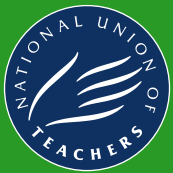




NATIONAL UNION OF TEACHERS INVESTIGATING THINKING SKILLS



**innovation**

Teacher research into using thinking skills approaches in the classroom



*"To launch its high quality and exemplary Professional Development Programme in 2000, the Union awarded scholarships to teachers to investigate the teaching of thinking skills in their classrooms. The initiative was exciting and innovative but also entirely consistent with our proud tradition of being both a trade union and a professional association.*

*This publication takes forward that tradition by sharing with the wider profession the learning of the teachers involved and the lessons arising from their investigations. I am very pleased that financial support from the Innovation Unit established by the DfES has made it possible to make this publication widely available."*

**Doug McAvoy, General Secretary, NUT**



*"The teachers who completed the scholarships engaged in critical inquiry into their practice in the classroom using thinking skills interventions as a window into the complexities of teaching and learning. The focus on thinking skills proved to be a powerful catalyst for the systematic investigation of pedagogy and one that can promote dialogue amongst teachers regardless of subject or phase of education. Awarding scholarships to provide teachers with the time and support to conduct research in their classrooms proved invaluable in promoting high quality professional development. The teachers were unanimous in their support for the scheme and the benefits it brought to their pupils and to themselves as practitioners."*

**Vivienne Baumfield, Director,  
Thinking Skills Research Centre, University of Newcastle**



*"The Innovation Unit aims to work in partnership with teachers and others to contribute to solving learning challenges. We will do this through promoting innovative practice in teaching and learning and making it powerful throughout the education system. This publication, describing innovative work initiated and undertaken by teachers contributes towards meeting this aim.*

*The Innovation Unit welcomes the opportunity to assist in the dissemination of these findings by supporting the publication and distribution costs so that the case studies and outcomes can be made available to as many teachers as possible."*

**The Directors, Innovation Unit**



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## INTRODUCTION

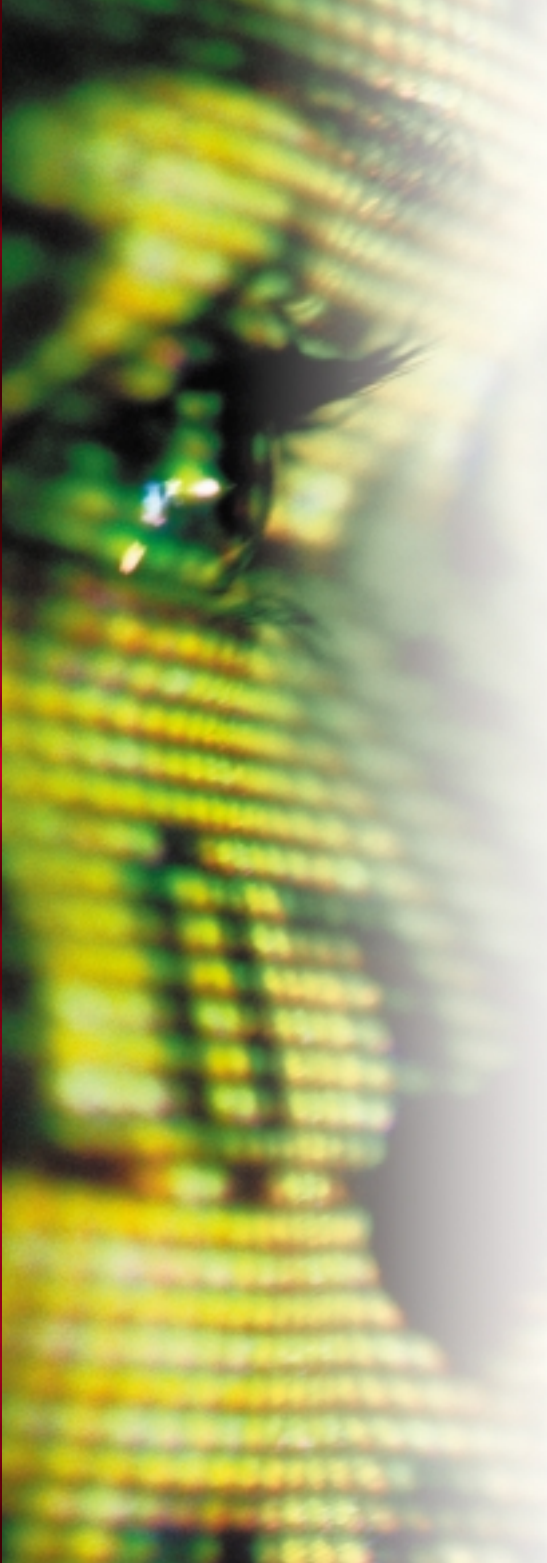
To mark the launch of its Professional Development Programme in 2000, the National Union of Teachers awarded scholarships to pairs of teachers to investigate the effects of teaching thinking skills. The Union also organised a programme of support and mentoring for the teachers carrying out investigations, led by members of the Thinking Skills Research Centre, University of Newcastle (Director: Dr Vivienne Baumfield).

