



LESSON STUDY RESEARCH REPORT

Using lesson study to develop teaching approaches that help pupils understand division including tenths and hundredths

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Abstract

Background: The purpose of the study was to use lesson study to develop teaching approaches that help pupils understand division including tenths and hundreds, with a focus on subtraction, place value, and data handling.

Aims: The aim of the study was to use lesson study to develop teaching approaches that help pupils understand division including tenths and hundredths, with a focus on subtraction, place value, and data handling.

Methods: The participants are two teachers new to year 3 and one new to the Key Stage and the school ECC teacher. The case students are four pupils from the low and high end of the middle attaining group. Lesson study was used to develop teaching approaches for year 3 pupils to improve their understanding of subtraction, place value, and data handling. Teachers planned together, used a range of teaching approaches and resources, and evaluated lessons daily to inform future planning. Case study pupils were observed and progress was made through the use of practical resources and extended exploration time. Lesson study improved teaching methods and resources and could be implemented in other year groups.

Findings: Lesson study was used to develop teaching approaches for year 3 pupils to improve their understanding of subtraction, place value, and data handling. The use of practical resources and a variety of teaching approaches led to progress and increased confidence in pupils' learning. Lesson study was found to be a valuable approach for improving teaching and learning.

Implications: Lesson study approach helped teachers identify and address students' misconceptions in subtraction, place value, and data handling. The use of practical resources and a variety of teaching approaches improved student learning and informed future teaching methods. Lesson study should be implemented in all year groups.

Keywords: lesson study; mathematics; place value; subtraction; primary education

Context

The school is a two form entry primary school with pupils from Nursery to year 6. It is a non-denominational school set in North West London. Pupils are from a range of backgrounds with the majority of pupils with Pakistani, Indian and Eastern European Origin.

In year 3 teachers plan together and employ a range of teaching approaches such as talk partners, talking maths and toolkits for successful learning. Teachers use a range of strategies such as visual, auditory and kinaesthetic learning including the use of ICT regularly. The range of equipment is used to enhance pupil learning.

Teachers use a range of sources/schemes during the planning phase, such as abacus and self-designed Notebook documents, to assist learning rather than sole-reliance on one particular scheme. Lessons are evaluated daily to inform future planning thus if more time on particular concepts are required they it can be planned for appropriately.

Both Year 3 classes are divided into 5 groups, covering 3 levels of attainment with adult support changing between groups daily. The lower attaining children receive intervention support weekly such as numbers count, talking maths and 1st class at number.

Each term 6 children are assessed using APP (2 high attaining, 2 middle attaining and 2 low attaining). These act as a bench mark for levelling of other children.

The lesson study group consisted of 2 teachers both new to the year group and one new to the Key Stage and the school ECC teacher. From analysis of the Hodder test teachers recognised that subtraction, place value and data handling were areas which needed development.

Aims of the Lesson Study, Classes and Case Students

From analysing the Hodder assessments, completed in Autumn 2012, it was identified that pupil's across year 3 showed inconsistency in their understanding of subtraction, place value and data handling. Therefore, a focus on these areas and their misconceptions determined the content of our lessons. We wanted to provide a variety of practical resources and strategies to enhance learning and to find out which the most effective within both the focus group and across the class.

Whilst planning we used schemes of work available to teachers in the school such as the National Numeracy Strategy and Abacus. We also consulted with the ECC teacher with regards to methods required to consolidate learning. We felt it was of importance to use a range of schemes, teaching approaches and techniques. Materials and practical resources included Numicon, place value dice, diens cubes, place value arrow cards and charts, 100 squares, number lines, money, unifix cubes, multiplication grids.

Case Pupil 1 - (cycle 1) – Male pupil is in the low end of middle attaining group in this class. He finds it difficult to use his knowledge of different mathematical methods and strategies to solve calculations and problems.

Case Pupil 2 (cycle 1) – Female pupil is in low end of middle attaining group in this class. She can use methods once shown, however is not retaining this skill. This child appears to be very confused.

Case Pupil 1 (cycle 2) – Female pupil is in low end of middle attaining group. She takes a long time to consolidate and can appear to be very confused when working independently, often making careless mistakes.

