An investigation into thinking skills and young children's metacognition in the Foundation Phase in Wales.

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Abstract

This study aimed to explore the nature and extent of metacognition in young learners, and to better understand the pedagogical practices teachers use to effectively support the teaching of thinking. I designed four research questions to explore these aims:

- How were Foundation Phase teachers in Wales teaching thinking?
- How did the teachers involved in the study develop in their teaching of thinking through the course of the intervention?
- To what extent did children in the study demonstrate development in their awareness of thinking?
- What was the impact of the intervention on children's performance on a limited number of standardised tests?

The questions were addressed through a mixed methods approach, comprising a survey of all FP settings in Wales to ascertain practitioners' views and practices relating to teaching thinking and an action research phase which lasted one academic year. BERA (2011) ethical guidelines were followed throughout.

Six teachers participated in the action research to co-construct a shared understanding of the nature of thinking in the FP. We explored pedagogies for developing thinking, particularly the use of Visible Thinking Routines (Ritchhart *et al,* 2011). Video Stimulated Reflective Dialogue (VSRD) was used to explore teachers' reflections on their own teaching. The study also involved six children from each teacher's class. They were asked about their views on thinking. They made videos of 'good thinking', which were discussed using VSRD. They undertook cognitive tests at the start and end of the intervention.

The findings are significant because they indicate that, through VSRD, teachers became more reflective and their interactions with children improved. The findings also reveal that VSRD supported young children's metacognitive thinking – they demonstrated increased metacognitive behaviours at the end of the study, and made more progress on three out of four standardised tests compared to the control group with medium effect size (Cohen, 1988). The study's conclusions have implications for teachers, teacher educators and policy makers in curriculum design and professional development.

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Chapter 1

Word Cloud 1. Themes in Chapter One.

This chapter introduces the context within which my research study took place and introduces the reader to the key themes that will be explored in subsequent chapters. This chapter starts with a Word Cloud (created in wordle, http://www.wordle.net). A word cloud is a way of displaying text visually, with the words occurring most commonly in the text having prominence. I wanted to do this because the word cloud is an accessible visual representation, and makes it easy for the reader to identify key themes. As such, I have used a word cloud for this, the introductory chapter and also for Chapter 7, where I draw together the conclusions of the study. Of course the word cloud does not analyse or interpret the information, but their inclusion provides a clear way of introducing the content to be examined and discussed within the chapter. Gottron (2009) suggests that word clouds enable the reader to gain a quick impression of concepts in a document. In fact, according to Paulovitch *et al* (2012: 1145), 'Word clouds have become one of the most widely accepted visual resources for document analysis and visualisation'.

In Word Cloud 1, the reader is alerted to important themes within the chapter relating to, for example, the study, thinking, learning, children, teachers, development, research, metacognition and teaching.

After briefly summarising my background and interest in this area, the aims and research questions are presented. The underpinning theoretical framework that shaped my research is outlined and justified. The definition, background and development of thinking skills and metacognition are discussed, within the wider historical, political and educational context. There is a specific focus on the teaching of young (3-7 year olds) children within the Foundation Phase (FP) in Wales (DCELLS, 2008), as this was the age phase within which the research took place. There is also consideration of why reflective practice was a key theme within the research. I conclude by outlining the structure and content of the subsequent chapters.

1.1 Setting the Scene

My interest in thinking began as an undergraduate – I completed a Psychology degree and was fascinated by the complexities of thinking processes. Hobson (2002:1) says 'Just think … and you will realize how remarkable thinking is' and this was certainly true for me. As a primary school teacher in London I was able to develop this interest further, and attended numerous professional development events. I embedded approaches such as Cognitive Acceleration (*eg* Adey, 1993) into my classroom practices. My interest continued when working for a Local Authority in the capacity of a Mathematics adviser, and I gained qualifications in a number of approaches such as Cognitive Acceleration in Mathematics Education - CAME (Adhami *et al*, 1995), Let's Think (Adey *et al*, 2001) and Thinking Maps (Hyerle, 2011). When I moved into initial teacher education, I became increasingly interested in exploring teacher development and pedagogy – in particular in relation to interaction between teachers and children. Undertaking this research study has allowed me to bring these interests together. I have explored a particular aspect of thinking - metacognition – in young children, and considered how teachers can develop their pedagogy to support this in their classrooms.

1.2 This Research Study

A pragmatic, mixed-methods approach was adopted for the study, within a socioconstructivist framework. My overarching research aims were to explore metacognition in young children, and to explore the teaching of thinking within FP settings. The detailed aims and Research Questions are outlined in Table 1.1 below:

Research Aims and Questions	
Research Aim	To explore the nature and extent of metacognition in young learners, and to better understand the pedagogical practices teachers use to effectively support the teaching of thinking.
Research Questions	1. How were Foundation Phase teachers in Wales teaching thinking? 2. How did the teachers involved in the study develop in their teaching of thinking through the course of the intervention? 3. To what extent did children in the study demonstrate development in their awareness of thinking? 4. What was the impact of the intervention on children's performance on a limited number of standardised tests?

Table 1.1: Aims and Research Questions for the study

1.3 Theoretical Framework: an overview

All research takes place within a theoretical framework. Teaching and learning are, of course, highly complex processes, which many theorists have tried to explain. To frame my research, I considered three theoretical approaches – constructivism, socioculturalism and social constructivism. Researchers operating under each of these frameworks put forward suggestions to explain how learning and development happen.

These frameworks are discussed in Chapter 2, but here are briefly reviewed in order to justify the overarching theoretical framework underpinning my study – which took a social constructivist standpoint.

The roots of constructivist learning theory derive largely from the writings of John Dewey (1859-1952) and Jean Piaget (1896-1980). Piaget suggested that when learners encounter a new situation, they adapt their understanding of what is happening in order to make sense of the experience. They construct this meaning based on their experience, indeed Piaget (1950), saw the child as an active participant in the learning process, bringing prior experiences with them into new learning situations. Each new experience means that the individual amends and adapts their existing understanding. Growth in intellect happens when the individual meets a new situation that conflicts with their existing understanding. This is what Piaget termed a state of 'disequilibrium' – or cognitive conflict, and learning happens when the conflict is resolved. This 'construction' of meaning is something done by the individual, and happens in progressive steps as the learner matures biologically. These steps follow a hierarchical and predictable sequence based upon stages of cognitive development (Piaget*, ibid*).

