

# DEVELOPING ACTIVE LEARNING

in the PRIMARY CLASSROOM



ANITRA VICKERY



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**ANITRA VICKERY**

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



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# CONTENTS

<i>About the Author</i>	vii
<i>Notes on Contributors</i>	ix
<i>Acknowledgements</i>	xi
Introduction	xiii
Chapter 1: Frameworks for Thinking <i>Anitra Vickery</i>	1
Chapter 2: Active Learning in the Early Years <i>Mary ffieid</i>	19
Chapter 3: Creating a Culture of Enquiry <i>Anitra Vickery</i>	39
Chapter 4: Developing Teacher and Learner Questioning Skills <i>Anitra Vickery</i>	60
Chapter 5: Reflective Teachers, Reflective Children <i>Anitra Vickery</i>	78
Chapter 6: Learning Through Assessment <i>Anitra Vickery</i>	95
Chapter 7: Active Learning with ICT <i>Keith Ansell</i>	114

Chapter 8: Thinking Skills through Mathematics <i>Anitra Vickery</i>	131
Chapter 9: Developing Thinking and Learning Skills in Science <i>Chris Collier and Rebecca Digby</i>	154
Chapter 10: Philosophy for Children <i>Darren Garside</i>	174
Chapter 11: Talking and Learning through Language and Literacy <i>Carrie Ansell and Tor Foster</i>	194
<i>Index</i>	215

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**Anitra Vickery** has been working in teacher education for the last twelve years and is, at present, a Senior Lecturer in Primary Mathematics, Professional Studies Coordinator and a Personal Tutor on the PGCE course at Bath Spa University. Previously she worked with serving teachers in her role as Numeracy Consultant for South Gloucestershire and Swindon LEAs after completing 16 years of teaching in primary schools as class teacher and deputy head. Her area of particular interest is the development of children's thinking and problem solving skills and she has developed a number of teaching and learning materials for publication in this area.

In the field of teacher education her particular interest is the interplay between affective issues and reflective practice. She has built up close working relationships with local Primary Schools, which has enabled her to keep abreast of current practice.





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**Keith Ansell** has been a primary teacher since 1980, working in Surrey and Bristol where he became an advisory teacher for ICT. Later, as an e-learning consultant with South West Grid for Learning, he supported ICT consultants from Cornwall to Gloucestershire, and represented SWGfL on the Content Committee of the National Educational Network. He has worked as a project manager on a number of online software projects, services and competitions across the South West. He currently works as a senior lecturer on the Primary and Early Years PGCE course at Bath Spa University. Keith is part of the ICT team, and also teaches Design and Technology within the course. He is in his third year as a personal tutor, guiding and supporting PGCE students as they become primary teachers. He has good links with the ICT in education industry and organises the exhibitions at the summer regional ICT conference at UWE.

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**Rebecca Digby** is Senior Lecturer in Primary and Early Years education. She teaches early years science on the PGCE training programme, is a personal tutor for a group of Bath Spa teachers, and leads the International Perspectives on Early Years education module on the Education Studies undergraduate course. Previously, she taught in schools across the primary and early years phases in both England and Scotland in a number of roles including Advanced Skills Teacher specialising in science and creativity, and deputy headteacher.

**Mary ffield** worked for a number of years in Primary and Early Years education and care, including as a social worker, a playgroup leader and a teacher. She developed an interest in teacher education while supporting and mentoring student teachers in her classroom, and subsequently worked as a Senior Lecturer and PGCE Programme Leader at Newman University College, Birmingham and at Bath Spa University, where she established a part-time Early Years PGCE course in close collaboration with a local children's centre and a primary school. Her research interests include development and citizenship education, an area in which she has contributed to teaching handbooks, and the early professional experiences of NQTs.

