

DEVELOPING ACTIVE LEARNING

in the **PRIMARY CLASSROOM**

ANITRA VICKERY

with contributions from Carrie Ansell, Keith Ansell, Chris Collier,
Rebecca Digby, Mary ffield, Tor Foster and Darren Garside



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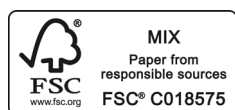
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CHAPTER 1

FRAMEWORKS FOR THINKING

Anitra Vickery

I cannot teach anybody anything; I can only make them think.

Socrates

Chapter overview

For many years the primary curriculum put an emphasis on passive learning, with the child being considered an empty vessel that needed to be filled with knowledge through a didactic approach. Encouraging children to be active about their own learning and their development of cognition and metacognition requires a very different pedagogy, one which enhances general thinking skills. The explicit development of thinking skills can be offered in different ways; through specifically designed programmes added to the normal curriculum, through targeting thinking and reasoning in specific subjects and by permeating the normal curriculum by identifying and creating opportunities within all lessons. Whichever approach is taken the objective will be to enable children to participate actively in high quality thinking and learning. Efforts to make thinking skills a more central feature of the curriculum have met with resistance. There are competing opinions as to whether thinking skills can be taught, or whether they are best developed through the subject disciplines, and there are questions from some quarters as to whether the teaching of thinking skills is a legitimate curriculum objective.

INTRODUCTION

This chapter will consider the role of thinking skills in the learning process and different approaches to developing thinking skills.

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The definition of thinking has occupied academics in a range of fields including psychology, sociology, neuroscience and philosophy from the beginning of time. Each of these fields has influenced the creation of taxonomies, frameworks and definitions of thinking skills. Models that can provide a basis for programmes for the development of thinking skills are available from a number of different sources. These include the ideas of educational thinkers such as Dewey, Feuerstein and Bloom; programmes that focus on implementation (such as the Somerset Thinking Skills courses (Blagg, Ballinger and Gardner, 1988), and Top Ten Thinking Tactics (Lake and Needham, 1993)), programmes that are based on thinking skills in particular subjects (such as Cognitive Acceleration in Science Education (CASE) (Adey, Shayer and Yates, 1989) and Cognitive Acceleration in Mathematics Education (CAME) (Adhami, Johnson and Shayer, 1995)), and movements that seek to add to the traditional curriculum such as Philosophy for Children (see Chapter 10). Reference to the development of thinking skills can also be found in the National Curriculum (DfE website).

The chapter will identify concepts that are common across a range of different frameworks and suggest how these can be incorporated within the curriculum. It will suggest how teachers can integrate thinking skills into their teaching through establishing an effective framework which supports planning, assessment and progression. It will consider the role of:

- the development of metacognition and thinking through pupil presentation;
- assessment for learning, including self and peer assessment;
- collaborative learning and group work;
- discussion.

The chapter concludes with the case study of a primary school practitioner who has been proactive about the development of a greater focus on children's thinking and empowering children as active learners who take responsibility for their own development.

PROGRAMMES FOR THINKING

There has been a surge of interest in the teaching of thinking skills in recent years as a result of an increased understanding about learning and the working of the brain (Fisher, 2005). A number of programmes that claim to help in the development of thinking skills have been developed in the light of this new evidence of brain function.

Dewey (1938) is associated with frameworks for reflection where learners are encouraged to reflect on the process of learning in order to modify and improve it (see Chapter 5). He is also associated with the notion of experiential education (Dewey, 1938). Rebecca Carver was a passionate believer in experiential education

and she developed the concept of the ABCs of experiential education (Agency, Belonging, and Competence), to provide meaningful memorable experiences (Carver, 1999). She viewed these as crucial to the development of critical thinkers and life-long learners believing that they enabled growth and deeper critical thinking; characteristics necessary for learners in a complex world. Carver (1999) argued that the 'ABC' elements would support the development of thinking individuals and describes each one as follows:

- **Agency** – represents the development of active learning where children are encouraged to be participants in their own learning. They are encouraged to consider and reflect on their thinking in the problem-solving process, seek and give explanations and be creative and imaginative. This process empowers children to effect changes in their own lives and communities and recognise that they can do so.
- **Belonging** – refers to children recognising themselves as members of a group or community who share the same values and goals. They undertake activities which are meaningful and relevant to all. They feel safe and acknowledge their responsibilities and learn to respect the needs and interest of the members of the group.
- **Competence** – refers to the learning and application of knowledge in different areas, cognitive, physical, artistic, social and technological. The opportunities for application and reflection are provided by the adults and peers with whom the children interact; each adding to the experience of the individual.