This publication includes summaries of the investigations based on the reports written by the teachers involved. Details of how to obtain copies of the full written reports are printed inside the back cover.

The aim is to inform other teachers about the classroom-based investigations and add to professional knowledge about teaching and learning. Investigations can be used to try out teaching strategies and analyse the effects of those strategies on pupils' learning. While the investigations which the teachers carried out were not intended to be templates to be followed, other teachers will be inspired by them.

Since the investigations summarised here were completed, the Union has continued to organise support programmes for groups of teachers investigating the teaching of thinking skills: with Newcastle University for teachers awarded Best Practice Research Scholarships in England; and with the North East Wales Institute of Higher Education, Wrexham, for teachers awarded Teacher Research Scholarships in Wales.





## **THE INITIAL SCHOLARSHIP PROJECT**

Members in the NUT's Northern Region were invited to submit proposals to investigate the teaching of thinking skills in their classrooms. On the strength of their proposals, pairs of teachers from six primary; one middle; and four secondary schools were awarded scholarships.

The schools ranged from small to large; rural to inner city; and reflected different intakes and ability profiles. The investigations focused on classes ranging from Key Stages 1 to 4. The teachers involved had different levels of experience, both in the number of years they had been teaching and in their knowledge of research in general and of teaching thinking skills in particular.

## **SUPPORT TO TEACHERS**

The teachers were provided with four days of seminar support, two days at the start of their investigations, a further day half-way through, and a final day towards the end of the project period of one school year. Evidence-informed practice, research methodology, data collection and analysis, and report writing for a teacher audience were amongst the themes covered during the seminars. Electronic mentoring was available from the University of Newcastle to the participating teachers throughout their investigations.

The seminar programme enabled each pair of teachers to realise fully the research potential of their project. Pairs of teachers pursued different projects. The investigations shared a common basis in existing research evidence on teaching thinking skills and effective learning. The details of pedagogical techniques described in the reports demonstrated a variety of approaches and procedures in adapting thinking skills strategies to the needs of different individual and groups of pupils. The emphasis was on critical engagement with the claims made about thinking skills so that their impact in classrooms could be evaluated.

The variety of activities contributed to a coherent picture of the practical application of thinking skills, both because participating

teachers were encouraged to use similar approaches to research and data collection and also because the investigations shared a focus on the impact of the various approaches to teaching thinking on aspects of classroom interaction and pupil learning. While one pair of teachers, for example, started with the primary objective of building a 'Community of Enquiry' of pupils in Literacy, the reports showed that, across the board, successful engagement with thinking skills almost inevitably resulted in the creation of a community of enquiry whether or not this had been a conscious aim.

Whatever the nature of individual investigations, the support programme also allowed for the choices made and the conclusions reached by each pair of teacher researchers to be subjected to general peer discussion and debate.

## **PROFESSIONAL JUDGEMENT WITHIN A FRAMEWORK**

A coherent framework was provided by the support seminars and this was adapted by teachers, using their professional judgement, to suit their particular circumstances.

The teachers adopted an infusion approach and integrated thinking skills into the existing timetable of lessons and hence the National Curriculum.

The teachers involved taught at least one and often more of the following thinking skills strategies: 'Odd One Out'; 'Fortune Lines and/or Living Graphs'; 'Mysteries'; 'Memory Mapping'; and 'Mind Mapping'.

Plenary 'debriefing' activities normally followed the use of thinking skills strategies.



## THINKING SKILLS APPROACHES

Steve Higgins, of the University of Newcastle, describes in more detail each of these approaches.

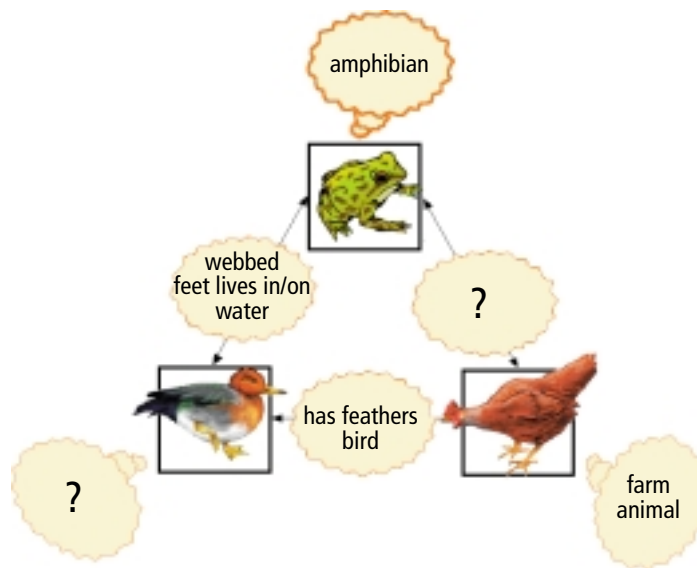
### ◆ 'Odd One Out'

In this strategy pupils are presented with three items and asked to choose one as the 'Odd One Out' and to give a reason.