A second closely associated learning theory is social constructivism, which owes much to the writing of the influential psychologist Lev Vygotsky (1978), who proposed that learning happens within a social context. This learning happens when a more knowledgeable other supports and extends the learning of an individual, which Vygotsky (1978:86) describes as learning in the 'Zone of Proximal Development':

> 'The distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers'.

Social constructivist learning theory has an emphasis on collaboration as a means of learning. Whilst the individual has a crucial role in forming their own understanding of the world, they do not act alone in this process.

As with constructivist learning theory, the view of the individual as active in the learning process is also one of the central tenets of the social constructivist view. Learners still have responsibility for constructing their own understanding of the world, but this happens as a result of their many and varied interactions (*eg* Vygotsky, 1978; Conkbayir and Pascal, 2014).

Learning is a process where the learner makes sense of the experiences that they have and involves 'interaction between the self and another person, the material world, the natural world, an idea, or whatever constitutes the environment at hand' (Rodgers, 2002:846).

Of course, with social interaction there can be disagreement, discussion and debate – and as such this can be a source of disequilibrium. However, this can be a rich source of learning, and can be the means by which a cognitive conflict is resolved – the interaction mediates the development of new knowledge and meaning. This is supported by, for example Forman and Cazdan (1998) who suggest that when children collaborate to complete problem solving tasks, their skills improve as they provide scaffolding (Bruner, 1978: 19) for each other, beyond what they could achieve alone. Scaffolding can be provided by adults or peers, and Bruner provides a definition of the term which indicates how it can support the learner make sense of the task they are undertaking:

> '[Scaffolding] refers to the steps taken to reduce the degrees of freedom in carrying out some task so that the child can concentrate on the difficult skill she is in the process of acquiring' (Bruner, *ibid*)

Scaffolding, and the concept of interaction is explored in more depth in Chapter 2, as in my research study, this was seen as an important element of classroom practice. I wanted to consider how teachers might develop their pedagogy, with a focus on their interactions during thinking-skills based lessons.

The third main perspective on learning that I considered was socioculturalism. Here, recognition is given to the social and cultural context of the individual (*eg* Rogoff, 2003). Emphasis is upon how learner is shaped by the community and surrounding culture – learning is enculturation into a community of practice (*eg* Rogoff, 2003; Lave and Wenger, 1991).

As with constructivist and social constructivist approaches, sociocultural theory also proposes that learning is an active process. In sociocultural learning theory, the learner is seen as an apprentice, who learns through guided participation in social activity (Rogoff, 1990).

Within the focus of this research, although I was interested in seeing how general classroom ethos and culture shifted to encompass the thinking skills agenda, and indeed how context was a mediating influence, I focused primarily on the individual responses of teachers and children. Therefore, a social constructivist framework was adopted for this research study. This is explored in greater depth in Chapter 2.

1.4 Welsh context

This study explored the nature and development of thinking skills in schools in Wales. As such, it is important to briefly outline the specific curriculum that teachers encounter here. Since 2008, the primary curriculum has been divided into the Foundation Phase (for 3- 7 year olds) and Key Stage 2 (7 – 11 year olds). The Foundation Phase (FP) curriculum in Wales aims to promote young children's all-round development, largely through play and experiential learning (DCELLS, 2008). This draws upon a well-established tradition in the United Kingdom of child-centred, play-based practice (Gray and MacBlain, 2012), which has emphasised individual children's interests, first-hand experience and holistic learning experiences.

The FP curriculum was first introduced in Wales in 2004 as part of a 'major change and policy development' (Siraj, 2014:11), within Wales, designed to improve the quality and continuity of educational provision. In 2001, the National Assembly for Wales published a vision document 'The learning country', which paved the way for an overhaul of Welsh education policy. The policy for children aged 3 – 7 years is exemplified *in 'The Foundation Phase: Framework for children aged 3 – 7 years in Wales'* (DCELLS, 2008). Essentially the FP is a Welsh Government national reform, replacing the combined 3-5 Early Years and Key Stage 1 provision.

The FP is one curriculum, designed to be delivered holistically through seven 'Areas of Learning' rather than though more traditional subject areas.

It is designed to provide all young children in Wales a 'flying start in life' described in 2001, by the then Minister for Education, who stated:

> 'We want all our young people to have the best start in life, the opportunity to reach their full potential, and a clear entitlement to

> influence the services that affect them. We want to drive up standards of teaching and attainment in all our schools, valuing and supporting the teaching profession to achieve this' (Davidson, 2001:8).

My research study began two years after the statutory rollout of the FP across Wales. Many of the underpinning principles of FP practice are evidence based and known to have an impact on quality of provision, and the FP rationale acknowledges that early experiences lay the foundation for all learning (*eg* Sylva *et al*, 2004). Of particular relevance to my theoretical framework, the FP advocates both teacher-led and child-led activities, and places importance upon the role of the adult in scaffolding and supporting learning.

The concept of 'thinking skills' and the teaching of thinking has received a great deal of attention within recent curriculum developments in the United Kingdom (*eg* DCELLS, 2008; Higgins *et al,* 2005). Perkins (2009) outlines the importance of knowing what is actually worth our students learning – a real challenge since we cannot predict the types of jobs that will exist, or the society our students will be a part of, in 10 years' time. He highlights the importance of teaching skills such as problem-solving and curiosity which he feels will be vital in the future. Rotherham and Willingham (2010) suggest that schools must explicitly teach critical thinking, collaboration, and problem solving to all students if they are to cope with the demands of life in the twenty-first century. Claxton (2008) indicates that the challenge is more complex - it is more than just giving learners knowledge of skills – we need to support them to be ready, willing and able to use them. Generally there has been a shift in emphasis in the curricula of many countries, which has seen a greater emphasis on promoting critical and creative thinking rather than content knowledge (*eg* Trickey and Topping, 2004; OECD, 2015b).

The challenge for teachers is that education policy is highly political, and initiatives come in and out of favour quickly, without always having time to embed in practice. Numerous social and political Influences have shaped the school curriculum in the UK, particularly since the Second World War. The reform of the curriculum in the United Kingdom in the 1960s saw the

publication of *Children and their Primary Schools* (DES, 1967a –'The Plowden Report') for schools in England, the Gittins Report in Wales (DES, 1967b) and *Primary Education in Scotland* (SED, 1965).

