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 [Horsforth Newlathes case study](#)

 [Horsforth Newlathes presentation](#)

## What CPD materials, research or expertise have you drawn on?

National strategies materials were used to support the process. Each school was given a copy of the Lesson Study booklet mentioned above:

<http://nationalstrategies.standards.dcsf.gov.uk/node/132730> (link to booklet is on right of page)

We also used some of the power point slides from the Headteachers CPD materials.

Full materials at <http://nationalstrategies.standards.dcsf.gov.uk/node/181385>

Day 4 of Senior Leadership Team CPD <http://nationalstrategies.standards.dcsf.gov.uk/node/175012>

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 [Improving Practice and progression through Lesson Study booklet](#)

 [National Strategies Lesson Study approach - Mathematics document](#)

 [National strategies power point slides](#)

## Who provided you with support?

- Local authority staff

## How were you supported?

The training on Lesson study was delivered by myself, a consultant with responsibility for leading teachers, and a Mathematics Regional Advisor. We had a planning meeting before the session and stayed in contact throughout the project.

**Impact**

## What has been the overall impact on pupil learning?

Most of the schools used APP to identify gaps in the learning of the study group and thus address the children's needs through careful planning and the delivery of the study lesson.

In one year 6 lesson the children were identified as lacking an understanding of equivalence, this was addressed through the careful planning of the resources used to explain equivalence (balances).

The schools varied but three of the schools commented below.

- Very positive: lesson observations, planning and attainment data all shows good impact. Average points score progress was 3.5; last year was 2.7. (Headteacher)
- Pupil learning has improved due to children feeling more confident and secure in areas of mathematics. (Y6 teacher)
- All focus children were fully engaged and responded well to the lesson. They achieved the objectives set for them. (Y2 teacher)

Progress has been accelerated in the classes involved at an average of 0.5 above expected. Most of these classes were just below expected progress last year. Success criteria included accelerated progress at approximately 4 points. Accelerated progress was achieved but not quite 4 points. This would be 4 points average point score progress if the results are rounded.

## Thoughts you think are relevant to overall impact on learning

As teachers are focussing on a small group of pupils, Lesson Study enhances the use of APP to identify gaps and plan for the next steps in learning and teaching. The diagnostic nature of Lesson Study ensures impact in subsequent lesson if not in the study lesson itself.

Schools have said:

'Teachers are able to pin point exact areas where these pupils were struggling and they are able to plan and accommodate for them.' – Year 5 teacher

'Raised confidence and awareness of investigative Maths and how different children approached the work.' – Headteacher

## Quotes you think are relevant to overall impact on learning

'It was fun to be able to move instead of sitting on the carpet.' – Year 3 pupil

'I get what a place holder is now and what it does.' – Year 3 pupil

'Children reported very much enjoying the lesson in post-observation pupil feedback.' – Year 4 teacher

## Quantitative evidence of impact on pupil learning

- Data comparison of cohorts
- Periodic teacher assessment

## Qualitative evidence of impact on pupil learning

- Logs or interviews
- Observation outcomes
- Pupil consultation data
- Pupils' work

## Describe the evidence of impact on pupil learning

When comparing progress of pupils in the classes that were involved in Lesson Study to previous cohorts the majority showed improvements. As mentioned one showing an increase in points progress of 1.2 points. This is for the whole class, not just the focus pupils.

Pupil progress of the focus pupils within the lessons was mostly observed as good or outstanding.

Focus pupils reported in post study lesson interviews that they greatly enjoyed the lesson and learned new things in them.

## What has been the impact on teaching?

Lesson study has had a noticeable impact on teaching. The process of focused observation, collaborative discussion and planning has enabled the teachers to become more reflective practitioners. The cycle of planning, observing pupils' learning processes, reflecting on what has worked or not worked, and using this to inform teaching and improve learning means that not only is teaching impacting on learning, but learning is impacting on teaching

Use of APP ensured that teachers adapted their teaching to meet the needs of children within their class. Joint planning enabled teachers to share ideas and learn from each other. Teachers were able to develop new approaches to teaching - most schools reported that there has been an increase in practical mathematics, the use of models and images and investigative maths. Teachers in two schools reported that they have further developed the use of guided group work to address the needs of groups of children in the class with an identified gap in their learning.

School comments:

'Misconceptions have been identified and strategies to improve these have been adapted.' – Year 6 teacher

'Teaching is rated 'good' AT1 Maths at start of year was 'satisfactory.' – Headteacher

'Teacher's practice much improved both quantitatively and qualitatively.' – Headteacher

## Thoughts you think are relevant to impact on teaching

The use of Lesson Study is an excellent way to develop teaching practices. Joint planning, delivery and observation ensures that good practice is shared. The joint nature of the process also means shared responsibility for the lesson enabling teachers to try new approaches and resources, sometimes working outside their comfort zone.

## Quotes you think are relevant to the impact on teaching

'Cross cohorts have been working together collaboratively.' – Headteacher

'It has given teachers the courage to observe other teachers and be very focused on individual pupils and have their learning at the centre.' – Y5 Teacher

'It has enabled teaching staff an appropriate amount of time in which to share the planning for a lesson. Not only did this allow us time to 'bounce' ideas off each other but it also ensured ownership was shared and that we all had a vested interest in its success or failure.' – Subject Leader

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 [Meadowfields - Comments from teachers](#)

## **Evidence of impact on teaching**

- Evidence from observation and monitoring
- Evidence from planning
- Teacher perceptions

## **Describe the evidence of impact on teaching**

- Feedback from schools: Headteachers, Subject Leaders, class Teachers, Teaching Assistants, presentations, reports, case studies, interviews and video.
- Lesson observations, planning and assessment monitoring.

