



CASE STUDY REPORT

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

Jackie Harden

This study was originally published in 2010 as part of the 'What Works Well' initiative, part of the National Strategies for Education in England.

Abstract

Background: The purpose of the study was to observe how the use of models and images impacted on target children's understanding of fractions and to gain a better understanding of why they may be experiencing difficulties.

Aims: The main aim of this development work was to use models and images to help children understand the concept of fractions and use them independently to find halves and quarters.

Methods: The participants included teachers, a leading teacher, a subject leader, a LA maths advisor, a Primary Strategy Numeracy Advisor, parents, carers, and support staff.

Methods used included lesson study, observation, feedback, peer observations, CPD training, and work scrutiny to measure progress towards success criteria. Models and images were used to help children understand fractions.

Findings: The main findings are that using models and images to teach fractions has improved children's understanding and confidence in working independently, and has enabled teachers to share best practice and improve their teaching strategies.

Implications: The findings suggest that using models and images can help children understand difficult concepts such as fractions, leading to increased confidence and engagement in learning. This can be further developed through CPD and lesson study to improve teaching and learning in mathematics.

This abstract was generated by Camtree using a large language model (LLM) and added to the original report in 2023.

Keywords: Primary education; Problem solving, reasoning and numeracy; Mathematics

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

Description

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.

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

- Observation outcomes
- Periodic teacher assessment
- Pupils' work

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:

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

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

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 confidence 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

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

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.

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About 'What Works Well'

This case study was originally published as part of the 'What Works Well' section of the National Strategies for Education in England. The National Strategies were professional programmes aiming for improvements in the quality of learning and teaching in schools in England. 'What Works Well' involved teaching practitioners from all phases and areas of education sharing accounts of real developments which had improved learning and teaching, and made a difference to pupil progress. 'What Works Well' case studies were designed to support practice transfer and include sufficient detail and resources to enable others to implement the effective practice described. They were reviewed by experts prior to publication as 'User Generated Content' (UGC) under a licence which encouraged reuse and derivative works, but which precluded commercial use.

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