Key recommendations in these reports meant a shift from subject centred curricula, and instead an endorsement of the importance of creativity, exploration and project work. More recently, reports such as Estyn's (2002) '*Excellent Schools: A vision for schools in Wales in 21st century'* and ACCAC' [1] s (2004) *Review of the school curriculum and assessment arrangements 5–16* echoed the need to develop a curriculum which had appropriate focus on the development and application of skills. Many such elements are valued in the Welsh curriculum for 3 – 7 year olds – the Foundation Phase (FP) (DECELLS, 2008).

At the time of data collection, underpinning the Welsh curriculum from FP to Key Stage 3 was a framework that focused on cross-curricular development of literacy, numeracy, ICT and thinking. This was the '*Skills Framework for 3-19 year olds in Wales*' (Welsh Assembly Government (WAG), 2008), and was introduced on a non-statutory basis. It was developed in response to a number of reports such as that of Future Skills Wales, which stated that:
'Of the establishments reporting skills gaps in their workforce, IT skills are the most common skills lacking, followed by communication skills and then... showing initiative, problem solving and ability to learn.' (WAG, *ibid*:2)

The Framework was designed to ensure continuity and progression, and to ensure that children were encouraged to develop their key skills, such as thinking, questioning and communicating, across all subject areas.

Within the framework, thinking was defined as 'as developing patterns of ideas that help learners acquire deeper understanding and enable them to explore and make sense of their world' (WAG, 2008:10). Within the thinking skills section of the Framework, guidance noted that whilst thinking is an

[1] The acronym of Awdurdod Cymwysterau, Cwricwlwm ac Asesu Cymru - the Qualifications, Curriculum and Assessment Authority for Wales, which merged in 2006 with Department for Children, Education, Lifelong Learning and Skills (DCELLS)

innate ability, thinking can become more effective if taught, and pedagogy to teach this relies on 'basic principles of pedagogy such as questioning technique and articulating strategies' (WAG, *ibid*). Thinking skills such as asking questions, activating prior knowledge, thinking about cause and effect and reviewing outcomes were identified within the framework, and details of progression in these skills outlined.

The Skills Framework offered teachers guidance on promoting young children's thinking through a cycle of planning, doing and reflecting (see Figure 1.1 below).

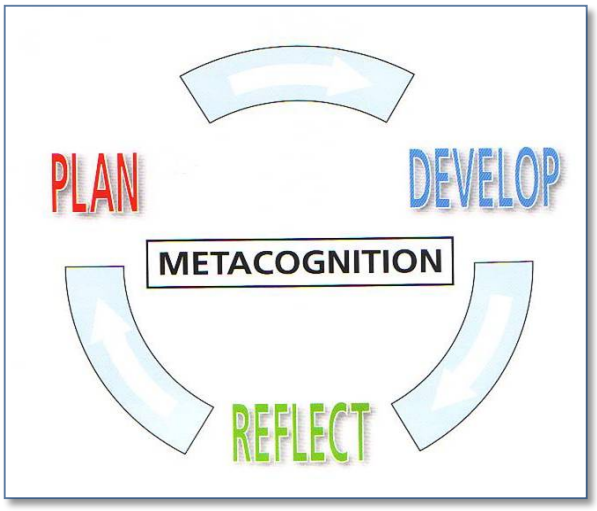


Figure 1.1: Plan, Do and Reflect model Source: WAG (2008: 13)

At the heart of the thinking process outlined above lies metacognition, and the framework identified that there were several aspects of learning associated with metacognition:

- knowledge and understanding of thinking processes
- making sense of the task
- knowledge of strategies and methods, how and when to use them
- monitoring and evaluating learning from the success (or otherwise) of chosen strategies or methods
- making connections across contexts.

(WAG, 2008:12).

However, since the time of conducting the research there have been considerable changes within the Welsh education system. These will be discussed in the Chapter 7, the conclusions of the thesis.

1.5 Thinking, teachers and the curriculum

Before outlining the research design and participants, it is important to introduce the reader to some of the key literature in the area of research into thinking, teaching thinking and professional learning for teachers.

Whilst Chapter 2 gives an in-depth discussion of current debates within the literature in the field of thinking and thinking skills, this section aims to draw out some key themes that were important in my study. As such, the purpose of this section is to give a brief introduction to this existing body of knowledge, to provide a justification for the research questions and research design of the study.

Trying to understand the nature of thinking has interested scholars for a very long time. Many writers in the western tradition attribute initial ideas about thinking to the ancient Greeks and particularly the contribution of the philosopher Socrates (469-399 BC). Socrates would support his pupils' learning through dialogue between himself (as the expert) and the pupils as novices (McGregor, 2007). However, as will be outlined in Chapter 2, there is no agreed consensus on how to define thinking within the relevant literature. There also remains a considerable amount of debate within the literature as to the nature of thinking and definitions of thinking skills. Even the term 'skill' is problematic. Skills are commonly described as actions that we develop and practice to get better at or gain mastery over. Indeed, Johnson (2001), points out that once a skill is mastered, it can be performed without thought. This debate is explored within the literature review.

Of relevance in this study are the 'post-Plowden insights' into teaching and learning described by the Cambridge Primary Review (Alexander, 2007: 90-1). These include:

- Children are 'able to think and learn in the same ways to adults, albeit in rudimentary forms'.

- There is acknowledgement of how ‘social interaction plays a vital role in children’s development and learning’.
- The ‘social environment in which children grow up can explain variation in their achievement in areas such as literacy and numeracy’.

Chapter 2 also discusses the debate around the nature and extent of young children’s thinking. There has been substantial research into the impact of teaching thinking on pupils (*eg* Trickey and Topping, 2004; Higgins *et al*, 2005).

In particular the chapter explores the concept and role of ‘metacognition’, often simplistically described as ‘thinking about thinking’ (McGuinness, 1999; Hattie, 2009). Metacognition is not a new concept – in the early 1900s the psychologist Charles Spearman (1863-1945) described general intelligence (the ‘g’ factor) as a cognitive ability which included the ability to observe one’s own mental processes – this ability to identify and notice our own thinking is a part of metacognition (although not the sole aspect). Much of the literature on thinking refers to conscious rather than unconscious processes and it is these conscious processes that are the focus of this thesis. In fact, one of the key premises of this research project relates to the importance of individuals having an awareness of their own thinking in order to seek to improve it. The key concept of metacognition – which has been simplistically defined as thinking about thinking is actually more ‘slippery’ to define (Tanner *et al*, 2011) and will be discussed at length.