One of the most well-known programmes for developing thinking is Feuerstein's Instrumental Enrichment (FIE) (Feuerstein et al., 1980) which was actually developed about 40 years ago. FIE was developed by Reuven Feuerstein, a child psychologist, whilst he was working with holocaust survivors. He believes that intelligence is not fixed and that the cognitive skills of children can be developed if they learn how to think. The FIE programme has been implemented as a curriculum, especially for children with additional support needs, in many countries. The teachers adopt the role of mediators and help the children to think and learn by helping them to filter and interpret the information from set tasks which focus on specific cognitive functions. The tasks which require analytical thinking become increasingly more complex and abstract as the children move through the programme. The sessions are interactive and the children are expected to be active. Those who recommend the programme claim that the children are motivated by the tasks and that they develop problem solving strategies which they can apply in real life. The FIE programme was changed and developed here when Blagg et al. (1988) reported no positive outcome in children's cognitive development in a UK context. The programmes developed as a result were The Somerset Thinking Skills Course (Blagg et al., 1988), a series of generic thinking programmes for secondary-aged children, and Top Ten Thinking Tactics (Lake and Needham, 1993) which is suitable for primary school children. The contents of both were firmly underpinned by Feuerstein's theory. These programmes aim to develop the skills of classification and seriation, focusing on the organisation of ideas and facts and interpreting interrelationships.

Philosophy for children

Philosophy for children (P4C) is used extensively throughout primary classrooms particularly in regard to the development of children's social and moral education. Its use has developed both the quality of questioning and discussion amongst children. It is believed that if children understand their own thinking through thinking about thinking (metacognition) they will improve and develop their ability to think (see Chapter 10).

Bloom's taxonomy

This taxonomy divided learning objectives into three domains – cognitive (thinking, intellectual), affective (feeling, emotional) and psychomotor (doing, practical) – and set out descriptors of progress in each area. The aim was to provide a balance in learning over the three domains and signpost progression in each. In the cognitive domain the objectives range from knowledge and comprehension to the application of skills associated with critical thinking. The taxonomy provides a valuable structure for classifying different types of questions (Bloom et al., 1956) which has been amended and revised by Lorin Anderson, a student of Bloom (Anderson and Krathwohl, 2001) (see Chapter 4 for more detail).

Thinking skills through discrete subjects

Science, mathematics and geography are subjects for which there are well evaluated programmes in which thinking and reasoning are targeted. Cognitive acceleration programmes in maths and science (e.g. Cognitive Acceleration through Science Education, CASE, (see Chapter 9) and Cognitive Acceleration through Mathematics Education, CAME) aim to develop thinking skills by asking questions that facilitate 'guided self-discovery'. These programmes are underpinned by the theories of Piaget and Vygotsky. A major focus is placed on helping children to make the transition from concrete to operational thinking as described by Piaget. The role of the teacher in the programme is defined as operating in what Vygotsky described as the Zone of Proximal Development (ZPD) or the gap between what children can do unaided and what can be achieved with the aid of intervention. The programmes also recognise the importance of discussion between peers and promote the idea of pupils working in groups to solve a problem.

Thinking through Geography (Leat and Higgins, 2002) initiated a movement amongst geography teachers to move away from a knowledge-based curriculum to an approach which focuses on learning. Activities associated with this approach set up rich cognitive challenges and scaffolding for metacognitive analysis. Although designed for secondary students they can be used as a model for primary classrooms.

The infusion approach

Activating Children's Thinking Skills (ACTS) (Dewey and Bento, 2009) was implemented in the Northern Ireland curriculum and initially used with upper Key Stage 2 children to develop thinking skills. It employed an infusion approach in which a teacher's pedagogy is developed alongside making children's thinking

explicit. In this programme lessons are designed and planned by teachers across all areas of the curriculum using a framework based on Swartz and Parks' taxonomy of thinking skills. (Swartz and Parks, 1994; McGuinness et al., 1995; McGuinness, 1999; Leat and Higgins, 2002). The programme includes thinking activities for:

- finding patterns;
- considering similarities and differences;
- conjecturing and justifying;
- reasoning;
- considering different perspectives;
- decision making;
- problem solving processes;
- evaluating.