Items are chosen to ensure that a range of answers are possible. Pupils can also be asked to identify the similar corresponding characteristic of the other two, or features common to all to develop their vocabulary and understanding.

Alternatively asking for other examples to go with 'Odd One Out' or the other two can be a good technique to extend the strategy. Asking learners to make up their own sets of items for an 'Odd One Out' task is also a good extension and can be used as a formative or diagnostic assessment activity.

The aim of the activity is to provide opportunities for pupils to use ideas and concepts appropriate to different subjects. It helps pupils to use and clarify key ideas and terminology.



## ◆ 'Fortune Lines'

'Fortune Lines' allow consideration of what happens to a person over the course of time. This could be a fictional character, such as Max from 'Where the Wild Things Are', or an historical figure, such as Anne Frank. Statements from the story or the person's life are presented to pupils on small pieces of card. The pupils have to discuss with a partner or as part of a small group the sequence of the statements and then relate these pieces of information to a graph of how the character feels.

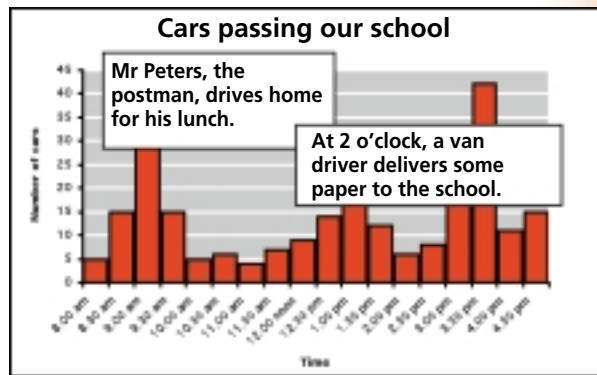
They can then draw a line (the 'Fortune Line') to show changes in the character's fortune over the course of the story. If this task is repeated for a second character it is possible to show how different characters' fortunes' relate to each other. One example might be that of Little Red Riding Hood and the Wolf where the contrasting fortunes of the heroine and the villain can be compared.

If the fortunes of both characters are drawn on the chart the lines can help to show the development of the plot. The main aim of the activity is to develop skills in drawing inferences and in explaining and defending their interpretation.

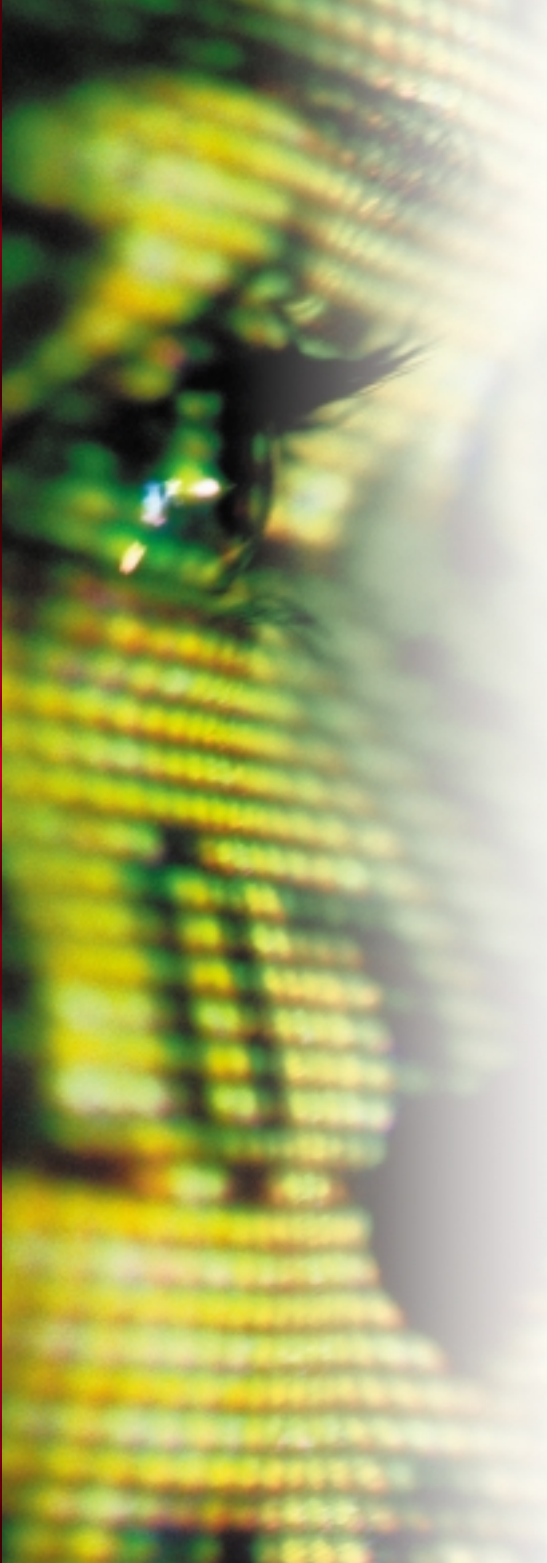
## ◆ 'Living Graphs'