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**Darren Garside** entered the teaching profession in 1999 following a short pre-service career working for academic libraries, political organisations and a management consultancy. He joined Bath Spa University in 2007 after completing a Masters of Teaching on the conversational dynamics of Philosophy for Children (P4C) enquiries. Initially he joined the PGCE English team and is at present a core member of the Education and Childhood Studies degree programme, specialising in the philosophy of education. During his time at BSU he has developed his teaching and research interests into P4C and philosophy of education, and is currently exploring how P4C methodologies can be used to enhance learning at university. He is writing his doctoral thesis on the concept of teachers' pedagogical judgement in the context of the Philosophy for Children movement.

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# INTRODUCTION

The overall objective of our book is to provide a synthesis of the factors that contribute to making children active partners in their learning. The book is offered as a hybrid of a practical handbook and an academic text. It sets out to bridge the gap between research-based knowledge and the practical enterprise of teaching by summarising the theoretical foundations and providing models of practical application.

Each chapter uses the same structure; opening with a review of research and published opinion before going on to offer some Try this activities to aid a practical investigation of some of the key ideas. Every chapter also provides a case study and a list of ideas for further reading. It is important to note that the case studies in each chapter, whilst offering a number of vibrant and innovative ideas, have not been chosen to exemplify 'best practice', but rather to illustrate how some schools are responding to the challenge of empowering children to take responsibility for their learning.

All of the contributors to this book are passionate about the development of active learning in the primary classroom. The different chapters they have provided look at active learning from the perspective of different subject disciplines and distinct aspects of pedagogical practice including assessment, questioning and the use of information technology. Chapters 1 and 10 focus on the development of the skills that underpin active learning by discussing Frameworks for Thinking and Philosophy for Children. By bringing together these different perspectives it is possible to identify a number of common themes and appreciate the consistency in the thinking about approaches that lead to the emancipation of the learner.

Recent research into how children learn has resulted in a set of beliefs about pedagogical approaches and curriculum design that is widely shared amongst many schools. These beliefs can be detected within a variety of curriculum 'movements' e.g. creative curriculum, active learning, an enquiry-based approach, personalisation, assessment for learning, the learner-centred curriculum and new areas of activity such as the development of thinking, cross-curricular and learning skills. The key

principles of making children active partners in their learning and emphasising the development of learning skills and personal qualities link all of these ideas.

This book seeks to explore these principles and provide trainee and newly qualified teachers with opportunities to explore a range of philosophies and strategies to develop learning.

Time constraints, competing priorities and the other challenges inherent to training courses impact on the opportunities trainees have to make connections between their own experience as learners, their new role as inchoate reflective practitioners and the learning of the children they teach. The book seeks to support trainees in making these connections by bringing together the theoretical basis of key ideas about effective learning, connecting the principles of reflective practice to children's learning, and making practical suggestions for classroom implementation.

## 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**

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



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**

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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?*

- **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

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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**

