

# Developing thinking skills in the Primary classroom

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## **Abstract**

*Louise Farrell graduated from the Herts MEd in Leading Teaching and Learning in 2005. In this article she provides an account of her evaluation of strategies for supporting the development of her pupils' thinking skills.*

As a primary school teacher and science specialist, I have always been interested in how I can develop children's learning in science. When my project began I was Coordinator for both Key Stage 2 and science in my previous school. I am now Deputy Headteacher at my current school so I have been able to use my developing understanding of thinking skills to influence practice directly in two schools.

My project began when an OFSTED (Ofsted, 2001) inspection report pointed to the need to extend and challenge able pupils throughout the curriculum. This became a focus in the School Development Plan and I was asked to take a lead. However, I was keen to provide opportunities for all the students in the school to develop their cognitive skills, together with the language necessary to do this, regardless of their ability. I therefore decided to focus on the development of thinking and how this can be accelerated through discourse. Fortunately, this was also an area of interest in my new school. I began by reading around the subject to help me to find a way forward for my development work.

## **Building on the work of others**

My reading raised two important issues for me: firstly, there is the question of whether the development of thinking skills should be integrated into the whole curriculum rather than approached as a discrete programme and secondly, if pupils are to develop their 'cognitive processing' they need to be able to reflect on what better

thinking is (McGuinness, 1999). Realising that I also needed to develop my own understanding of the thinking process, I read John Dewey's early work (Dewey, 1910). His view that reflective thinking involves identifying and defining the problem and then generating and testing a hypothesis stimulated my own thinking. The crucial issue for me was how you teach such thinking skills to young children. Matthew Lipman (2003) argues that it is important to introduce young children to the different thinking skills or processes in a logical order, starting with the lower order skills such as comparing, distinguishing and connecting before moving on to such things as classification and analogical reasoning. He stresses that it is a matter of being able to recognise these thinking processes in others in order to engage in discussion and argument. This suggested to me a key role for the teacher in enabling children to engage in this social process.

I began to think about the value of teacher questioning together with the way in which children can learn through discussion. I read about the development of 'dialogic talk' (Alexander, 2000; 2004); here the questioning is controlled by the children and provides them with the opportunity to express their ideas and develop their understanding by making links to what they already know. The Socratic approach to questioning also raised some interesting issues about my own classroom practice. This approach to questioning differs from random open-ended questioning; it follows a pattern with questions probing reasons and assumptions in order to take the enquiry further. Examples include 'Can you explain that?', 'Can you give me an example?', 'Why do you think that?', 'How do we know that?' and 'What if someone were to suggest that...?'. Such questions can be divided into the following categories:

- Questions that seek clarification
- Questions that probe reasons and evidence
- Questions that explore alternative views
- Questions that test implications and consequences
- Questions about the question / discussion

Having stimulated my own thinking about thinking, I moved on to explore various intervention programmes which have been used to accelerate pupils' thinking skills and raise attainment across the curriculum. Such programmes have sought to develop thinking skills both in the primary and secondary sectors of education. A number of these programmes (Blagg, Ballinger, Gardner, Petty, and Williams,

1988; Lipman, 1991; Adey, Robertson, & Venville, 2001) involve children working in small groups with an adult. The Cognitive Acceleration Through Science Education at Key Stage One (CASE@KS1) (Adey *et al.*, 2001) programme was of particular interest to me. The thirty small-group activities, published under the title *Let's Think*, are designed to promote cognitive conflict and encourage social interaction and metacognition in Year 1 pupils. I wanted to trial these activities to see if they might help me to support the development of my pupils' learning and thinking skills.

The thirty small-group activities lasting 30 or 40 minutes were based on Piagetian and Vygotskyian psychology. They promoted cognitive conflict and encouraged social interaction and metacognition. Piaget believed that during the maturation process children go through different stages of development; the intervention activities in *Let's Think!* were aimed at pupils making the transition from pre-operational to concrete operational thinking. Each *Let's Think!* activity follows the same structure, shown in Table 1 below. They require no writing from the children, leaving them free to engage with one another; they are free to concentrate on engaging critically but constructively with one another and so continue to build on their thinking skills.