Over recent years, the importance of promoting metacognitive strategies in school has been widely endorsed, as seen in the Welsh Skills Framework outlined earlier in the chapter. The importance of metacognition has been identified within the literature, for example, meta-analysis by Higgins *et al* (2014), revealed that supporting metacognitive approaches to learning was a high impact, low cost way to improve attainment. However, the age at which children are able to develop metacognition is a continuing debate in the literature.

There are a number of researchers who suggest metacognitive skills would not develop in FP children aged 3 to 7 years old (*eg* Veenman *et al*, 2004).

However, Siraj-Blatchford (2009:80) suggests that we should consider the emergent nature of cognitive development – where emergence involves 'processes that occur over time that result in the development of higher order structures of the mind'. This debate is explored in greater detail in Chapter 2.

Chapter 2 also reveals that the debates about thinking are not just about what to teach, they also discuss how to teach. Over recent years there has been global interest in the question of 'effective' learning and teaching in general (*eg* OECD, 2012), and this is explored in Chapter 2. In a report on behalf of the Department for Education and Employment, Carol McGuinness (1999) identified the importance of making thinking skills explicit by sharing the language of thinking and talking. Because thinking is an invisible process, young children need to learn the words associated with thinking, use props to help them work through each stage of thinking, and see models of good thinking in practice. Thinking, like English, mathematics and other curriculum subjects needs to be taught. Within my research design, opportunity for teachers to develop a more explicit approach to the teaching of thinking was a key factor. This may also mean that, whilst teachers may feel positive and supportive about the principle of teaching thinking skills, they may not have the tacit understanding in order to do this most effectively. Unless given clear and explicit guidance they may find it difficult to plan, deliver and assess thinking skills. Hence I wanted to survey the FP teaching population to find out for example, what approaches were reported, and what effect teachers stated this had on learners.

Currently, practitioners are faced with many choices of programmes to develop thinking in their classrooms, including De Bono's Thinking Hats (1985) and Hyerle's Thinking Maps (2011). The influence of ideas from Piaget and Vygotsky can be found within programmes used by schools to develop thinking, such as Philosophy for Children (P4C), developed by Lipman (1991; 2003). In the literature review, several approaches are examined in more detail.

Many approaches to teaching thinking reflect the importance of high quality discussion and interaction as key principles when teaching thinking, and these are principles within which the research in this thesis is framed.

Thinking skills programmes are varied and promote a variety of strategies, habits, attitudes, emotions, motivations, aspects of character or self-identity and also engagement in dialogue and in a community of enquiry. These 'thinking skills' are not united by any single psychological theory. Wegerif (2003), suggests that what unites these elements is that they are the sorts of things that practitioners (as opposed perhaps to policy makers) believe can and should be taught in order to improve the quality and/or the effectiveness of their students' thinking. So, the perceptions and understanding of classroom teachers may be crucial in the effective teaching of thinking – and this is something that the research set out to explore.

Sociocultural and social constructivist theories of cognitive development propose that social interaction with parents, siblings, peers and teachers is a mediating factor in learning and development (Siegler and Alibali, 2005). Fogarty (2005) suggests that teachers set the climate for thinking, by teaching the skills and concepts of thinking, but also by structuring interaction, and by encouraging children to think about their own thinking. One of the key arguments of this thesis is that critical to the success of any programme is the extent to which teachers and children understand these principles, and how well they are modelled and demonstrated in classroom practice. Perkins (2003), argues for the importance of making thinking visible in the classroom, and this is an argument developed by Ritchhart *et al* (2006), who outline strategies teachers can use to do this. Some of these strategies were adopted within this research, and are further outlined in the literature review.

Although there is debate and discussion, from analysis of the literature it has become clear to me that many approaches to teaching thinking share common principles. Different research may summarise these factors in different terms, but the key messages remain. For example, Higgins *et al* (2004), identify the following:

- clear purpose
- articulation
- making connections in learning

- metacognition and,
- evaluation

as key principles when teaching thinking, and McGuinness (1999) suggests that teaching thinking explicitly, valuing collaboration and emphasising metacognition are important concepts. From my reading, these, and other studies, have commonalities for effective pedagogy that include:

- the view that thinking is modifiable and every learner can improve;
- clear teaching and explicit feedback is essential;
- children should talk about their thinking and discuss their views with others;
- children need to develop strategies to control how they think (metacognition); and
- children should be given opportunity to deliberately practice their thinking in different contexts.

These informed the broad principles which I used when considering my research design. For example, children were offered the chance to talk explicitly about thinking in Video Stimulated Reflective Dialogue (VSRD) episodes and teachers discussed and developed pedagogy that aimed to give feedback on thinking.

Another of the key findings throughout the literature is that teachers make a very real difference to the achievement, employment prospects, wellbeing and emotional development of learners (*eg* The McKinsey report, 2007). Recent evaluation of FP provision by the Wales Institute of Social and Economic Research, Data and Methods (WISERD) identify skills, qualifications and training of teachers as important factors in successful provision (Davies *et al*, 2013). The literature indicated that teacher reflection was an important aspect of professional learning (*eg* Schön, 1983; Moon, 2000). The influential American educator Dewey (1938) suggested that high quality learning and teaching is characterised by reflection and enquiry.
He provided a view of reflection as a complex, emotional and intellectual process that needs time to develop. Review of the literature in this area made me aware that the nature and style of reflection itself needed careful

consideration. Therefore, both children and teachers in the project were invited to reflect on the nature of thinking, and I designed this reflection to take place using video and dialogue as a scaffold. This shaped Research Question 2, whereby I wanted to explore whether the teachers involved in my study would develop in terms of their pedagogy related to teaching thinking over the course of the study.

Within the focus of this study, although I was interested in seeing how general classroom ethos and culture shifted to encompass the thinking skills agenda, I was more interested in the individual responses of participants, and the development of metacognitive capabilities. Siraj-Blatchford (2009:84) also indicates that metacognition develops as, within interactional situations, a child is required to 'describe, explain and justify their thinking… to others'. The nature of interaction between teachers and children, and between the children themselves became a focus for my study.

1.6 Research Tools

I took a pragmatic perspective when designing my study (*eg* Burke Johnson *et al*, 2007), which entailed selecting the method best suited to the different research question. I saw the need to design a project which allowed (a) multiple methods of data collection, such as qualitative and quantitative sources; (b) a focus on practical implications of research for classroom teachers; and (c) emphasis on the importance of conducting research that best addresses the research problem, rather than being constrained by a specific paradigm or method. A pragmatic, mixed methods perspective allowed for this. Chapter 3 provides in-depth discussion and justification of my methodological standpoint and research design.