Swartz and Parks (1994) proposed that thinking skills can be taught using a range of strategies including the following.

- Encouraging children to work in collaboration using language that makes their thinking visible.
- Modelling the language through exemplifying the use and extension of prompting probing questions.
- Creating diagrams or mind maps to guide the thinking of both the teacher and the children.
- Making strategies explicit and encouraging children to consider which ones they will use throughout the lesson and then to reflect on the usage at the end. Edward de Bono also advocates the practising of certain strategies for task analysis which enable children to section problems into manageable chunks and become more effective thinkers (de Bono, 1992).

The National Curriculum promotes the development of thinking skills and states in the section entitled 'Learning across the National Curriculum' that: 'By using thinking skills pupils can focus on "knowing how" as well as "knowing what" – learning how to learn.' It sections thinking skills into five key areas that complement the key skills and are embedded in the National Curriculum.

The use of key questions by the child or modelled by the teacher could be used to help develop these skills:

- **Information Processing Skills** enable pupils to sort and collect relevant information, to sequence, compare and contrast, and to analyse part/whole relationships.
 - Q. *What is the problem about?*
 - Q. *What does it tell me?*
 - Q. *How is it similar or different from . . . ?*
 - Q. *Can I see a pattern?*

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- **Reasoning skills** enable pupils to give reasons for opinions and actions, to draw inferences and make deductions, to use precise language to explain what they think, and to make judgements and decisions informed by reasons or evidence.

Q. *Can I explain this to a friend?*

Q. *Can I explain this to my teacher? (more precise language)*

Q. *If I know that what else do I know?*

- **Enquiry skills** enable pupils to ask relevant questions, to pose and define problems, to plan what to do and how to research, to predict outcomes and anticipate consequences, and to test conclusions and improve ideas.

Q. *What do I need to do and why?*

Q. *Where can I start my enquiry?*

Q. *What do I think will happen?*

Q. *Can I test this?*

- **Creative thinking skills** enable pupils to generate and extend ideas, to suggest hypotheses, to apply their imagination and to look for alternative innovative outcomes.

Q. *Is there another way of doing this?*

Q. *What will happen if I . . . ?*

- **Evaluation skills** enable pupils to evaluate information, to judge the value of what they read, hear and do, to develop criteria for judging the value of their own and others' work or ideas, and to have confidence in their judgements.

Q. *Could I have approached this in a different/better way?*

Q. *What could I do to improve it?*

All of these frameworks help to give shape and substance to the idea of any programme that seeks to develop thinking skills. They share many common features and perhaps the aspect that unites them all is the objective that learning should be transferable and equip children for the task of thinking productively throughout life in the twenty-first century.

TEACHING THINKING SKILLS

What does it mean to teach children to think? How can we be explicit about what this means and what it involves?

There are a number of definitions for the term '*thinking skills*' some of which have attracted some controversy. The definition that thinking skills are a set of skills that enable people to think in different ways for different purposes is generally agreed (Fisher, 2010). Thinking skills can be described as techniques and strategies that develop high quality thinking but what exactly does this mean? If children are to learn in a more meaningful way, to develop the strategies outlined in the frameworks referred to above and be more flexible and reasoned in their judgements then they must be shown how to do that. The skills of reasoning or questioning can be taught

through modelling and if these are practised sufficiently they become part of a child's 'thinking toolkit' which helps them to make sense of the world.

Designing tasks

Whilst children should be offered a wide variety of learning tasks it is possible to identify certain key ingredients that promote the development of thinking skills. The core ingredients include:

- Tasks that have a degree of uncertainty, open-ended tasks that require children to strive to make sense of the task before selecting a strategy to find a solution.
- Access to any resources that might be used.
- Opportunities to engage in questioning and discussion.
- Structures that allow children to reflect on and explain their process of enquiry.
- Time to present outcomes and process to their peers. This should include a reflection on the efficacy of the process followed and what they would change if they were to repeat the task.