'Living Graphs' are a development from fortune lines. They use a more mathematically based graph or chart as the framework for analysing statements.

It is important to use statements that pupils can understand easily, perhaps relating them to their own experience, as they then have to discuss and relate the statements to the more abstract frame of the chart.







The main idea is that pupils' skills in interpreting graphs or charts are supported by discussing and placing short pieces of text on the appropriate part of the graph. This helps them to make sense of what the graph represents.

### ◆ 'Mysteries'

In this strategy, pupils work with statements alone. They are presented with a central question and are given up to about 20 pieces of information on pieces of paper or card. The central question acts as the organising 'frame' for the task and provides motivation as a puzzle or problem to be solved.

The statements can contain a range of types of information (such as general or background information as well as specific details) and may contain 'red herrings' or irrelevant information. Pupils work in pairs or small group to read and sort the statements and have to come up with a solution to the central question or 'Mystery'.

The teacher listens in or 'eavesdrops' on conversations, or intervenes to support discussion and questioning. In the final phase of 'debriefing' the teacher encourages the groups to summarise their thinking and to justify their solutions to the central question.

Through working on a mystery, pupils can have experience of a range of important skills particularly interpreting information and speculating to form hypotheses. In the course of a mystery, they have to sort relevant from irrelevant information and check and refine their explanations as they make connections between the different pieces of information.

It is also a useful strategy to 'debrief' aspects of learning as well as the task, as pupils can talk about their understanding of 'being a detective' in solving the 'Mystery'.

### ◆ 'Maps from Memory or Memory Mapping'

Pupils work in small teams to recreate a map (geographical or historical) or a diagram or picture.

Each team sends one member up to the front of the class where they have ten seconds to look at the map or picture. They then have to go back to their group and start to reproduce the original. After a short period of time, another member of the group has their ten seconds looking at the map. After a few turns each, the teacher decides when to stop the activity and asks the pupils to compare their versions with the original.

In debriefing this task, certain strategies tend to emerge as beneficial: such as the importance of having an overview of the map or picture, key features such as roads or rivers, the use of colour and symbols. This strategy is also good for developing and discussing collaborative skills because teams which divide up the task and are clear about what they have to focus on when it is their turn tend to be more successful.

The strategy provides a context for pupils to describe, explain and clarify as they undertake the task. It is also useful to support discussions about key features of maps and diagrams and helps pupils to learn what is particularly significant or important.

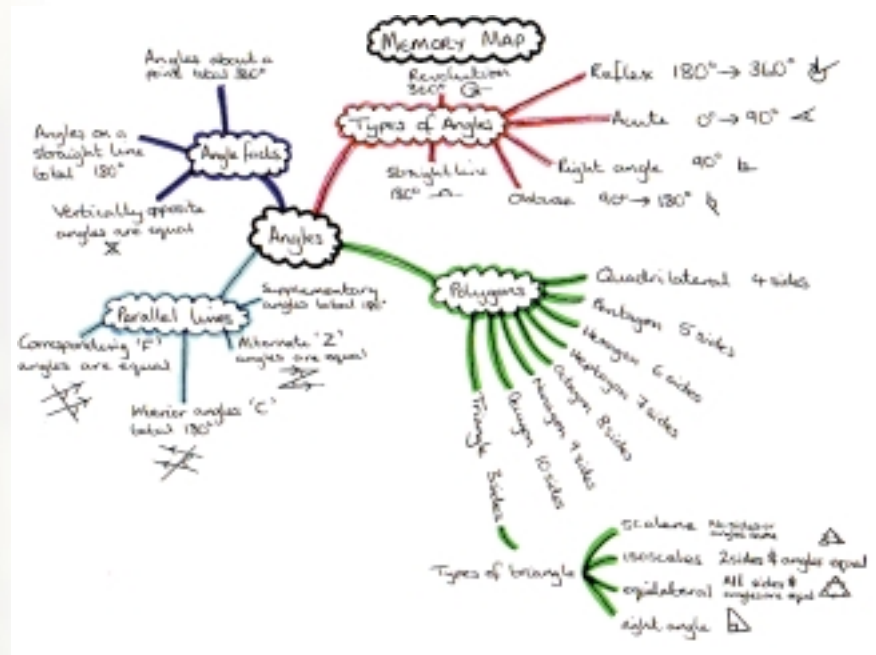
### ◆ 'Mind Mapping' and 'Concept Mapping'

In 'Mind Mapping' or 'Memory Mapping' (the term is easily confused with maps from memory and related terms), pupils are asked to brainstorm an idea or a concept to create a web of related ideas with branches for each related sub-idea.