Because of the nature of my research questions, I designed a number of research tools. These included a questionnaire, standardised cognitive tests and a cycle of action research (*eg* McNiff (2013).
A key tool used with participants was VSRD (*eg* Moyles *et al*, 2003). Chapter 3 elaborates on the design and implementation of these tools in my study.

1.7 Participants in the study

In this research study, I conducted an initial scoping survey sent to all FP settings in Wales. Subsequent to that, in the action research phase, six FP teachers became involved in the study, with the aim of further developing and improving their teaching of thinking. The study worked on the basis of 'collaborative inquiry' (*eg* Angelides and Gibbs, 2007). I acted as a critical friend, working with the teachers, and engaging in reflective dialogue regarding the nature of the classroom practices that existed. Chapter 3 provides a detailed background for each teacher, outlining their experience and school context. I also involved six children from each teacher's class, with ages ranging from four to six years old at the start of the study. I wanted to find out their views of thinking, and explore the nature and extent of metacognition at the start and end of the study. In Chapter 3 I discuss how I designed the study to encourage participation of children of this age and to ensure appropriate ethical considerations of all aspects of the study.

I take a view of the child that sees them as 'capable constructors and creators of and within the world around them' (Robson and Quinn, 2015:xxxi) echoing Malaguzzi's (1993:10) perspective that they are 'rich in potential, strong, powerful, competent'. This view influenced the design of my study, so that I gathered data in a number of ways, as I wanted to create authentic opportunities to hear the children's views and thoughts.

1.8 Organisation of the thesis

The thesis is arranged in the following chapters:

Chapter 1: Setting the scene: Introduction and Context

Chapter 2: Literature Review.

The literature review is structured into three main sections.

Section 2.1 justifies my theoretical framework and the research into the nature and definitions of thinking in the existing body of literature. Section 2.2

explores what is known about the teaching of thinking whilst Section 2.3 refers to what is known about teachers' professional learning, with a specific focus on reflective practice.

Chapter 3: Methodology and Research Design.

Chapter 3 explores the methodology underpinning the research in more depth. In Section 3.1, ethical considerations are discussed. Section 3.2 outlines and justifies my methodological framework. Section 3.3 outlines the research design and tools that I adopted for each of the research questions.

Chapter 4: Findings and Results: Scoping Study.

Chapter 4 discusses the findings from the questionnaire that was sent to all FP settings in Wales, and provides information to answer Research Question 1 – namely 'How were Foundation Phase teachers in Wales teaching thinking?' The results suggested that whilst a large percentage of respondents stated that they viewed the teaching of thinking as a high priority, and as an effective activity to undertake with learners, there were wide variations in approaches, materials and training across the sample.

Chapter 5: Finding and Results: Action Research – the teachers.

Chapter 5 presents the findings for the Teacher Network days and the two observations and subsequent VSRD episodes that I conducted in the six teacher's classrooms. This chapter seeks to answer Research Question 2, namely 'How did the teachers in the study develop in their teaching of thinking through the course of the study?' The results indicate that through the process of action research, teachers were able to develop their pedagogy and reflect on the teaching of thinking more critically.

Chapter 6: Finding and Results: Action Research – the children.

Chapter 6 presents the findings from my discussions with the children involved in the study, the observations of teaching episodes, the VSRD episodes with the children and the findings from the standardised cognitive tests that I conducted.

This chapter seeks to answer Research Questions 3 – 'To what extent did children in the study demonstrate development in their awareness of thinking?' and Research Question 4 – 'What was the impact of the intervention on children's performance on a limited number of standardised tests?' Although the sample size was small, the results for this group of children indicated that there were significant differences between the control and intervention children at the end of the study. In three of the four cognitive tests undertaken (naming vocabulary, early number concepts and reasoning) the intervention group made more progress than the control group, with a medium effect size (Cohen, 1988). The children involved in the intervention also became better able to discuss their thinking, and demonstrated an increase in metacognitive behaviours over the course of the study.

Chapter 7: Conclusions.

Chapter 7 discusses the implications of the findings for each of my research questions in more depth. Key themes are drawn together, and connected to the literature discussed in Chapter 2. I outline the strengths and limitations of my study, and identify the potential implications of my findings for students, teachers, other researchers and policy makers. I reflect on how this study has impacted on my personal identity as a researcher. I discuss the original contribution of my study to the field and suggest future research that could arise from this work.

In particular, there are three specific contributions to knowledge in the field that my research makes, with particular reference how VSRD has had significant contribution as a research tool, as a pedagogical tool and as a support for professional learning.

Reference List

Appendices

Chapter 2
Literature Review

Introduction

This chapter explores the literature relating to research in the fields of thinking, teaching and professional development. For convenience, the literature is reviewed in three sections. Put simply, Section 2.1 covers what thinking is and how different writers define this process. Section 2.2 addresses the question of what we know about the teaching of thinking, while Section 2.3 explores how teachers can develop their pedagogy in this area, with a focus on reflective practice.

2.1 The meaning and nature of thinking

2.1.1 Defining 'thinking' and 'thinking skills' in this study

The word 'think' ranks around the 125-136 mark in terms of its frequency in print and is the twelfth most commonly used verb in the English language (Ritchart *et al*, 2011:5). However, Ritchhart *et al (ibid*) suggest that the fact that 'think' is used so commonly does not necessarily mean that we are clear about what thinking is, and what kinds of thinking we need to promote in the classroom. Understandably, given the complexity of thinking, there are many different views as to the nature and definition of this process. Robson and Hargreaves (2005:82) point out: 'Any study of thinking … needs to recognise that defining what might be meant by 'thinking', in itself, is problematic.' Thinking is something that as humans we talk about, and engage in frequently, and it is a natural characteristic – something we cannot help but do (Robson and Hargreaves, *ibid.*). As such, Fisher (2005) suggests that there are many intuitive assumptions about thinking that are held by both adults and children – for instance, the belief that thinking is associated with processes that happen in the brain, the belief that thoughts can be visualized with some sort of 'inner eye', and the belief that we can control our thoughts. Some writers distinguish between different ways of thinking, such as lateral, creative, and evaluative (*eg* DeBono, 1986) or wishful, imaginative and pondering (White, 2002).

Others see thinking as a more generic process. Adey (2001: 2), for example, describes thinking simply as ‘something we do when we try to solve problems’. Rogoff, (1990:8) sees thinking as ‘functional, active, and grounded in goal-directed action’. Fisher (2005:22) sees thinking as ‘any mental activity that helps us process information’. It does however in itself cause something of a paradox in the view of some researchers. For example, Johnson (2001:6) indicates that ‘to have mastered a skill usually means to be able to exercise it without thinking’.