The development of thinking skills relies on being able to make the thinking visible. In order to do this clearly you will need to help children develop a language that can be used to describe their thinking. You can develop language through modelling, through intervening and guiding discussion and by encouraging collaboration and reflection. In this way you will develop the metacognition of all learners. Allow time and create opportunities for children to do this. Build discussion and reflection time into the day so that children are frequently thinking about their thinking.

Children come into school with preconceived ideas about a range of topics including themselves and their ability to learn and contribute meaningfully. You will need to unpick these perceptions through socially constructed dialogue or discussion with peers and other adults as well as constructing new knowledge and understanding through activities and informed teaching. It is important for you to consider how the adults that interact with the children can facilitate thinking and also how they can judge whether the children are thinking and the quality of that thinking. If you present children with cognitive challenge where they are required to think more deeply and systematically you will develop the skills of thinking that will enable them to meet the demands of the uncertain future of the twenty-first century. Everyone worldwide will need these skills to be successful in an increasingly complex world (Fisher, 2010).

THE THINKING ENVIRONMENT

However thinking is taught – whether it is through discrete subjects, across all curriculum areas or through specially designed programmes – it needs to take place in an environment of questioning, discussion and discovery: an environment which

has a positive ethos and where the curriculum is suitably challenging and flexible (see Chapter 3).

The environment that is best suited to this is a constructivist environment, where high quality interactions between the teacher and children and amongst children are generated. It should be an environment in which there is an open-minded attitude towards thinking and knowledge where children are prepared to take risks with voicing opinions and reflecting on the opinions of others. In this way children begin to appreciate the process of thinking, both theirs and their peers. The Thinking Together programme (Dawes et al., 2000) has been developed from this premise.

Wallace and Adams (1993) designed a problem-solving wheel called TASC (Thinking Actively in a Social Context) which can be used by children to guide their approach to problem solving. It contains a number of prompts displayed in a circle so that children can be reminded about some of the strategies they can use to solve a problem and note which ones they actually use. They are identified under eight headings, shown below.