It can be used in a wide variety of ways. 'Mind Mapping' is usually done individually as a means to represent thinking on a topic, either to record ideas or so that the connections between ideas can be developed.

In 'Concept Mapping' the links between the different ideas on the 'map' are labelled so that the relationship between the ideas is expressed more precisely. This supports clarification and developing

understanding of the relationships between ideas. 'Concept Mapping' has been used across the curriculum, but particularly in science, as a way of assessing changes in pupils' understanding.



### ◆ 'Plenary Sessions' and 'Debriefing'

'Debriefing' is an important component of teaching thinking lessons. It means setting aside time to discuss strategies with pupils. This might be structured with:

- What did you do?
- How did you do it?
- Why was that effective/a good approach?

Thinking about thinking and talking about thinking is described as metacognition. It is through this process that learners start to gain insight into their own and others' thinking and learning.

An 'Odd One Out' science task could, for example, be used to help pupils identify and use appropriate scientific terminology for



classification. The debriefing would make this part of the task explicit and help pupils to distinguish between 'scientific' and other reasons, drawing attention to the words the pupils had used and introducing appropriate vocabulary.

It can be difficult to leave sufficient time for effective discussion and debriefing at the end of a session, particularly if the earlier stages of a lesson are, or are not, going well. The pupils may regard the plenary as a signal for the lesson to end and thoughts of play time, lunch or home can then distract them. It may be more effective to stop the lesson to talk about these issues as they arise.

Alternatively, discussion and review might take place at the beginning of the next session. This will then help to focus pupils on how they are going to do something in a different, more effective, way.

## **DATA COLLECTION**

The support seminars provided for participating teachers emphasised the importance of systematic enquiry and the collection of data on the impact of the project on teachers and pupils. Descriptions of classroom practices were also prioritised.

Some or all of the following approaches to data collection were used by teachers during their investigations:

- testing pupils before and after interventions;
- diaries to record teachers' observations on a regular basis;
- observations in partner teachers' classrooms focusing on pupils' performance and responses;
- pupil logs;
- questionnaires to record pupil feedback;
- teacher-pupil interviews; and
- video and/or audio recordings.



## BENEFITS TO PUPILS

The nature of cause and effect in teaching is complex. Not surprisingly participants expressed reservations about the extent to which teaching thinking skills could be shown to be solely or directly responsible for pupil improvement. Yet, an overwhelmingly positive consensus emerged in favour of using thinking skills in the classroom.

The teachers who participated were unanimous in reporting increases in pupil attainment. Teachers said that:

- enjoyment was evident and confirmed by the pupils themselves;
- pupils' motivation and active engagement increased and they stayed on task longer;
- pupils developed greater understanding of how they learned;
- pupils' confidence was raised, bringing a corresponding improvement in reasoning skills and comprehension including understanding of texts and questions;
- as pupils' understanding increased, their vocabulary expanded, their communication skills developed and their standards of written work improved;
- pupils acquired a greater ability to listen and express themselves in peer discussion;
- creative and critical thinking developed within a 'community of enquiry'; and
- pupils enjoyed and benefited from working in small groups and this led to greater respect between pupils, group co-operation and exchange of ideas.

Teachers' reports of their investigations recognised that evidence of improved pupil attainment was tentative given the small sample sizes and the characteristics of research using a case study approach.

## BENEFITS TO TEACHERS

The pairs of teachers found that carrying out and reporting investigations led to significant benefits. They shared the pupils' enjoyment of thinking skills activities; felt strongly that their own confidence had increased; and believed that their projects contributed to their professional development. The reports indicated a striking sense of commitment to the teaching of thinking skills, with several pairs of teachers having widened the approach they used in their initial investigation beyond the focus subject. Others expressed the intention to do so in future.

The participating teachers said that working in pairs was valuable. Having a partner led to an exchange of ideas and brought each teacher the benefits of collaboration, support, encouragement and, in some cases, peer observation of and by their colleague.

Some teachers, however, found that shortage of time given the immediate and pressing demands of teaching hampered their intentions; in a couple of cases quite severely. Where there was whole school support for the work, it was easier for teachers to balance their roles as teachers and researchers.