Table 1: Structure of Let's Think! Activities (Adey *et al.*, 2001)

Concrete preparation	The materials and language of the activity are introduced. Existing knowledge is consolidated and children recall what they already know so that they can use this knowledge during the activity.
Cognitive conflict	The children are given a challenge and encouraged to puzzle over it. A correct answer is never given, even if the children do not find it out for themselves. The focus during this part of the activity is the thinking that is carried out, rather than a solution to the problem.
Social construction	Children are encouraged to interact with one another throughout the activity by offering suggestions and commenting on those of others in a polite, constructive way. Pupils

	may be asked to justify statements made. At the beginning of the programme the teacher models how group members should interact with each other during this stage.
Metacognition	The children are encouraged to be aware of their own thinking during any phase of the activity. Questions and comments such as: ‘...you’ll need to think hard...’ or ‘What were you thinking when you did that?’ may be asked.
Bridging	This is the process of linking the kind of thinking that is being developed in the <i>Let’s Think!</i> activity to other situations when that type of thinking could be useful. It can be carried out during any stage of the activity.

I believe that *Let’s Think!* has been successful because it includes three preliminary activities. These develop pupils’ speaking and listening skills and establish how the activities will take place. Also, although the group is allowed to work collaboratively and independently, the teacher is present at all times. The teacher’s presence is an important factor since, although children may possess the tools of language, they may not have learned how to use them to good effect once adult support is withdrawn. The educational effectiveness of group work depends entirely on communication (Dawes, 2004) and the teacher’s presence during the activities to model and promote good communication. An additional reason why *Let’s Think!* may have been successful is that, through questioning, it requires the students to reflect upon how they can apply the thinking skills in other curriculum areas.

### **The process of development work**

Feeling more confident about my own understanding of the development of thinking, I set about planning my classroom explorations. I knew that I wanted to learn more about the impact which both structured intervention activities and open-ended teacher questioning can have on children’s ability to talk about their own thinking. I therefore decided to use a comparative case study approach (Hays, 2004) to help me understand more about the way in which cognitive discussion takes place and how it can be promoted

through different kinds of questioning approaches and structured activities. A key strategy would be the observation of the children's personal interactions and thinking behaviours in a range of classroom activities.

Collaboration with other staff was vital for two reasons: first, I would sometimes be teaching the group and could not both teach the lesson and observe the children, and second, I wanted to involve colleagues so that the development work would become embedded in school practice rather than just my own. I asked colleagues to take field notes that included general observations regarding timings, events in my classroom, learning conditions and children's actions.

We focused on two mixed ability groups of six Year 1 children whilst they undertook activities aimed at developing cognitive discussion through collaborative work and Socratic questioning over a ten week period. One group would complete ten activities from the *Let's Think!* intervention programme and the other would develop their thinking skills through the teacher using open-ended, Socratic questions. I was interested to see if there would be any difference in the development of the pupils' understanding and thinking. I explained to parents and the children what I wanted to do and was encouraged by the amount of interest and enthusiasm shown. The children were very excited to be included in my project.

In addition to observing the children and listening to their talk I decided to video them to allow me to revisit what I thought I had seen and heard. I also kept a research journal throughout my project in which I recorded my questions, thoughts, concerns, reminders and key events.

### **What I learnt**

The evidence from the observations, discussions and my research journal suggested that open-ended, Socratic questioning does provide pupils with opportunities to discuss their thinking. Pupils appeared to explain, work and think collaboratively with greater effectiveness. Pupils' development in their ability to explain was particularly interesting to me. The field notes contained evidence that suggested to me that the children were more able to explain their own and others' actions at the end of the project. Attributing such outcomes to any particular input is always problematic of course but it seemed clear to me that opportunities to carry out 'dialogic talk' (Alexander,

2000, 2004) had helped to build the children's confidence in this regard.

The structured intervention activities similarly seemed to impact positively on children's powers of explanation. They appeared to think and work more collaboratively, adopting new ideas, asking questions and demonstrating their learning. The large number of questions being asked by the children by the end of the project was particularly interesting to me. In the early part of the project, children had opportunities to question one another about their thoughts and actions yet seemed to lack the confidence to do so. Adey *et al.* (2001) point out that social construction needs to be modelled by the teacher at the beginning of the programme and this is the role that the teacher undertook. My project seemed to support the view put forward by Mercer, Wegerif and Dawes (1999) that intervention programmes rely on this action of the teacher; children need to hear the appropriate forms of dialogue if they are to use these themselves. The pupils' increased confidence and ability to question by the end of the project was a very encouraging development.