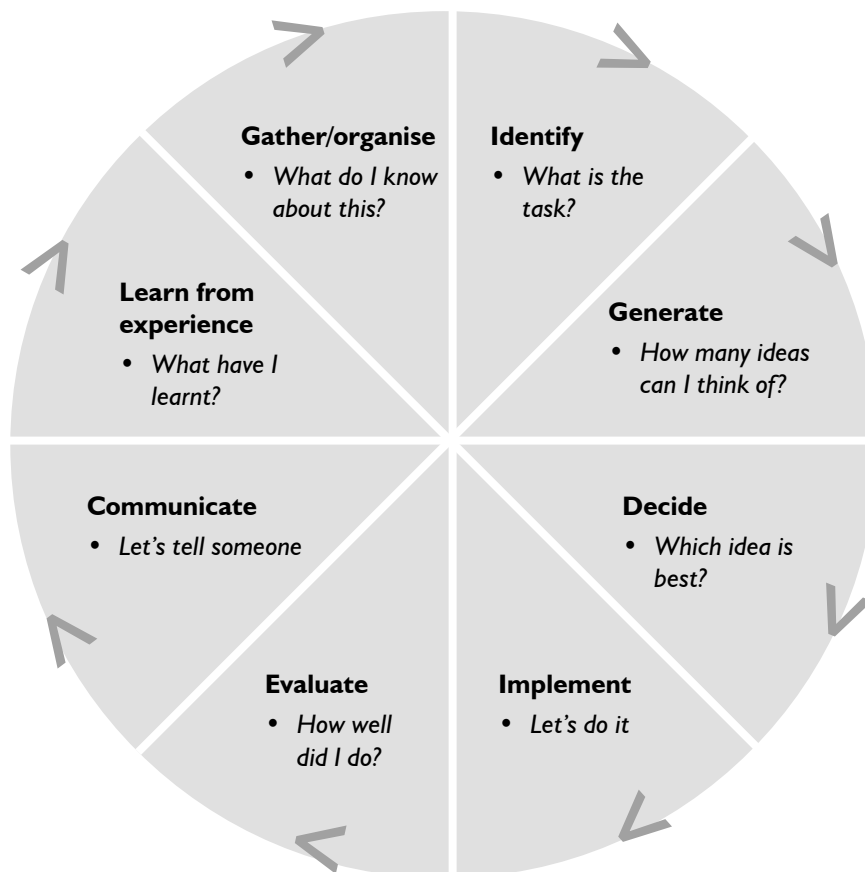


Figure 1.1 Strategies for problem solving

You might feel that it would be more meaningful if the strategies or approaches to problem solving were discussed with and formulated by the children. The process of thinking would be more transparent and could change depending on the topic to be investigated. You could encourage the children to create a mind map or a diagram of their thinking journey which would make their thinking visible and be a vehicle for discussion. It is important to create a dedicated space to display their 'thinking and learning journey'.

Larkin (2002) suggests that this form of analysis would encourage children to ask the questions that would encourage thinking. Devereux (2002) provides a list of key questions for early years children to support this which you might want to use initially to model the thought processes.

- *What will happen if you . . . ?*
- *Have you thought about . . . ?*
- *What is your problem?*
- *How can you find out about . . . ?*
- *What happens when you test?*
- *Why do you think this will happen?*
- *How can you fix this?*

Recent research into the working of the brain informs us that the majority of brain growth occurs before a child is six years old. This has huge implications for the role of parents and teachers and the place of activities that provide cognitive challenge throughout the curriculum.

The role of the adult

The role of the adult in developing thinking is crucial. Dewey (1938) believes that teachers play a very important part in moulding and crafting children's experiences through their interactions with the children. You need to be proactive about developing opportunities for collaborative work where there are appropriate interactions and timely interventions from all adults. Dialogue is essential in the development of thinking skills. It is through dialogue that children begin to be aware of and understand their own and other people's thinking. You can aid this process by consciously planning opportunities for discussion and reflection throughout the day. The adults involved in these opportunities need to know the children well so that an environment of trust can be established; one which promotes discussion, creativity, risk taking and reflection. You should try to impress on your adult helpers that they should use every opportunity to mention the words and phrases associated with thinking such as, learning through thinking, think, 'put your thinking hats on', evaluate your thinking, and reflect on your thinking and learning.

Benefits of an explicit approach to the development of thinking skills

All children regardless of age and attainment will benefit from an education that focuses on the development of thinking skills. This approach will provide opportunities for children to be involved in the planning of their work and be creative and reflective. It should produce learners who are more focused and have an increased awareness of themselves and others as learners as well as developing a disposition for curiosity, perseverance, confidence and reflection.

The framework below sets out the features that underpin the creation of the environment in which thinking skills will flourish. Each time you plan a unit of work or lesson consider each of the three areas illustrated below to ensure that you are addressing all the areas that will promote thinking.

