Development tool

National College for School Leadership

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What are we
learning about...?

'Making mathematics count' in school networks

Trial and transfer – improving practice through Research Lessons

Problem-solving together in mathematics

A development tool designed to help groups of teachers to innovate and transfer mathematics practice across a network of schools in order to solve classroom problems.

Networked Learning Communities

learning from each other | learning with each other | learning on behalf of each other

Trial and transfer – improving practice through Research Lessons

❝ What's the best way to improve teaching? Focus on learning. And the best way to increase learning? Move the focus off the teacher and onto the student. ❞

Kolb, 1992

This development tool is designed to explore a process of collaborative problem-solving known as Networked Research Lesson Study. It aims to help groups of teachers develop lessons and innovate new practices in order to solve classroom problems and raise standards of teaching, learning and achievement.

Research lessons provide a framework for collaborative study of the basic unit of teaching and learning – the lesson. The framework engineers the way the lesson is seen and the way it is talked about. This engineering enables teachers to:

- take risks together that they might not otherwise have taken alone
- see things they could not otherwise have seen
- capture insights through multiple perspectives
- identify and value what does and does not work
- develop new practices
- share the new practices with colleagues

The engineering is based on a familiar enquiry design but with some important modifications: case pupils, joint ownership, shared risk and communicated outcomes.

A group of teachers who know what they need to improve, collaboratively plan, teach, observe and analyse a series of lessons. They record, even video, key moments and sequences as they refine the process. They create an artefact – a video presentation, a demonstration lesson, a resource – to take the new practice to other teachers. All their discussion and analysis starts from how the case pupils and their groups responded and learned at each stage, compared with what was planned and expected.

Leaders are finding that involving teachers from more than one school in a research lesson sharpens their practice and their vision, and makes them more accountable for accuracy and learning.

❝ Research Lesson Study is a powerful process... when we sit down to plan and deconstruct a lesson we're challenging each other... it's amazing how much you can learn by explicating your ideas. Justifying it, really strengthens your knowledge and gets you to a place where you could not get on your own. ❞

Mathematics teacher

This development tool provides practical guidance on the conduct of a Research Lesson Study (RLS). It gives examples of this collaborative problem-solving process in action with a focus on teaching and learning in mathematics. It is suitable for use with groups of teachers of mathematics, or networks of mathematics practitioners. We hope that you will find it useful in exploring the possibilities of collaborative problem-solving and the innovation and transfer of mathematics practices in your context. □

Acknowledgements

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Nick Martin and Non Worrall
Lead Developers

Trial and transfer – improving practice through Research Lessons

The origins of Networked Research Lesson Study are in *Jugyoukenkyuu* – Japanese 'lesson study' which began to interest educators in the United States of America eight years ago. In Japan, teams of teachers traditionally identify an aspect of their teaching which is likely to have an impact on an area of need in pupil learning. They spend between one and three years working in groups, planning interventions which might work, closely observing these 'research lessons', deconstructing and writing up what they learn – from failures as well as successes.

At the end of a cycle of studies, they may teach a 'public research lesson' before an audience of peers from local schools and colleges in order to share the practice and widen the critique. It can be a city-wide event (Watanabe, 2002). These studies are widely read by Japanese teachers who contribute more than 50 per cent of the educational research literature produced in the country. Most Japanese teachers would expect to be involved in at least one network or community of colleagues, working on a research lesson question, at any one time in their career.

Lesson study has been developed in a number of locations in the US. It is also used in the IQEA and Networked Learning Communities programmes in England. The model developed by the NCSL-CfBT Networked Research Lesson Study project (2003-05) is unique in its use of 'case pupils'. These are learners who represent a particular group profile within the class ie higher, middle or lower attaining in the subject being taught. They are kept constantly in mind when jointly planning, observing and analysing the lesson – and what they did or did not do or learn, is the basis of all lines of questioning. In the NCSL-CfBT project, teachers noted dramatic rises in student learning and test results as a consequence of their involvement.

❝ As far as things like coursework go... they've come on in leaps and bounds with that – both normal investigative work and also statistics. ❞

Mathematics Advanced Skills Teacher

Practice knowledge tends to stick with teachers in their classrooms. Teachers have not been good historically at making their practice knowledge explicit to themselves let alone others. Michael Fielding and colleagues (2005) argue that such "sticky knowledge" is best moved from classroom-to-classroom by joint development work.

