

Using models and images to support learners with English as an additional language

Jackie Harden
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Introduction

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

Reviewing the impact of using models and images on children's learning.

Who might find this case study useful?

- Carer
- Headteacher
- National Strategies consultant
- Parent
- Subject leader
- Support staff
- Teacher

Contacts

- Author: Jackie Harden

School or setting

School: Greet Primary
Type of school: Primary
Local Authority: Birmingham
Region: West Midlands

Free school meals: 35 - 50%

Learners

Year groups: Year 3

Gender: Both

Specific group: English as an additional language (EAL)

Performance: Below age-related expectation

Whole school: No

People involved: LA adviser, Senior leadership team (SLT), Support staff, Teacher

Number of classes: 1

Number of adult learners: 4

What

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

- Problem solving, reasoning and numeracy
- Mathematics

How did you intend to impact on pupil learning?

We intended to impact on learning by providing children with practical models and images that would help them to understand the concept of fractions (doubles and halves). Our aim was for these practical models and images to then become an image that children could use when working independently to find halves and quarters of shapes or numbers.

We intended to use the lesson study to observe how target children understand and use the models and images and to gain a greater understanding of why they might be experiencing difficulties, in order to improve quality first teaching to meet their needs.

What were your success criteria?

- Pupils to understand that they can find half of a shape by folding into 2 equal parts.
- Pupils to understand that a half is always exactly in the middle of 2 equal parts, regardless of how big the quantity being halved
- Pupils to understand that to find a quarter, you halve and halve again
- Pupils to use practical models and images to develop their own internal images about what a half and quarter look like and how to find it.

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?

- Observation outcomes
- Periodic teacher assessment
- Pupils' work

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

- Assessment for Learning (AfL)
- First-hand learning
- Problem solving
- Simulation and virtual learning
- Teaching sequences
- Use of pupil talk for whole-class teaching
- Use of thinking skills

Describe the teaching approaches you used

The main aim of the lesson was to support and develop children's understanding of fractions by using models and images.

Models were introduced to the whole class with the aim that children would then use them to calculate fractions of amounts. Key concepts of fractions were demonstrated – equal parts, same amount, half way is exactly in the middle and finding quarters by halving and halving again. To demonstrate this, as a class we labelled one end of a piece of elastic 0 and the other end 1. I then asked the children to estimate where half is. The children pointed to various parts of the elastic, showing that they didn't yet understand the concept of half. Together we decided that to find where half is we should fold the elastic in half. We marked this point with $\frac{1}{2}$.

I then asked the children if they knew what half of 6 was? Could they find it on the elastic if we put 0-6 at the ends? (We stretched the elastic to show 6 is more than 1) By talking with a partner, they agreed we should fold the elastic in half. This gave the children a model and an image that $\frac{1}{2}$ is always in the middle and that the 2 halves are exactly the same, no matter how large the number.

We repeated the same model to find $\frac{1}{4}$ by folding in half and in half again. Some of the children copied the action with their hands, showing a long length folded in half, and then in half again. They used this action later when they were working independently, showing they were beginning to understand halve (for half), and halve again for quarters.

We then worked on the interactive whiteboard to halve an array of circles (based on the assessment suggestions in Maths Framework Year 3, Block B, unit 2). Children discussed with talk partners the different ways they could do it. This activity was repeated to divide the array into 4 equal parts.

As guided group work and independent work, the children were given arrays of 8, 12 and 20 circles which they had to split into 2 equal halves, and then 4 equal quarters. They were given coloured counters to place on the array investigate different ways in which they could do this.

Adults working with the children reinforced the vocabulary of fractions, equal parts, half, quarter and asked children to explain how they know.

We used pupil progress data to identify children who are not performing as well as we would expect. The lesson study observations and evidence from pupils' work enabled us to identify their strategies for learning, their errors and misconceptions and how using models and images could best support their learning.

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

- Lesson study
- Work scrutiny

Describe the CPD approaches you used

We were invited by the LA advisor to conduct a Lesson Study as part of a Year 3 Narrowing the Gap mathematics for EAL learners course.

We are a 3 form entry school but have 4 numeracy groups in Year 3 so teachers paired up to carry out the Lesson study. The focus for the study and the target children were agreed and the lesson plan shared. The LA advisor and National Strategy Advisor also joined us for the observation and feedback session.

The observer's focus was to see how the use of models and images impacted on target children's understanding and what learning strategies they were using.

Observation feedback and children's work gave excellent evidence of how these target children had understood the concept of fractions and how they had managed to work independently.

The lesson study provided an excellent opportunity for peer observations, feedback and professional discussion of how children learn in mathematics and what teaching strategies could be most effective in helping children to grasp difficult concepts and make progress.

This professional discussion enabled best practice to be shared and for all involved to consider which models and images could be used as next steps for these children and their own target teaching groups.

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

Year 3 EAL Maths course materials, including:

- Overcoming Barriers Materials- helping children move from level 2 to level 3
<http://nationalstrategies.standards.dcsf.gov.uk/node/85232>
- Securing Level 2 in mathematics
<http://nationalstrategies.standards.dcsf.gov.uk/node/195310>
- Moving on in mathematics- Narrowing the Gaps
<http://nationalstrategies.standards.dcsf.gov.uk/node/264253>
- Practical mental maths ideas
<http://nationalstrategies.standards.dcsf.gov.uk/node/224722>
- Practical resources
- Developing pupil talk.

School INSET on guided group work and speaking and listening strategies in numeracy.

Excellence and Enjoyment: learning and teaching for bilingual children in the primary years DVD Ref number 2061 - 2006 DVD-EN

Improving practice and progression through Lesson Study handbook (DCSF)

<http://nationalstrategies.standards.dcsf.gov.uk/node/126431>

Who provided you with support?