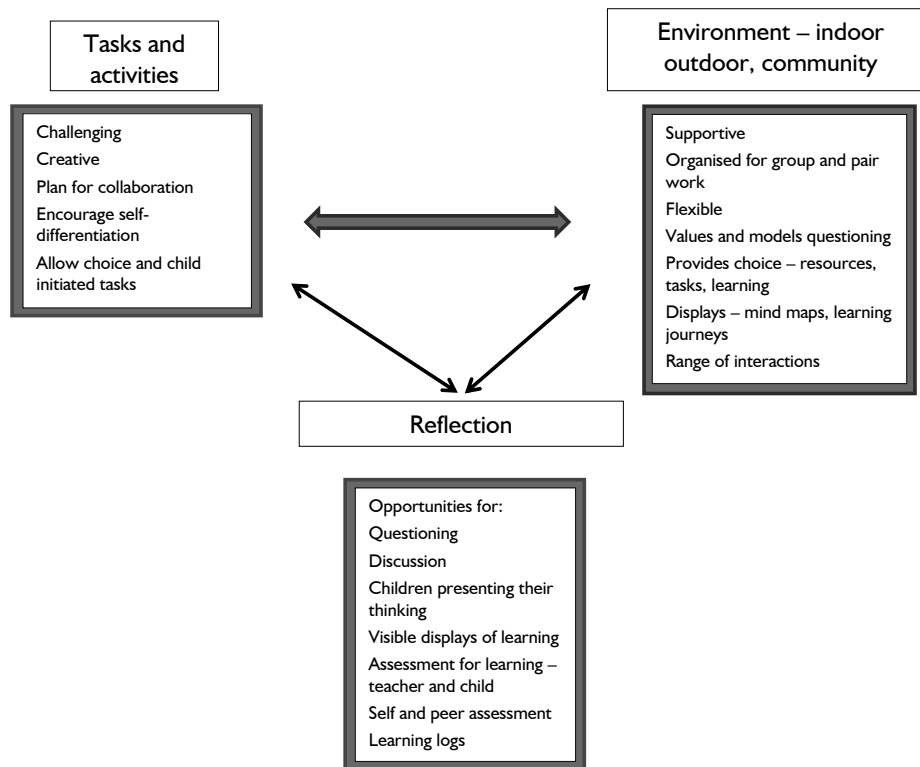


Figure 1.2 Creating an environment that encourages the development of thinking skills.

CASE STUDY

This case study focuses on the work of Jon, deputy headteacher of a city junior school. At the time of the case study Jon had been in post for two years. The school has a mixed demographic with a large majority of pupils of White British heritage. The number of pupils known to be eligible for free school meals is below the national average and the number of pupils with special educational needs and/or disabilities is above average.

The school prospectus outlines a philosophy of teaching and learning and lists aims that take into account the increasingly complex technological environment in which we live. The school has redesigned its curriculum to meet the needs of the twenty-first century recognising that education should be more than just acquiring knowledge. Their skills-based curriculum aims to develop independent effective learners who embrace problem solving.

The deputy head is passionate about enabling children to develop a framework for thinking that will support them in their approach to any problem they may encounter. He firmly believes in equipping children with life-long skills. He has been driven by his personal philosophy and influenced by the research he has conducted into active learning; exploring the ideas of de Bono, Claxton, Pardoe and Wallace's TASC framework. He has also attended workshops on developing active learning. When he was appointed as deputy head to the school he was also made assessment coordinator. This new role further developed his interest in assessment for learning and his belief that children need to know how to assess their own work and take responsibility for developing their own learning. He wanted the children to drive their own learning and for them and the teachers to feel challenged, motivated and equipped to do this.

The school has a policy of using 'I can' statements and a learning wall to make learning visible; however, Jon felt that they were not being used as actively as they could be. He decided to create a framework to encourage the children to become more active about their learning. He wanted to develop perseverance, confidence, teamwork, reflection and creativity amongst the children and to this end he designed a framework called 'Power Learners'. This framework makes visible the characteristics of active learners and suggests how children can develop these to take responsibility for their own learning.

- ***Power Learners look for ways to improve.***
For example: they make use of the success criteria.
- ***Power Learners look for creative ways to solve problems.***
For example: they are brave and try something new.
- ***Power Learners give and take ideas.***
For example: they develop others' ideas to improve them and then make use of them.
- ***Power Learners help the team.***
For example: they help to resolve conflicts.
- ***Power Learners take responsibility for their learning.***
For example: they answer and ask questions.
- ***Power Learners talk about their learning.***
For example: they explain how they found the answer.
- ***Power Learners never give up.***
For example: they never say 'I dunno!' but instead have a go.

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The above framework presents the seven 'Power Learner' areas; however, the example underneath each area represents only an illustration of what each includes. He introduced this to the staff, holding meetings to ensure an understanding of both the philosophy and the process and the teachers were enthusiastic. The teachers used Jon's materials and worked with their own classes to develop 'Power Learners'. They appreciated the chance to share the learning with their class and this gave them some ownership. However, by working with the classes during the teachers' Preparation, Planning and Assessment (PPA) Jon was able to see how the programme was developing with children throughout the school.

Each characteristic was introduced separately. Jon created lesson plans and PowerPoints to do this. The first characteristic, 'looking for ways to improve', was introduced through a practical activity with chopsticks. The children were required to move small soft balls from one container to another using the chopsticks. They were then encouraged to discuss ways in which they could improve their performance. This chopstick task was graded at level 3 and the children were asked to suggest how the activity would be different for a lower level, say 1, and a higher level such as 6. The levelling exercise was done in an attempt to help pupils see the whole 'learning journey' so they could see how you can progress in a skill. This particular exercise enabled them to think about how to make progress from one stage or level to the next by looking for improvement.