David Hargreaves (2004a) urges school leaders to create opportunities for teachers to value risk-taking and to work across schools in each other's classrooms where they are not blinkered by assumptions about their immediate settings. He believes there is more chance of practice being innovated and travelling across mathematics departments in separate schools, than between departments in the same school (2004b). Networked Research Lessons have been shown to harness risk-taking to produce what Hargreaves describes as "disciplined innovations" geared towards tackling aspects of practice in need of development, so that 'failures' are outweighed by subsequent improvements.

Pause for thought…?

If you were to conduct a research lesson tomorrow, what would your question be?

Getting the right focus for your Research Lesson Study: one of the great things about developing lessons using RLS is that the research question guiding the process always comes from the same root. Because you know what the practice is that you want to improve, your question can always be written:

How can we improve the way we teach…*x**

** **X** might be *'…dialogic group talk for solving complex statistical problems'* or it might be *'…students to use differentiated investigation success criteria to help them plan and conduct an effective ratio investigation.'* □

Getting started with Research Lesson Study step-by-step

1 Analyse children's mathematics work and school self-evaluation data from network schools to identify a teaching problem you hope to solve.

2 Identify a lesson study group of teachers. You can work in pairs but three or more is best. Agree on ground rules for joint collaboration, risk-taking and group discussion.

3 Go to the existing research knowledge-base. Draw on what is already known about your focus before you start. Keep revisiting so that you don't end up reinventing the wheel.

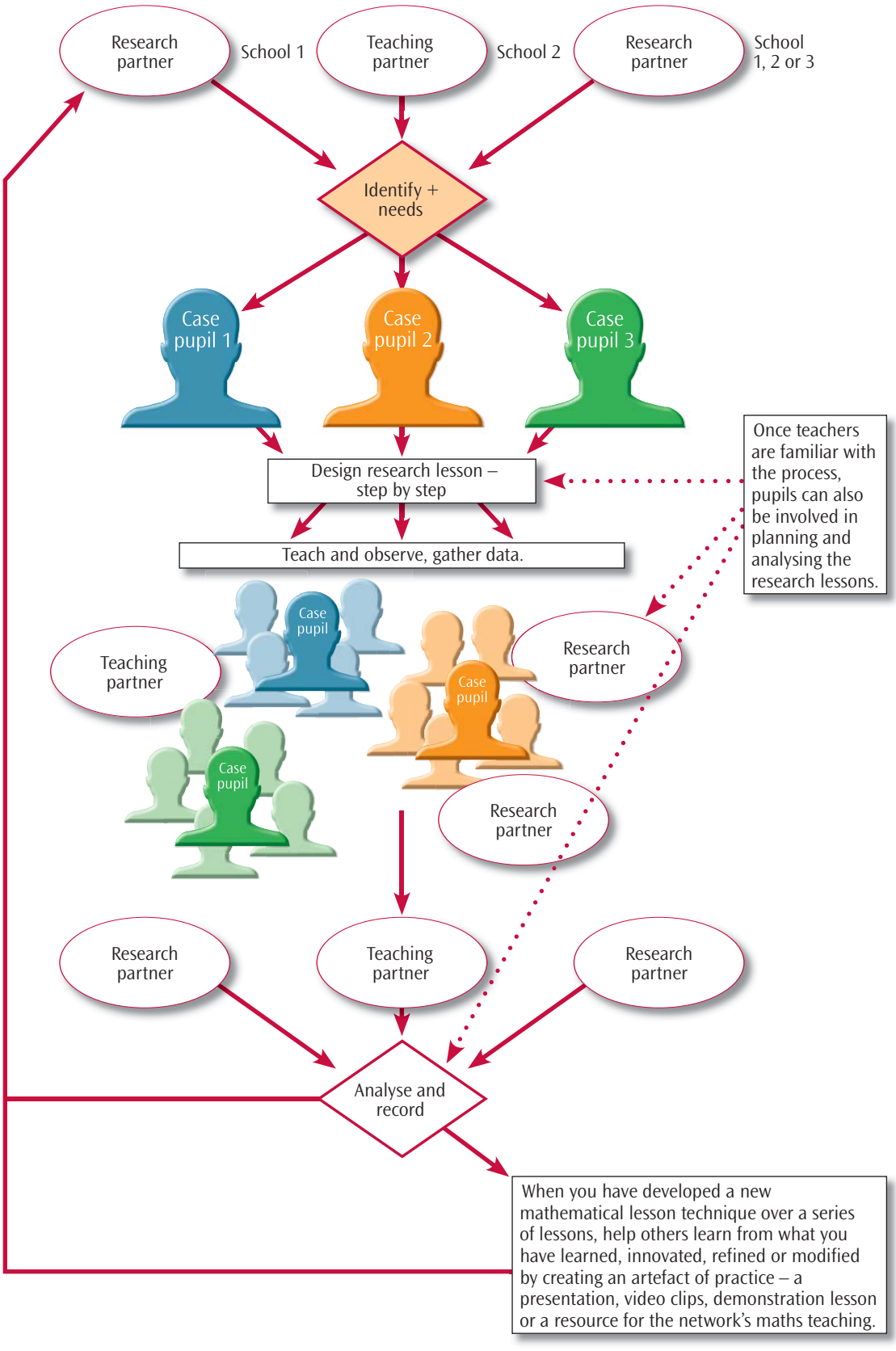
4 Identify three (or six or nine) 'case pupils' representing three types of learners who typify differing class needs. Carefully analyse their needs.