The increase in patterns of collaborative working amongst the children also challenged my thinking. By the end of the project the children were working keenly and confidently together, sharing their ideas readily. The structured intervention activities appeared to be both helping the children to work together to solve problems and also providing them with the language necessary to participate in collaborative work.

Open-ended, Socratic questioning and structured intervention activities appear then to result in similar types of talk about thinking. However, the structured intervention activities offered more opportunities for the children to talk and enabled the learners to become more independent when discussing thinking. The role of the teacher appears to be key in fostering this talk about thinking. My explorations reinforced the view that it is more effective if teachers firstly focus on developing learners' listening skills before attempting to develop their discussion about thinking during subject based group work (Dawes, 2004). I also found that if the learners are not provided with opportunities to work independently they become too reliant on the teacher working with them. As a result, I believe that it is necessary for teachers to introduce activities but then leave pupils to work independently (Harlen, 2004a; Alexander, 2000), so that they can participate in exploratory talk. The role of the teacher

is then to share in the pupils' discussion by asking questions to guide the conversation but to allow the group to work independently. The teacher also needs to create a safe learning environment where the children feel confident in expressing their views and ideas. During the activity the teacher can also make the pupils aware of their thought processes so that they can use these strategies to solve future problems.

In order for group work to be successful in encouraging learners' talk about thinking, consideration needs to be given to the nature of the activities and the resources provided. Providing pupils with individual sets of apparatus encourages them to work individually and so develop their own thinking skills. Although this develops thinking skills, it appeared from my observations that it is the interaction with peers and adults that accelerates the development of cognitive abilities. This accords with much of what I learnt from my reading (Lipman, 2003; Vygotsky, 1978; Dillon, 1994; Harlen, 2000; 2004a; 2004b; Mercer *et al.*, 1999; Pollard, 2002).

### **Reflections**

This project has greatly increased my personal knowledge about thinking. It has made me reflect on my understanding of the term 'thinking skills' and how these skills can be developed in the primary classroom. It has also helped me consider my interaction with pupils during small group work and whole class teaching. I now ask questions that require the pupils to use and apply their thinking skills. I also try to ensure that small group work which occurs in my classroom encourages cognitive discussion. I let the pupils work more independently now so that they can continue to develop their thinking skills through exploratory talk and I recognise that effective questioning alone does not encourage good thinking habits.

### **The way forward**

This project has enabled us to begin to address the issue of the development of thinking skills in my school. There are a number of ways in which we are taking this forward.

#### *Professional development workshops*

These enable us to stimulate and support staffroom discussion about developing thinking. Although most teachers recognise the importance of asking open-ended questions, professional

development sessions provide the opportunity to focus on developing our classroom practice.

*The use of thinking development activities in all curriculum subjects*

To promote talk about thinking and develop good thinking habits it is important to adopt a whole school approach in which teachers incorporate into curriculum subject lessons activities that are specifically aimed at developing thinking skills.

*Teacher collaboration*

We must enable teachers to collaborate in order to learn more about the effectiveness of group work strategies for developing pupils' awareness of their own thinking and their ability to think. We need to develop our own expertise in this area through good professional development programmes, peer observation and other forms of collaborative work.

During the two years that I engaged in this development work I have learned a great deal. My project helped me to address the issue of developing thinking in my school. I am keen to continue to address the issue by focusing on the transfer of skills developed during structured thinking activities to other subject areas and contexts. I am also interested in working with Year 3 pupils to explore the use of De Bono's (1996) 'thinking hats' with them. I foresee that this journey of investigation and discovery will be never-ending as there are so many strategies to explore. My project taught me that many children have never reflected on the process of talk; they need to be helped to pay attention to what and how they speak to one another, so that they can become members of what Goodwin (2001) calls the 'articulate classroom'. This plays a key role in helping children to become educated and develop their thinking (Dawes, 2004). Children who can confidently and effectively talk to one another can support one another's learning.

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