Each characteristic from the framework has been explored in a similar way using practical problem solving activities as the starting point. The children are extremely enthusiastic about 'Power Learners'. The children's enthusiasm ensures that parents hear a lot about 'Power Learners' and it is also shared on the parents' section of the school's website which states: 'We encourage children to take responsibility for their own learning, to be involved as far as possible in reviewing the way they learn, and to reflect on how they learn'.

The children's understanding of these characteristics is becoming visible across the curriculum not just in the specific 'Power Learning' sessions. For example, when Jon was taking an RE lesson about Moses the children identified that Moses was using the second 'Power Learner' point in that he was being creative and looking for innovative ways of solving problems.

Jon has also devised cards that allocate teamwork roles to develop the effectiveness of group work. These roles have child-friendly names such as 'Captain' for the person who will coordinate the team. The cards have clear suggestions of how the children can fulfil their role. These group role cards are linked closely to the 'Power Learners' framework so that as the children use them they gain a deeper understanding of the associated skills. The relationship between what the children might perceive as 'copying' and collaboration has been examined through discussion.

The 'Power Learning' approach is in its second year now but Jon is no longer responsible for PPA cover so it will be more difficult for him to monitor the programme. Jon ensures that all new members of staff are introduced to the philosophy and practice through the materials he has created. He hopes to continue to develop a more active approach to learning and his ultimate aim is to enable children to deal confidently with any situation that may present itself throughout their lives.

Reflecting on the case study

- What do you think are the strengths of the introduction of the ‘Power Learner’ programme to
 - a) the children;
 - b) the teachers.
- What would you do to ensure the transferability of ‘Power Learner’ characteristics across the curriculum?
- Which aspects of the ‘Power Learner’ programme do you feel are most likely to be effective?
- How does this approach compare to your experience in school?



TRY THIS

Try this 1: Solving problems

Activity 1

Often children can't solve a problem because they don't really understand what they are supposed to find out and have no strategies for a systematic approach. Help children to devise a series of 'prompt questions' to unravel the problem.

- In your own words tell me what you know.
- What don't you know?
- What could we do first?
- Do you think some resources or drawing a picture of the problem might help?

If this procedure is adhered to you may find that more children are prepared to tackle problems by themselves, in groups or pairs, before seeking help from you.

Activity 2

Children can develop their questioning and reasoning through practice and modelling. Work alongside children to solve a problem that requires a systematic approach, modelling each stage clearly. Present them with similar problems and observe their approach.

Are the children able to work systematically through a different range of problems?

Activity 3

Present children with a selection of games that will help them develop their problem-solving strategies. Children seem to be motivated by the idea of a game

and particularly if it involves working with a peer or group. There are a number of board games that require a strategic problem-solving approach to play and win and there is a vast selection on the internet. It is important to incorporate these into the curriculum regularly.

Do the children recognise the skills they are developing during these sessions?

Is there a noticeable progression in the approaches the children apply to problem solving as a result of these sessions?

Activity 4

Present children with real-life problems that arise out of the school environment.

- Redesign the school grounds to include a quiet area, a small outdoor theatre, a garden, a ball games area and areas for less boisterous games such as skipping or hopscotch.
- Organise and create appropriate spaces and stalls for a money-raising event.
- Develop strategies to be more environmentally friendly:
 - monitoring water use;
 - managing the recycling;
 - monitoring electricity usage.

Do the children become more aware of environmental issues?

Do the skills of organisation and information processing develop and are they applied in other situations?

Activity 5

Jigsaw puzzles are not just a source of entertainment they help to develop rational thinking. The process of completing a jigsaw also helps with hand-eye coordination and spatial awareness. In order to complete a puzzle children have to consider the shape, compare the size, colour and pattern of each piece and look at how it may connect to another piece. They also use trial and improvement techniques and develop their visual memory. The task may take days to complete and so if this process is shared then the skills of collaboration and discussion will be developed during the process.

Try this 2: Developing discussion

In order to take an active part in any discussion children must be informed about the subject to be discussed, be good listeners, respect the views of others, be

prepared to state opinions and reflect on others' points of view before coming to a decision. The extent to which children will be able to do this will depend on their age, the number of times they have taken part in such an activity and their understanding of the rules of engagement. If children are gradually introduced to this process they could become quite sophisticated critical thinkers by upper Key Stage 2.