Case Pupil 2 (cycle 2) – Male pupil is in high end of middle attaining group. Child shows good understanding across concepts, however cannot explain his understanding and often works in a manner of carelessness that makes his work difficult to read. This haphazard presentation causes him confusion when he looks back and tries to describe his written work.

First research lesson (RL1)

Lesson focus was subtraction using number lines and practical resources. C.Dardenne delivered the teaching, E.Purdue and S.Solanki observed case study pupils (one each). Teaching approach involved planning for and making accessible a variety of practical resources to consolidate the method. Resources used included number lines, 100 squares and Numicon with focus group.

In interviews, pupils were unclear about going BACK to the nearest ten.

In the post lesson discussion we highlighted the fact that the children had not made as much progress as we expected and the barrier proved to be bridging 10. For the second lesson, we agreed to use many more practical resources and to think about the balance of time, giving the children more time on their own activity. We also broke down the steps into a toolkit for RL2 that would be drawn up by the children to ensure they were clear about the steps required for success and when working with focus group to stay within teen numbers subtracting single digit numbers.

Second research lesson (RL2)

RL2 adults deployed the same as RL1. The teaching approach enabled children to have more time and resources to explore the learning. One case study pupil extended the resources supplied (Numicon, 100 squares, cubes) and used a ruler to help him further understand the process. The Numicon really helped the other case study pupil and the others in the group with some of them working free of resources by the end of the lesson.

In interviews, one child said “you can find out the answer using the Numicon”

In post lesson discussion, it was agreed that the progress exceeded expectations and giving children longer to explore, using resources repeatedly was of great value. The children were able to become more independent of the resources and could explain their learning more clearly. For the next lesson, we agreed that the teaching needed to clarify what ‘finding the difference’ means. We agreed that teaching this in the context of money was a practical and relevant approach.

Third research lesson (RL3)

Adults deployed the same as RL1 and RL2. Lesson focus was consolidating subtraction /finding the difference in the context of money by giving change, continuing to use a variety of practical resources, e.g. money, dice, number lines, variety of price tags.

Post lesson discussion revealed that the group had made steady progress, choosing the method they understood. It was agreed that the next weeks numeracy planning would concentrate on ‘finding the difference’ lessons in different contexts such as length and weight.

It was interesting to observe that different resources suit and support different children – sometimes unexpectedly, for example, the higher attainers found practical resources as useful as the

other children. As a result, a wider variety of resources are being used across the classroom to good effect.

Main observation/reflection: In Year 3, children still need to have tactile experiences with practical resources and time to help them consolidate mathematical concepts.

Impact on pupil learning and progress

Pupils will be more confident with using a range of equipment to provide assistance with learning e.g. Numicon. Children can also access toolkits for success to assist in understanding should they become confused. As children become more confident with links across mathematical concepts, we expect to hear clearer and more accurate explanations of understanding reinforced by an increased amount of time to talk using talk/work partners.

Impact on practice and future teaching

Lesson study approach has made us more focussed on pupil's learning in each lesson and the impact of adult guided small group work. We are very aware now that children learn in different ways and have different needs. This will help inform teaching methods and resources in the future.

During the post lesson discussion phase we discussed the impact of Numicon and other practical resources and now this informs our provision during lessons.

We believe it would be beneficial to implement lesson study in all year groups throughout the school, although the timing of the lessons (where in the week) needs to be considered for maximum impact. Moreover we feel that observations will become more focused on the learning rather than the teaching.

Impact on departmental and school approaches to teaching, learning and CPD

For impact on teaching and learning and use of equipment please see above. Children enjoyed and benefited using a range of resources and equipment that might not have ordinarily been used during lessons. As a result of this more resources have been ordered for classes across the school.

Personal reflections

It has been a great and enjoyable experience. Working with children so closely and being able to observe their behaviour, body language and misconceptions reinforce the idea that all children have different needs and therefore learn differently. This will help me to think more of other ways to teach my lessons by for instance use a wider variety of resources to access all children needs. Also, working with colleagues without feeling the pressure and being able to share ideas between us has been very worthwhile.

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