## SUMMARIES OF REPORTS

Each pair of teachers wrote a report on their investigation set out under broad headings:

- aim(s);
- school and classroom context;
- strategies;
- pupils' responses;
- collection of data;
- teachers' responses; and
- conclusions.

A brief summary follows of each pair of teachers' written report.





## Primary Schools

### 'Using Thinking Skills to Improve Literacy in Key Stage 2'

**Jill Tough and Ann Brunger** focused on literacy to investigate whether thinking skills could improve children's interaction with text, their enjoyment of learning, and their metacognitive abilities. They worked to incorporate their strategies into the existing structure of the Literacy Strategy, within two classes in a large inner city junior school – a Year 3 class, working below expected levels of attainment and a Year 6 class achieving expected levels.

Using 'Cinderella' as a base text, they introduced numerous strategies over a six-month period and continued to build on them for the remainder of the year. In addition to those most frequently used across all the investigations such as 'Odd One Out' and 'Memory Mapping', they used 'Living Graphs', 'Connections' chosen to appeal to visual learners, and strategies for helping comprehension of text, such as underlining or using italics, sometimes known as DART (Directed Activities Relating to Text) approaches. This last approach proved particularly popular.

Reading comprehension scores were tested at the beginning of the intervention, and again at the end. They showed an average 5% increase in standardised scores. Data were collected also by means of informal teacher diaries; pupil interviews and pupil learning logs.



### Outcomes

Pupils' confidence rose, skills developed, and the response was positive: *"It's fun all working together, you get more ideas"* was a typical response. Both teachers said; *"we feel the greatest gain has been our own. As an instrument of professional development, this project has been an enormous success..."*

## 'Using Odd One Out as a Formative Assessment Tool for Number'

Two reports are covered by this summary.

**Fay Hartland and Lynn Telford**, from two neighbouring schools, conducted an investigation into 'Odd One Out' as a way of assessing number and shape in Mathematics in their Year 4 classes. A third teacher in Fay's school, Anne Hawes, who taught Year 1, was also involved. They worked jointly with another pair, **Hanneke Jones and Angela Steele**, who taught in two nearby schools.

All four were first schools in Northumberland villages, small and semi-rural, with a low percentage of deprivation. All classes included a range of ability levels.

All five teachers agreed on shared activities and a timescale for observation, feedback and discussion. At the beginning of the project, they undertook reciprocal cross-school classroom observation to ensure consistency of approach.

The teams had conducted their own small-scale experiments prior to the Scholarship Project, the findings of which contributed to the project. They had the further advantages of collaboration with other teachers who had been previously similarly engaged.

The 'Odd One Out' strategy was used in various ways to develop reasoning. Activities were designed to motivate and engage children and increase their confidence, thus developing their understanding and reasoning powers in maths.

Children worked in groups, developing a community of enquiry, and stayed on task. As the project progressed, the teachers found that their pupils' mathematical vocabulary had expanded and that the ability of their pupils to express themselves had improved.

Data were collected and analysed by means of Assessment Records on grid sheets kept throughout the year. NFER tests were used for comparison and these showed an increase in correct answers above the standardised national average. Pupil questionnaires, teachers' notes, and one video recording in each school were used to evaluate strategies through observation of class and group interaction.

### Outcomes

The teachers were unanimous in concluding that during the year they saw improved results in maths and metacognition at all ability levels, although they were cautious as to how much of this could be attributed to their intervention given the impact of the Numeracy Strategy.

Pupils responded with enthusiasm to thinking skills. One said, *"I have learnt more about having reasons about numbers"* and another, *"It doesn't really matter if you get it wrong as long as you have a go and think about it"*.

The teachers concluded that 'Odd One Out' as a thinking skills strategy was flexible, easy to implement within the curriculum and provided a simple but effective tool for diagnostic and formative assessment. They enjoyed engagement with the project and intended to continue with thinking skills strategies. They felt that their own professional development had been enhanced.



## 'Building a Community of Enquiry to Enhance Children's Questioning Skills in Key Stages 1 and 2'

Caroline Hodgson and Teresa Laybourne adopted 'Philosophy for Children' as the focus of their research in literacy. They were teaching in a nursery and primary school in a disadvantaged area of Sunderland where children often entered school with extremely limited vocabularies.

The project was part of a wider investigation within the school into the teaching of thinking skills. The senior management of the school supported the team's approach as a focus for teacher training and as an addition to the curriculum. Teachers received 15 hours of training in the 'Philosophy for Children' approach before commencing the work.

Using story texts, the teachers sought to build a community of enquiry that would develop pupils' questioning skills. The teachers involved four year groups (Reception, and Years 1, 4 and 6) and two other teachers.

Pupils' questions were organised into three categories:

- closed (for example, "Do you like chocolate cake?");
- open-ended (for example, "Why do you like chocolate cake?"); and
- philosophical, inviting reflection and independent thought (for example, "How can we be sure everything is not a dream?")