Activity 1

Ask children to consider a film or television programme and discuss the merits of it under specific headings, such as entertainment value, quality of the acting and so on. Encourage them to develop a less personal bias by presenting facts to support statements and by asking them to comment on opposing viewpoints.

Do children find it difficult to be persuaded from their original viewpoint?

Activity 2

Encourage children to critique educational software programs by first designing questions that would enable them to determine the usefulness of the program and then actually using the program to see how many points are addressed. The merits of the program can then be discussed with their peers.

Do the children gradually become more discerning about the programs they use or does the 'fun' element overcome any reservations about the educational merit?

Activity 3

Read a story that has a moral issue or dilemma and encourage the children to discuss their feelings about it (see Chapter 10 for more ideas). Alternatively present the characters of a fairy story such as 'Little Red Riding Hood' and ask the children to support the actions of those characters and debate which one deserves most sympathy.

Can the children find convincing reasons to support their choice?

Activity 4

Involve the children in a critique of anonymous children's work from across the curriculum. Encourage them to discuss how the child could improve the work and what strategies they would put in place to enable them to do so.

Do the children become more adept at reviewing their own work as well as the work of their peers?

Try this 3: Making children aware of the stages in their learning

Activity 1

Encourage the children to create their own learning objectives for lessons by reviewing what the class learned or were introduced to in the previous lesson. Allow time at the beginning of sessions to discuss this.

How much guidance do you need to give?

Are the children concerned with 'guessing what's in the teacher's head'?

Activity 2

At the end of a topic or unit of work ask the children to predict what the next level or stage of learning might be.

Does this help to secure the 'big picture'?

Are children surprised by the increase in the amount of knowledge or understanding that is required for the next stage?

SUMMARY

Throughout this chapter you have been presented with a number of frameworks, taxonomies and theories about how to develop thinking skills. This provides a range of ideas for creating the right environment and approach to promote thinking skills within your classroom. The importance of developing interactions to increase dialogue and presenting cognitive challenge is emphasised, as is the need for assessment and reflection. There are also suggestions about how the teacher can be proactive at the planning stage to ensure that there are many opportunities to allow the children to be reflective about their learning and the route that learning will take. There is good evidence to suggest that the thinking person, the problem solver, will develop the ability to work successfully as a team member or independently, to be flexible and creative. These skills are highly valued in today's society and will be absolutely necessary in the future world of advanced technology.

FURTHER READING

de Bono, E. (2008) *Six Frames for Thinking about Information*. London: Vermillion.

This book illustrates Edward de Bono's 'six frames' technique in which he presents us with exercises to enable us to direct our attention in a conscious way.

Burton, L. (1989) *Thinking Things Through. Problem Solving in Mathematics*. Oxford: Basil Blackwell Limited.

This is a practical guide to mathematical problem solving that offers advice about the process as well as a range of problem-solving mathematical activities.

Fisher, R. (2005) *Teaching Children to Think*. Cheltenham: Nelson Thornes.

This book provides practical ideas about how to develop the learning and thinking of all children. The author reviews the main findings of research and looks at different ways of teaching thinking skills.

Hooks, B. (2010) *Teaching Critical Thinking Practical Wisdom*. Abingdon: Routledge.

This book addresses some controversial topics facing teachers both inside and outside the classroom. It is an engaging book which contains a series of accessible essays.

Leicester, M. (2010) *Teaching Critical Thinking Skills*. London/New York: Continuum International Publishing Group.

This book explains the essential elements of critical thinking and contains illustrative stories to help the application of abstract ideas such as reasoning and reflection.

Maclure, S. and Davies, P. (eds) (1991) *Learning to Think: Thinking to Learn*. Oxford: Pergamon Press.

This book explores three different beliefs about promoting thinking within the classroom: the skills approach, the infusion model and the belief that the curriculum as it is provides opportunities for developing thinking.

Moseley, D., Baumfield, V., Elliott, J., Gregson, M., Higgins, S., Miller, J., Newton, D. P. (2005) *Frameworks for Thinking. A Handbook for Teaching and Learning*. Cambridge: Cambridge University Press.

This handbook offers practical advice about the use of frameworks for teaching, learning and assessment focusing on thinking processes.

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