Despite some debate over the meaning of ‘thinking skills’, it is a familiar, everyday term (Robson and Hargreaves, 2005). Several writers have confirmed that thinking and thinking skills may well be fluid, hard-to-define concepts but argue that this should not put teachers off from promoting thinking in the classroom. For instance, Resnick (1987), suggests that thinking skills are hard to define, but possible to recognize, whilst McGuinness (1999) suggests that there are common process and attributes that constitute thinking – these include collecting, sorting, analysing and reflecting. As such, the term ‘thinking skills’ will be used within this study.

Several writers have explored the characteristics of thinking. For instance, McGregor (2007: 24) offers the following checklist of thinking, which she says should be:

- Skillful
- Flexible
- Purposeful
- Transferable
- Effortful
- Developed in authentic situations
- Useful

This checklist is effectively a synthesis of what other educationalists have agreed upon as characteristic of good quality thinking. However, one of the difficulties with checklists is that they may over-simplify what is a highly complex process.

McGregor herself acknowledges, for example, that while good thinking is often seen to be purposeful, in reality some types of thinking do not require conscious thought and effort (McGregor, 2007: 40). This idea is similar to that of Johnson (2000) who argues that it is not possible to teach thinking directly because thinking is, ultimately, an intrinsic process.

Building on the literature, within this thesis thinking is defined as an active, mental process that involves the utilisation of certain skills towards achieving a goal. My review of literature indicates that, despite some variations in definition, many researchers believe that thinking can be promoted if teachers are clear about the range and depth of cognitive skills they seek to develop, if they model good thinking and if they make the language of thinking explicit (*eg* McGuinness, 1999; Ritchhart *et al*, 2011).

2.1.2 Learning theories and thinking

Two of the main perspectives on learning mentioned in Chapter One – constructivism and social-constructivism - suggest different principles to underpin the process of learning. Although there is not scope within this thesis to explore the backgrounds or underlying principles of these in great depth, they are discussed in this section. The perspective adopted by myself as a researcher – social constructivism - influenced my research design, approach to analysis and how I view the development of thinking and so I will justify my reasons for adopting this stance.

Constructivism grew from cognitive science, evolutionary theory and biology (McGregor, 2007). Theorists in this field suggest that the learner needs to engage in activities that enable the construction of knowledge and understanding, assimilating and reframing their knowledge of the world through their exploration of it. Therefore, we can only really make sense of that knowledge which we have created for ourselves. Within this theoretical framework, learners develop in stages broadly linked to their age, and the teacher must determine where the learner is to be able to plan accordingly (Driver, 1995). Within the constructivist approach, Piaget (1896-1980) is one of the most influential theorists, and also one of the most challenged.

Originally a biologist studying molluscs, Piaget became interested in exploring how children learn and adapt to their environments (Conkbayir and Pascal, 2014). Contrary to the prevailing view of that time, Piaget and Inhelder (1958) suggested that children were not less competent thinkers than adults, but that they thought in different ways. They viewed intellectual growth as a process of adapting existing views (schema) in the light of experience. Athey (2007:50, 153) explained schema as patterns – sequences of events - of repeatable behavior. She identifies types of schema such as tracking objects, dynamic vertical schema; circular direction and rotation; going over, under or on top of; going round a boundary; enveloping and containing. Knowledge therefore is operative – it is about change and transformation (Athey, *ibid*:6).

Through experience schemas evolve and develop, they connect into 'threads of thinking' (Nutbrown, 2006: 120) about the world. If the existing schema – can explain the experience, this becomes assimilated into the child's schema, and often becomes a repetitive action. For example, in a simple example, a child who has learnt the word for dog may start to call other furry four-legged animals dogs. This is assimilation. If they are corrected when they call a for instance a horse a dog, the learner enters a period of disequilibrium, which leads to an adaptation of the schema. This is accommodation – and can feel like a struggle to the learner as they make changes to their existing schema. The schema for dog may then get modified to restrict it to only certain four-legged animals. According to Piaget (1958), assimilation and accommodation require an active learner, not a passive one.

Piaget's work is not without critique – for example, his sample size was small and select, and his research tools may have caused confusion (*eg* Conkbayir and Pascal, 2014). Furthermore, there is evidence from neuroscience to suggest that, whilst there may well be stages of cognitive development, high quality experiences are likely to accelerate the process of learning (*eg* Howard-Jones, 2009).

It is likely that by shifting from observational methods of evaluating children's development to more test-like situations, Piaget 'asked questions that were too difficult, and their answers were at an earlier level that those deemed to be correct' (Elkind and Flavell, 1969:43). Piaget's main focus was on the individual learner, but he did place value on social interactions, and he discussed the importance of argument and discussion in development (Piaget, 1924,1928 in Muller *et al*, 2009). What Piagetian perspectives do not discuss is 'how the social world contributes to individual development' Rogoff (1990:5). In contrast, social constructivism is closely aligned to sociocultural theory, which views learning as 'a process of transforming participation in shared sociocultural endeavours' (Rogoff, 1990:210).

Sociocultural theory places importance on the role of culture and history in learning and development – exploring learning in contextualised circumstances, rather than (as in a Piagetian framework) seeking a universalistic theory of development (John-Steiner and Mahn, 1996). However, this theory is not without criticism, not least because of its view of the individual in terms of internalising their learning. For example, Cobb and Yackel (1996:186) have argued that this aspect of sociocultural theory represents a transmission model in which 'students inherit the cultural meanings that constitute their intellectual bequest from prior generations'.

Social constructivist frameworks, although sharing commonalities with sociocultural theory, focus more on the individual child. John-Steiner and Mahn (1996), suggest that after engaging in social participation, knowledge is constructed by the individual as they work through what they have experienced. It is both the social and individual endeavours that lead to new knowledge being created. As explained by Chang-Wells & Wells (1993:86):

> "...[I]t is at points of negotiation of meaning in conversation that learning and development occur, as each learner's individual psychological processes mediate (and at the same time are mediated by) the constitutive intermental processes of the group".

From the sociocultural perspective, cognitive development happens when there is genuine collaboration. Vygotsky sees participation in activities with the guidance of more skillful others – adults or peers - as allowing children the opportunity to then internalise the experience (Rogoff, 1990).