- External agency
- Leading teacher
- Subject leader

How were you supported?

LA maths advisor and Primary Strategy Numeracy Advisor took part in the lesson study observations and feedback sessions. (as part of Year 3 Narrowing the gap, EAL maths course mentioned above)

Impact

What has been the overall impact on pupil learning?

- Pupils have a better understanding of how to find half and quarter of a number
- Pupils show greater confidence in working with models and images independently as well as in whole class or guided group sessions
- Pupils are more actively engaged as learners
- Pupils are more able to explain what they know or how they found half or a quarter as a result of the models and images

Thoughts you think are relevant to overall impact on learning

Children working below national expectations often find concepts such as finding fractions difficult to grasp. If they have a successful model or image to use, they are confident to find fractions when working independently.

Quotes you think are relevant to overall impact on learning

"Taking part in a lesson study has been extremely beneficial. It provides a very supportive means of sharing best practice and having a critical friend/ colleague help you to gain insight into the way children learn and the reasons why they may be experiencing difficulties." (Year 3 teacher)

Quantitative evidence of impact on pupil learning

- Periodic teacher assessment

Qualitative evidence of impact on pupil learning

- Learning walks / study visits
- Observation outcomes
- Pupils' work

Describe the evidence of impact on pupil learning

We used pupil progress data to identify target children and will use APP evidence and pupil progress data again in June to assess the impact on children's learning.

Teacher and Advisor's feedback from lesson study about children's understanding and learning strategies.

Work scrutiny of children's books indicated what they had understood and could do independently.

What has been the impact on teaching?

- Greater understanding of which models and images support children's learning
- Greater understanding of how target children learn new concepts and process models and images
- Improved planning, teaching and assessment as a result of CPD training and lesson study outcomes

Thoughts you think are relevant to impact on teaching

The professional discussion that conducting a lesson study provided has been invaluable.

Teachers are able to share good practice, gain a greater understanding of the impact of their teaching on children's learning and gain new ideas and strategies for teaching, particularly concepts which bellow average children find very difficult to grasp.

Quotes you think are relevant to the impact on teaching

"All of the year 3 teaching team have expressed greater confidence in teaching numeracy. We have explored the support documents and resource materials available which has helped to improve our planning and therefore children's learning." (Year 3/4 Phase Leader)

Evidence of impact on teaching

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

Describe the evidence of impact on teaching

All of the year 3 teaching team have expressed greater confident in teaching numeracy. They have explored the support documents and resource materials available, resulting in improved planning for teaching and learning.

What has been the impact on school organisation and leadership?

- Whole year 3 team involved in lesson study
- Lesson study being identified as a very successful tool for CPD and sharing good practice.
- Improved planning for teaching and learning is addressing the action points for numeracy on the SIP and YIP (yr group improvement plan)
- Improvement in standards and progress of children in mathematics in Year 3 as shown in Dec 09 pupil progress data.
- Opportunity to network with LA and National Strategy Advisers

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

In a large school such as ours, lesson study is a very good way to provide internal support and CPD for staff and to share good practice.

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

"Having seen the impact lesson studies can have on teacher confidence and sharing of best practice, our leadership team are considering ways to include it as part of staff CPD and performance management observations and reviews for next academic year." (Year 3/4 Phase Leader)

Evidence of impact on school organisation and leadership

- Improved planning for teaching and learning in Year 3
- Improved percentage of pupils on track for meeting age related standards compared to last year.
- More children in Year 3 making good or better progress compared to last year
- Dissemination of good practice to all staff.
- Quicker identification of children having difficulties in mathematics lessons and implementation of support
- Improved evidence for making judgements against Assessing Pupil Progress criteria.

- Senior leadership considering the use of lesson studies as part of whole school lesson observations and performance management next year.

Summary

What is the crucial thing that made the difference?

A greater focus on using models and images has improved children's understanding in whole class teaching sessions and is enabling them to become more independent learners.

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

- Overcoming barriers in mathematics – suggested models and images
- Securing Level 2 in Mathematics
- Moving on in mathematics- Narrowing the Gaps
- Teachers willing to take on new initiatives and improve their own practice.
- Time out of the classroom to plan and prepare study lessons.
- Staff meeting time to feedback on progress.

What CPD session and resources were particularly useful?

Yr3 EAL Maths Course run by LA

Improving practice and progression through Lesson Study handbook (DCSF)
<http://nationalstrategies.standards.dcsf.gov.uk/node/126431>

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

Start small - identify a class or target group to work with, where you think using models and images could really have an impact.

Plan as a pair or a team to share ideas. (This could be within a year group or across year groups focussing on children working at similar levels.)

Introduce the model or image in mental maths starter or whole class teaching, then extend using it to guided group work and independent work.

Monitor progress - possibly using lesson study method or at year group planning meetings, phase or whole school staff meetings.

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

Continue to use models and images with lower ability children to support their learning and give them images they can use when working independently.

Review the impact again in end of year teacher assessments and pupil progress data.

Use this to inform Year Group Improvement Plan for mathematics and SIP as appropriate.

Look at ways to develop staff CPD throughout the school using the lesson study model.

Case study status

Approved

Coordinator

Lorraine Dawes

Related case studies

['Talking Maths': Focus on under-attaining EAL pupils in Year 5](#) [Using first language as a tool for thinking and writing: A case study of more able EAL learners](#) [Visualisation project to improve children's creative writing in KS1](#) [Let's think through maths: Infant Cognitive Acceleration in Mathematical Education \(CAME\)](#) [Best practice CPD to embed 'Talk for Writing' within a primary school](#)

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