Data were assembled and analysed by means of teacher questionnaires; teacher interviews; video recordings; pupil interviews; and, in Year 6, student learning logs. The report presents comparative findings across the different year groups.

### Outcomes

These teachers reported clear and positive developments in pupils' abilities to interact, discuss, listen, reflect, and to generate open-ended questions. As one Year 1 pupil said, *"You ask some questions you don't know the answer to"*. Regardless of age or ability levels, the children's enjoyment was evident. The teachers concluded that the project was especially helpful to low achievers and, from their own point of view, believed that *"Philosophy for Children has changed our own perceptions of children's capabilities and has raised our expectations about what children can think and learn"*.

## 'Improving Thinking in the Literacy Hour in Year 5'

**Sarah Greene and Eve Strasshine's** project was a first-time engagement in research for both of them. They were working in a North Shields county primary of mixed intake, which has an integrated Deaf Support Unit. With a Year 6 group of 30 pupils whose achievement ranged from average to above average, and a Year 5 group of 32 mixed ability pupils, with a deaf pupil in each group, they investigated the use of thinking skills strategies as a possible tool for building a community of enquiry. 'Mysteries', 'Mind Mapping', 'Memory Mapping' and Robert Fisher's 'Stories for Thinking' were the strategies used for text-based activities integrated into the Literacy Strategy.

The chosen strategies were designed to motivate children; encourage them to develop their creative and critical thinking; improve their listening skills; develop their abilities to discuss, debate, question and make decisions; expand their vocabulary; and improve their writing skills. Data collection involved keeping teacher notes on the use and effectiveness of the strategies, and collecting the children's written work and their comments on the thinking skills programme. Assessment activities were video recorded for observation and analysis.

### Outcomes

The teachers concluded that the thinking skills project was successful. The children were motivated, stayed on task and demonstrated improved levels of attainment. Their enjoyment was evident, as was their appreciation of the value of thinking skills: *"Thinking skills is a fun way of learning"; "It's a good way to get your brain working"*. The teachers also concluded that it was possible to integrate the strategies into the literacy hour without compromising the National Literacy Strategy. They found that working as a pair contributed to more focused, motivated and exploratory teaching. They also enjoyed the activities and believed them to have *"deepened their knowledge and understanding of children's thinking"*.

## 'Using Thinking Skills Strategies to Improve Children's Understanding of Written Questions and Problem Solving in Year 4'

**Katherine Davis**, working with a Year 4 class of 30 children, tested the efficacy of a published thinking skills programme called 'Top Ten Thinking Tactics', by Lake and Needham, in the teaching of Mathematics. The main aim of the intervention was to establish whether thinking skills would improve children's understanding of written questions and their ability to solve problems. The teachers also wanted to find out whether the teaching of thinking skills could be incorporated into a *"a busy classroom and a timetable with severe constraints"*.

After a few weeks, circumstances led to a decision to teach only the first five of the ten tactics. For the purposes of data analysis, SATs scores pre and post-intervention were compared. Also, pre and post-intervention, Maths tests were given to three sample boy/girl pairs representing lower, middle and upper ability bands. Children's talk was recorded, transcribed and analysed. Teacher diaries were kept throughout recording teacher observations as well as teacher and pupil reactions to the programme.

### Outcomes

The Thinking Skills strategy appeared to bring improvement in maths problem-solving – SATs results, for example, showed a rise on average of 0.59 per cent, as against the nationally expected rise of 0.5 per cent of a level over one year. This finding was tempered by some reservations arising from the non-conclusive nature of evidence and the variations in results at different ability levels. Also the progress of the project had been seriously hampered by lack of time.





## Middle Schools

### 'Using Lessons from CAME to Improve Mathematical Thinking in Year 6'

**Helena Hay and Rosemary Todhunter** focused on whether the use of CAME (Cognitive Acceleration through Maths Education by Mundher Adhami) materials to develop thinking skills and metacognition was an appropriate strategy for 10-11 year old pupils. The project arose from a whole school initiative to adopt thinking skills at Hexham Middle School in a large market town embracing a mixed catchment area, rural and suburban, with a broad socio-economic mix.

Eight lessons from the CAME package were taught by each teacher, observed by the other, to Year 6 classes of 30 mixed ability children, working in small groups. The key aim was to accelerate questioning thus encouraging a greater understanding of mathematical concepts through thinking, reasoning, and interactive discussion.

Pupil Thinking Logs and teacher observation provided the sources of data collection, and the first and last lessons were videoed. Initially, the teachers found it difficult to refrain from providing answers, but their own confidence increased and interaction developed in ways that encouraged and facilitated pupil discussion. The teachers felt that their acquired skills were reflected in other aspects of their teaching.