## **What has been the impact on school organisation and leadership?**

8 out of the 9 schools in the project have continued to use Lesson Study as a CPD model to improve practice and progression. In some cases it has now been build into the yearly CPD cycle in others it has been used mainly as a tool to develop inexperienced staff.

Moortown Primary School – More peer group support in general: moderation, planning, etc.

As a local LA we will be delivering more extensive training on Lesson Study to a wider group of Headteachers next academic year.

## **Thoughts you think are relevant to overall impact on school organisation and leadership**

As study lessons focus on an identified small group of pupils they are an ideal way of addressing the Narrowing the Gap Agenda.

Where the Headteacher has been fully involved the impact has been greatest.

## **Quotes you think are relevant to overall impact on school organisation and leadership**

'We've re-structured organisation of PPA\* to enable this.'

'Reminded SLT to return to 'grassroots' – the logistics and 'art' of teaching and learning.' – Headteacher, Moortown Primary

\*PPA = Planning, preparation and assessment time

'As a reception teacher it has been great for me to work alongside other teachers further up the school.' – Subject Leader - Meadowfields

'It improves consistency across the school. Lesson Study is now built into our monitoring and development timetable.' – Headteacher - Meadowfields

## **Evidence of impact on school organisation and leadership**

Most of the schools in the project have continued to use Lesson Study as a CPD model to improve practice and progression. In some cases it has been build into the yearly CPD cycle and in others used as a tool to develop inexperienced staff. The findings and outcomes of the project have been shared with other senior leaders in the authority and there is planned further training on Lesson study.

Moortown - Re-structured PPA from Sept 2009; action plans show more collaborative working.

Lesson study will be introduced at the authorities Leading teacher training in the Autumn term, where one of the schools has been asked to share its learning. It will also be one of the CPD models used during the Leading Teacher Programme next year.

## Summary

### What is the crucial thing that made the difference?

- Middleton St Mary's - Pupil learning and developing the foundation stage practice of assessment in key stage 2.
- Moortown - Building awareness by sharing ideas and knowledge.
- LA - Developing collaborative learning, sharing best practice and reducing 'in school variance'.

### What key resources would people who want to learn from your experience need access to?

National Strategies Headteachers CPD materials - Day 2 & 3 - power points, handouts and notes:

<http://nationalstrategies.standards.dcsf.gov.uk/node/20473>

Improving practice and progression through Lesson Study booklet: <http://nationalstrategies.standards.dcsf.gov.uk/node/132730> (link to booklet is on right of page)

National Strategies guidance documents on Lesson Study: <http://nationalstrategies.standards.dcsf.gov.uk/node/175012> (See Attachments & Resources on right of page; click 'More attachments' for full list.)

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 [Lesson Study Booklet](#)

### What CPD session and resources were particularly useful?

- National Strategies Headteachers CPD materials - Day 2 & 3 - power points, handouts and notes: <http://nationalstrategies.standards.dcsf.gov.uk/node/20473>
- Improving practice and progression through Lesson Study booklet (as above)
- National Strategies guidance documents on Lesson Study (as above)
- Mathematics guidance document: <http://nationalstrategies.standards.dcsf.gov.uk/node/48414>

### If another individual or school was attempting to replicate this work, where would they start and what would the essential elements be?

If working with a group of schools ensure that the training on how to carry out Lesson Study and the benefit of its use are clear. Have explicit outcomes and success criteria for each school. Look carefully at the mix of teachers that form the Lesson Study group. Is there an appropriate mix of skills and experience? Ensure that the Headteacher is engaged, as Lesson Study works best if the Headteacher takes an active role. Work with Leading teachers prior to setting up the group so that they know exactly what their roles are.

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 [Feedback session power point \(not including school presentations\)](#)



 [Introductory power point \(not inc. Lesson Study outline\)](#)

 [Presentation to Headteachers \(not including video\)](#)

## What further developments are you planning to do (or would you like to see others do)?

Next year the LA will be providing a half day session on Lesson Study for all Headteachers. The Leading Teacher Programme in Leeds will use Lesson Study as one of its main forms of sharing good practice. I am thinking about using Lesson study more to focus on Ethnic Minorities, Social Class and Gender and Achievement in the future in addressing the Narrowing the Gaps agenda.

## Miscellaneous additional information

All schools involved in the project delivered presentations as part of the evaluation process.

## Related information

 [Case study Greenhill Primary](#)

 [Kippax North Jnr & I presentation](#)

 [Manston St James' CE primary presentation](#)

 [Meadowfield Primary School Case Study](#)

 [Middleton St Mary's CE Primary presentation](#)

 [Moortown Primary School presentation](#)

 [Brownhill Primary School presentation](#)

## Case study status

Approved

## Coordinator

Lorraine Dawes

## Related case studies

[Essex lesson study: Year 4 mathematics – Problem solving](#) [Essex lesson study: Improving learning in mathematics](#)  
[Action Learning: Improving children's success with problem solving](#) [Using models and images to support learners with English as an additional language](#)

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