5 Design the lesson in line with what is already in the curriculum plan. The responses of the case pupils are carefully predicted for each stage of the lesson. An RLS planning proforma is at www.nlcexchange.org and go to the Research Lesson Community.

6 The lesson is taught to the whole class and observed by the team. Data about the actual learning as opposed to the predicted learning of the three case pupils is captured. Video-clips may be shot.

7 On the same day, the RLS team deconstructs the lesson, always taking the observed learning and experience of the three pupils as the starting point for any element of the discussion.

8 Agree and record what worked, what practice has been developed and what has been learned from what didn't work. What might you try as a result?



Planning for problem-solving template

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Research Lesson Study stages

Planning for action… *Pause for thought…?*

Record your thoughts, plans and proposed actions here

1 Analyse children's mathematical work and school self-evaluation data from network schools to identify a teaching problem you hope to solve.

2 Agree on a lesson study group of teachers and agree on ground rules for joint working.

3 Draw on what is already known about your area of focus from the existing research knowledge-base.

4 Identify three case pupils representing three types of learner. Analyse their needs.

5 Design your research lesson in line with the curriculum plan agreed.

6 Teach the lesson to the whole class and plan for observation by others.

7 De-construct the lesson taking the case pupils as the starting point – decide what framework to use for your discussion.

8 Agree and record what worked in practice and what has been learned from what didn't work – decide how you will record this analysis and the next steps involved.