Within such exchanges, language is a crucial cultural tool. Within the social world of the classroom then, the role of the teacher in 'scaffolding' and 'mediating' learning is crucial. Scaffolding is created through the provision of 'supportive situations in which children can extend current skills and knowledge' (Rogoff, 1990:93). Wood *et al* (1976) suggest that scaffolding has six purposes, which are illustrated in Figure 2.1 which follows:

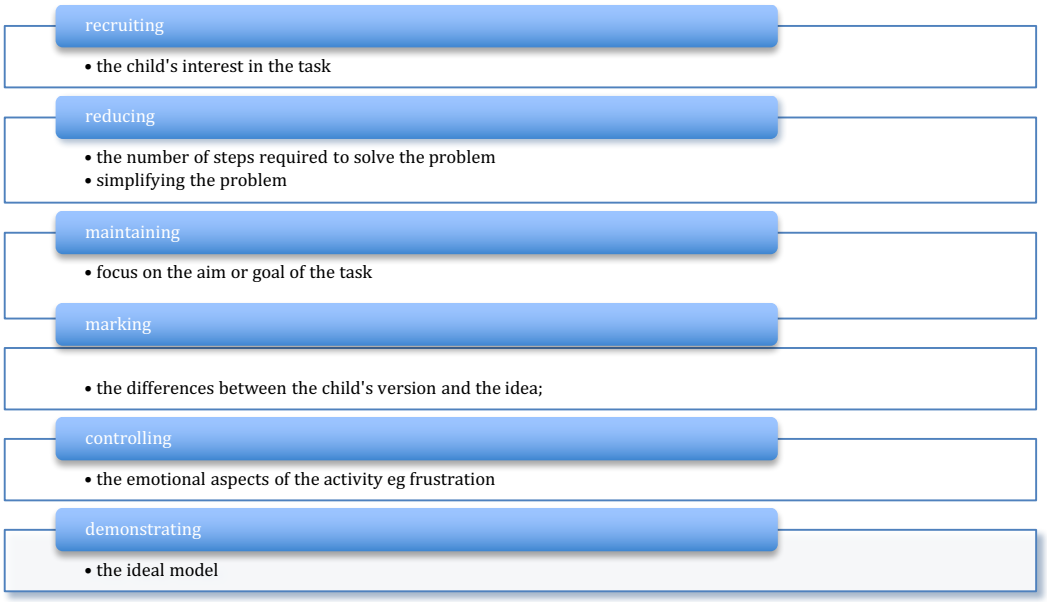


Figure 2.1 the six purposes of scaffolding, after Wood et al (1976)

For example, Fernyhough (1996,54) suggests that the adult may present a learning situation in ways that can be understood and assimilated by the child – for instance during jigsaw puzzle play they may say 'the puzzle needs to look like that'. This scaffolding marks and demonstrates, but may also act to control, reduce and focus. This external dialogue may subsequently become part of the child's internal dialogue as they reflect on the activity. Like Piaget, Vygotsky (1978) also believed that children constructed their own knowledge through interaction (Conkbayir and Pascal, 2014). However, he placed emphasis on the importance of the social context as well, and viewed language as an important tool in eliciting, transforming and shaping children's thoughts and ideas.

In contrast to the constructivist view of fixed stages of development, Vygotsky (1978) described the Zone of Proximal Development as the distance between a child's actual developmental level and the higher level

that they can achieve – through adult guidance or in collaboration with more capable peers. This is typically illustrated as in Figure 2.2 which follows:

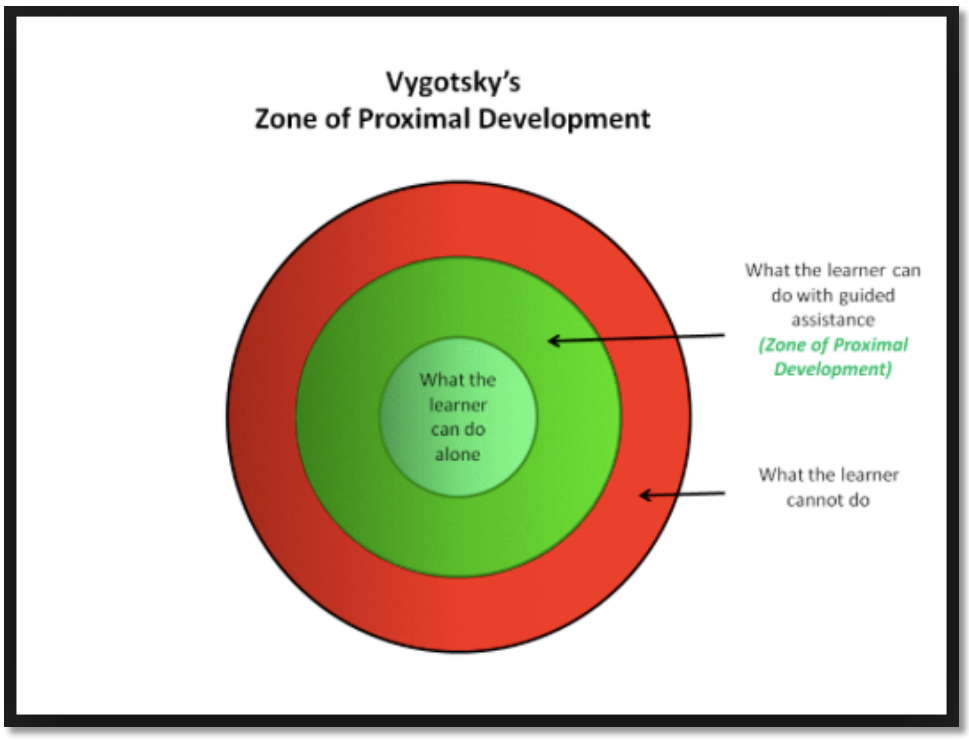


Figure 2.2 Illustration of Vygotsky's (1978) Zone of Proximal Development source: Doyle (2017)

The ZPD is not a fixed entity. It changes as the learner makes sense of the experiences they encounter. As the learner develops, what they can do alone and with the support of another will change over time as the learner understands more. The guidance and support that is given to the learner is termed scaffolding, and this may take the form of encouragement, reminders, suggestions, resources and questions (*eg* Wood *et al*, 1976). The scaffolding that is provided for the learner is not fixed and rigid like the scaffolding on a building, rather it is flexible – although like the scaffolding on a building it is meant to be temporary. The adult or more capable other needs to be responsive to the needs of the learner (Pearson, 1985) in order to remove or alter the scaffolding as the learner progresses.