### Outcomes

Evidence showed an increase in the frequency, type and quality of pupils' questions; increased use of reasoning vocabulary; greater awareness of making links; better levels of understanding; and recognition of different ways of working.

Children enjoyed the CAME lessons. Responses, between first lesson and the last, progressed from *"It was good fun measuring my partner"* to *"I understand how to check your work more accurately. I also know that if there's a problem, then I should use it to make the answer easier to find"*.

## Secondary Schools

### 'Using Thinking Skills Strategies to Tackle Motivation and Underachievement, particularly amongst boys, in Year 8'

**Tammy Nicholls and Pat Blackburn** taught thinking skills in the English department of a small comprehensive with no pupils for whom English was an additional language. Year 8 pupils were chosen as the focus for research because it was in Year 8 that many began to show signs of disaffection. Since girls were achieving higher test results and GCSE grades than boys, the teachers aimed particularly to address boys' underachievement.

Two classes were selected for the project: a higher ability group of 33 pupils, and a mixed ability group of 26 pupils. The chosen strategies were 'Mysteries', 'Memory Mapping', 'Odd One Out', and decision-making activities. The pupils were organised into 'response partner threes' of mixed ability and the strategies incorporated into the English curriculum.

Assessment folders, pupil logs and questionnaires, peer observation and video were used for data collection; but the most significant evidence of improvement was seen in the quality of pupils' written work.

#### Outcomes

Initially, the teachers were concerned that they lacked sufficient 'know-how' and time to conduct sufficiently rigorous data collection and analysis. They felt, however, that "...there has been a great impact on our own professional development. We are now confident in using thinking skills techniques and feel we are as motivated as the pupils". Both boys and girls, of all ability levels, showed improved motivation and confidence; the majority raised their achievement in both oral and written work; and most became more independent in their learning. Enjoyment was evident. One said, "I have enjoyed English lessons more this year because we are thinking more instead of just doing things from books"; and another, "I would like thinking skills in all subjects because it's a fun way to learn".



## 'Using Thinking Skills Strategies to Improve Students' Questioning, Analysis and Problem Solving Skills'

**Barbara Salkeld** headed a three-teacher collaboration at Moorside Community College, a smaller than average Comprehensive in an area of high unemployment in the Consett area of Durham. The full ability range was covered, but there was a higher than average number of lower attaining pupils and above average eligibility for free school meals.

The research focus was Geography, targeted on three groups of Year 9 students. The students represented the full ability range with most predicted to achieve National Curriculum results in line with the national average.

The Thinking Skills programme aimed to raise pupil attainment in Geography by developing students' abilities to ask relevant questions; analyse and understand the meaning of words and terms; and improve problem-solving skills. The teachers worked to encourage peer collaboration among the students, and build a community of enquiry within which debate and discussion would lead to understanding and metacognition. The strategies employed were 'Odd One Out', 'Mysteries', 'Living Graph', and 'Reading Photographs' (by David Leat) to help visual learners.

The teachers' full report and its appendices provide comprehensive detail on how these strategies were applied. The data were provided by audio recordings; teacher logs and observation; student self-evaluation sheets; and student discussion. The teachers concluded that the strategies had stimulated peer discussion and better exchanges of knowledge and information between teachers and students.



### Outcomes

Significantly, all students stayed on task and learned to take ownership of problems and discuss options and solutions collaboratively. Pupils confirmed that they were "*challenged*" and that the activities were "*fun*".



## 'Using Thinking Skills Strategies to Improve Pupils' Confidence in Using Historical Sources and Enhance Metacognition in GCSE History'

**Ian Price and Paula Mountford** focused on GCSE History in two mixed-ability Year 10 classes in a large Yorkshire Comprehensive with Technology status. Both teachers had previous research experience from a project focusing on the use of ICT. They were working in a History department that promoted teacher collaboration and was eager to find innovative ways to raise standards. The teachers' primary concerns were to build pupil confidence in dealing with historical sources and to develop their metacognitive skills.

The chosen thinking skills strategies were intended to enhance pupils' vocabulary; encourage listening and discussion; and improve classification skills, note-taking and source analysis. Activities were developed from 'Odd One Out', 'Mysteries', 'Mind Mapping' strategies (based on Tony Buzan's work), and visually based 'Structured Source Questions'. Pupils worked in pairs and small groups, and video and audio recording was used to observe and analyse pupils' responses and teacher 'behaviour'. Additionally, pupil logs and worksheets were kept and feedback was obtained in plenary sessions. The evidence for findings was supported by analysis of the quality of the pupils' written work.

### Outcomes

The teachers found that working as a team, observing and discussing their methods, was invaluable, and concluded that *"This small-scale investigation has proved to be of enormous benefit... we gained an enormous insight into ourselves as well as the methodology and techniques linked to the thinking activities we trialled"*.