A mathematics Research Lesson Study in practice

Developing Assessment for Learning strategies in Key Stage 3 mathematics

East Sussex RLS Network

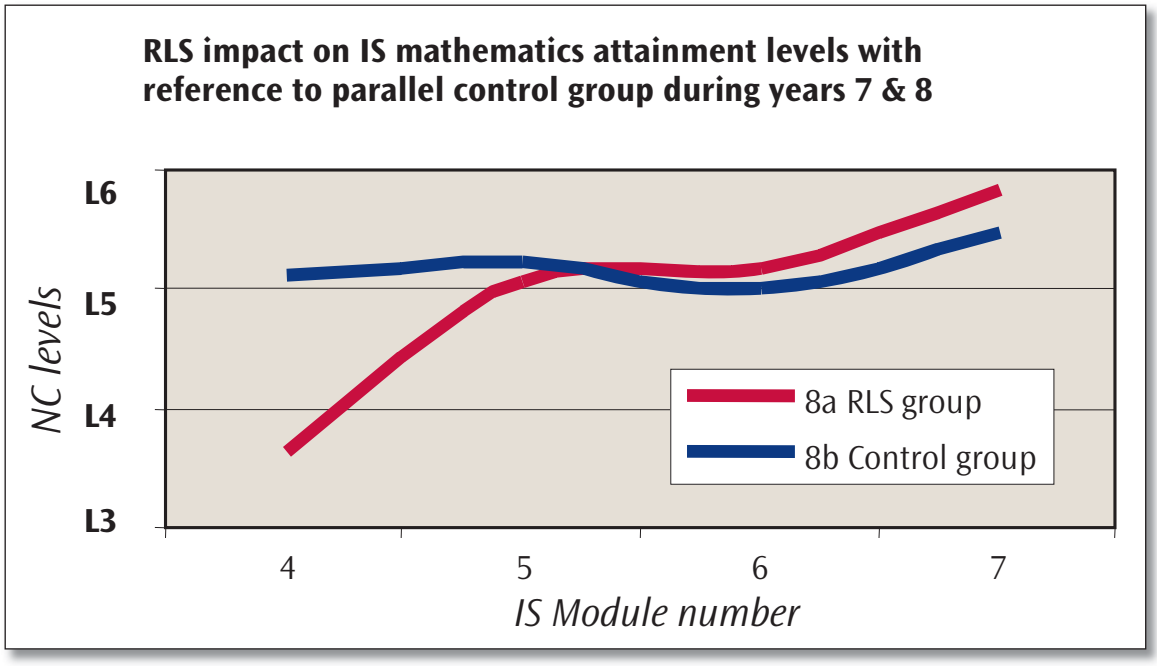
At Peacehaven Community School, we had never anticipated that an exploration of the use of *talk* in mathematics could have such an immediate and sustained effect on the progression of so many students up the level ladder. 'Finding the nth term', for example, is a fairly difficult mathematical concept for young people to assimilate, but using RLS we were able to provide students with the tools and motivation with which to gain a deep understanding of this abstract aspect of mathematics.

Within six months, every pupil in the RLS focus class had demonstrated a *significant* shift in their language patterns. A typical dialogue had evolved from *"I'm a level 4 in maths, but I want to get a higher level"* to *"I am working at a level 4a in this task because here's the evidence, and I think I can achieve a 5c by the end of this lesson by doing… and if I do this in enough tasks my level will go up to a level 5c."* The result was increased clarity of understanding and motivation by all students with regard to their current working level and progress.

RLS gave us the space to think, to innovate pedagogical alternatives for our project-based Independent Study (IS). Assessment for Learning (AfL) was a KS3 strategy and whole-school development priority. As part of this, we explored strategies that enabled students to assess accurately their own and each other's work, and from these analyses, to suggest ways of stepping onto the next rung of the ladder. In effect, they were managing their own and each other's learning: *"It's better when you just talk to your friends instead of the teacher about your work, because you can understand it better, and help them to understand what to do to get a higher level. Then it helps you understand how to get your level up too."*

Initially, students began to use level descriptors to inform their own progress. Our practice was transformed from questioning and leading learning, to role-playing and guiding student-generated discussion. Later, we focused on the dynamics of successful peer interview, with emphases on mathematical description and explanation. Through effective modelling and peer interaction, students' use of appropriate mathematical language proved to be significant, enabling them to improve their cognitive ability to work with higher level mathematical concepts. By the fifth lesson in the series, students were accurately assessing one another, suggesting feasible targets and offering simple strategies to enable progression.

For us, the most valuable aspect of RLS has been the collaborative element. With colleagues both within the network and the RLS partnership to bat ideas off, solutions generated become identifiably more robust and justifiable. The process of explication actively strengthens your beliefs in what you do in the classroom. In addition to feeding back to our faculties, we plan to use RLS as a tool to embed enhanced AfL throughout the school. The uniqueness of each classroom environment means that each approach becomes immediately more effective when tailored. RLS lets you do this and gives you the confidence and enthusiasm to share what you find, whether it works or not. □



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Further information

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If you would like to start a research lesson group in your network or are interested in finding out more about Networked Research Lesson Study, visit the Research Lessons Community at **www.nlcexchange.org** where further planning formats and observation and analysis guidance can be downloaded.

A DVD toolkit and booklets, *Getting started with Networked Research Lesson Study,* will be available from June 2005, which includes further examples of research lessons – presentations and video clips from the project and beyond. To order a copy, email **nlc@ncsl.org.uk**

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