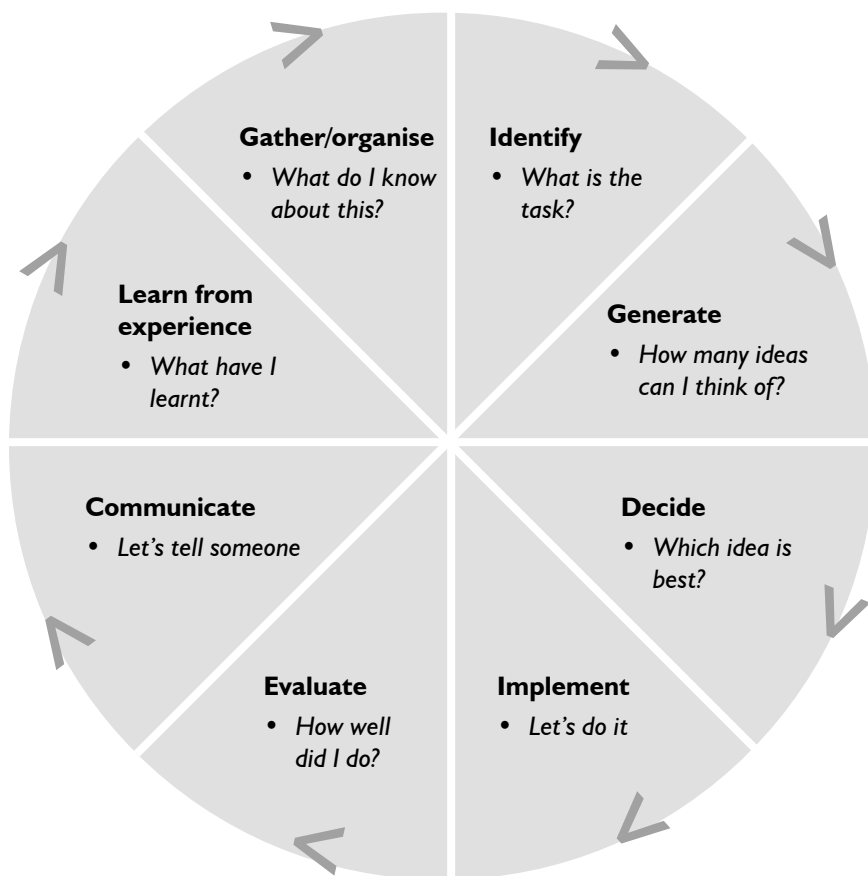
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However thinking is taught – whether it is through discrete subjects, across all curriculum areas or through specially designed programmes – it needs to take place in an environment of questioning, discussion and discovery: an environment which

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**

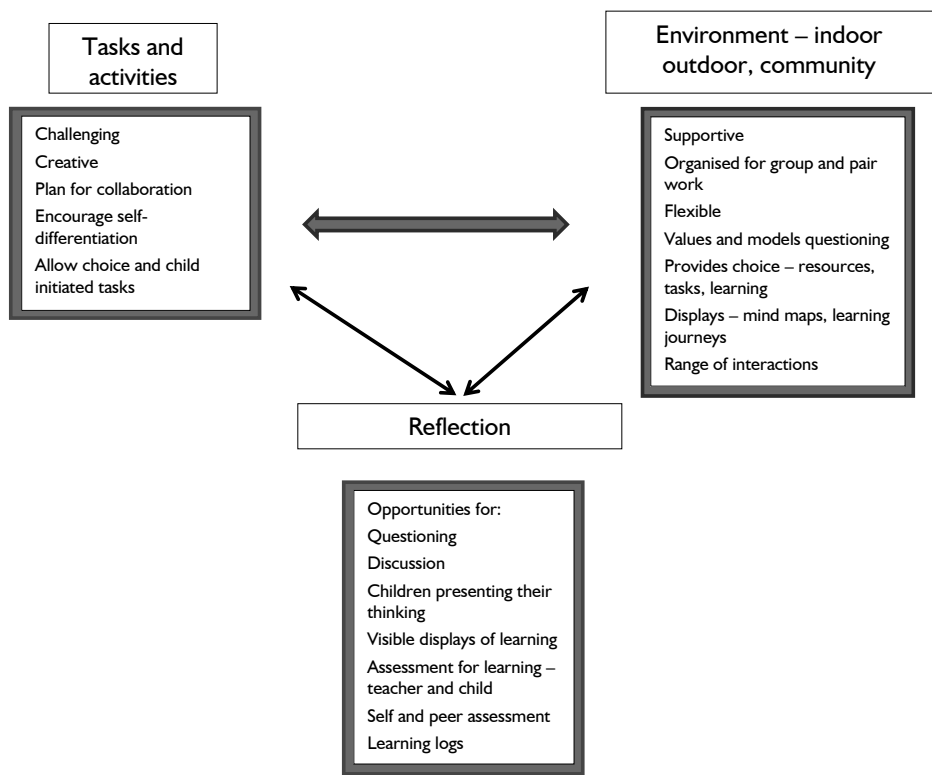
The role of the adult in developing thinking is crucial. Dewey (1938) believes that teachers play a very important part in moulding and crafting children's experiences through their interactions with the children. You need to be proactive about developing opportunities for collaborative work where there 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.