Learning experiences need to be suitably challenging – too little challenge and the learner will not need to think about them – and may become bored or disinterested. Too much challenge and the learner may become anxious or

disengaged (Pearson, 1985). The following figure shows how, over time the learner will change, allowing them to access more difficult tasks independently and with assistance.

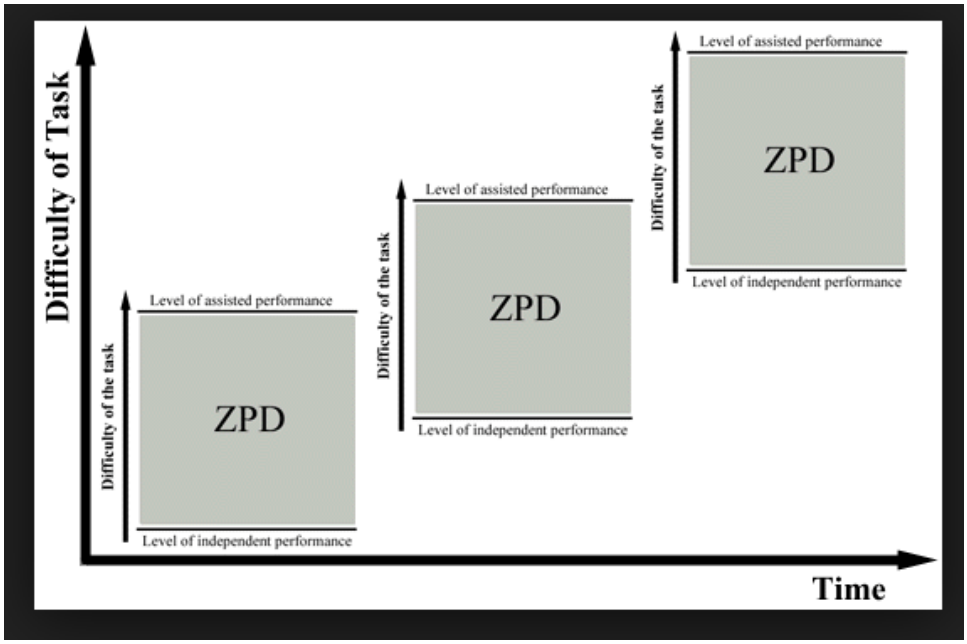


Figure 2.3 How a learner's levels of independent and assisted performance may alter over time source: Castillo, (2017)

The second term mentioned on the previous page was 'mediation', which refers to the notion that all human activity is mediated by tools or signs (Wertsch,1991). Fernyhough (2008:230) offers the definition of mediation as 'the use of culturally-derived psychological tools, such as utterances in spoken or sign language, in transforming the relations between psychological inputs and outputs'.

According to Vygotsky (1981), these tools can include language, algebra, art, diagrams, maps and signs. These tools or signs are embedded within culture and history. Wertsch (*ibid*) describes these as a 'toolkit'. The consideration of cultural tools is a key difference between Piagetian and Vygotskian perspectives (*eg* Fernyhough, 2008).

Indeed, Donaldson (1978) suggests that it is differences in access to tools and signs that determines success on Piagetian tasks – and as such the context in which such tasks are presented – rather than the age of the child

is the crucial factor. The individual needs to make his or her own personal meaning from the experience. Vygotsky (1991:36) states: 'all that is internal in the higher mental functions was at one time external'. Hatano and Inagaki's (1994) work supports this, their study demonstrated indication of cognitive constraints on the children's learning based on their stage of development, also indicated that theories of cognitive development needed to consider the role that experience plays in advancing development.
Later in this chapter, one form of mediated interaction, 'sustained shared thinking' (*eg* Siraj and Asani, 2015), will be discussed.

I adopted a social constructivist standpoint, since I recognised the individual's cognition, and their role in collaborating with others and actively making sense of their experiences. Rogoff (1990) suggests that socially shared activities which children participate in lead to the development of their cognition. Thinking and learning arise from engaging with existing cultural practices, which are valued in that particular time and place. Whilst learning is seen as an interactive process, in the sociocultural view the learner is initially an apprentice who, over time will develop understanding to participate fully in the community of practices (*eg* Lave and Wenger, 1991). A sociocultural view of learning acknowledges that a child's engagement and learning is mediated by influences from a variety of 'others', and the context in a child's life, and also that the child. This does not see the child as passive in the learning process, but rather as active. It is important to acknowledge the child as an active agent who is a 'co-constructor' of their own learning (*eg* Dewey in Wood and Attfield, 2005). The child is competent and capable, and acts as 'an architect of their own learning' (Dodd-Nufrio, 2011: 236).
There are similarities between learning theories, for example, Siraj-Blatchford (2009:4) suggests both Vygotsky and Piaget 'saw the potential for learning grounded in, and essentially limited by, even if not 'within', the child's current developmental capabilities'.

A notion that is relevant to this research project is the concept of 'emergence', which was originally a philosophical term relating to views of society as a living entity. In terms of learning and child development emergence is defined as development involving a process which occurs over

time, and which results in the development of the higher order structures of the mind (Siraj-Blatchford, 2009). From this perspective, learning experiences are not entirely child-led, but rather are negotiated, and emerge from effective interactions between adult and child, and, if developed by effective teachers can be seen as being responsive to adult and children's interests, values and motivations. Siraj-Blatchford (*ibid*.) suggests that both Piaget and Vygotsky apply notions of emergence within their theories – although Piaget considers discrete stages of development whilst Vygotsky considers development as a more continuous process.

2.1.3 Thinking, other skills and dispositions

This thesis takes the view that effective teaching of thinking should not take place in isolation, separated from knowledge. Hence practitioners need to focus on developing particular thinking skills, such as questioning, explaining and comparing; they need to help them transfer these skills to different situations and they also need to develop children's inclination to think. This is known in some of the literature as dispositions or 'habits of mind'. For example, Costa and Kallick (2014:22) define habits of mind as 'tendencies toward particular patterns of intellectual behavior', these are effectively attitudes and dispositions concerned with producing as well as reproducing knowledge. Dispositions are defined by Katz (1993:16) as:

> 'a pattern of behavior exhibited frequently and in the absence of coercion and constituting a habit of mind under some conscious and voluntary control, and that is intentional and oriented to broad goals'.

Costa and Kallick (2000), suggest that there are four levels of broad educational outcome, as illustrated in Figure 2.4 which follows:

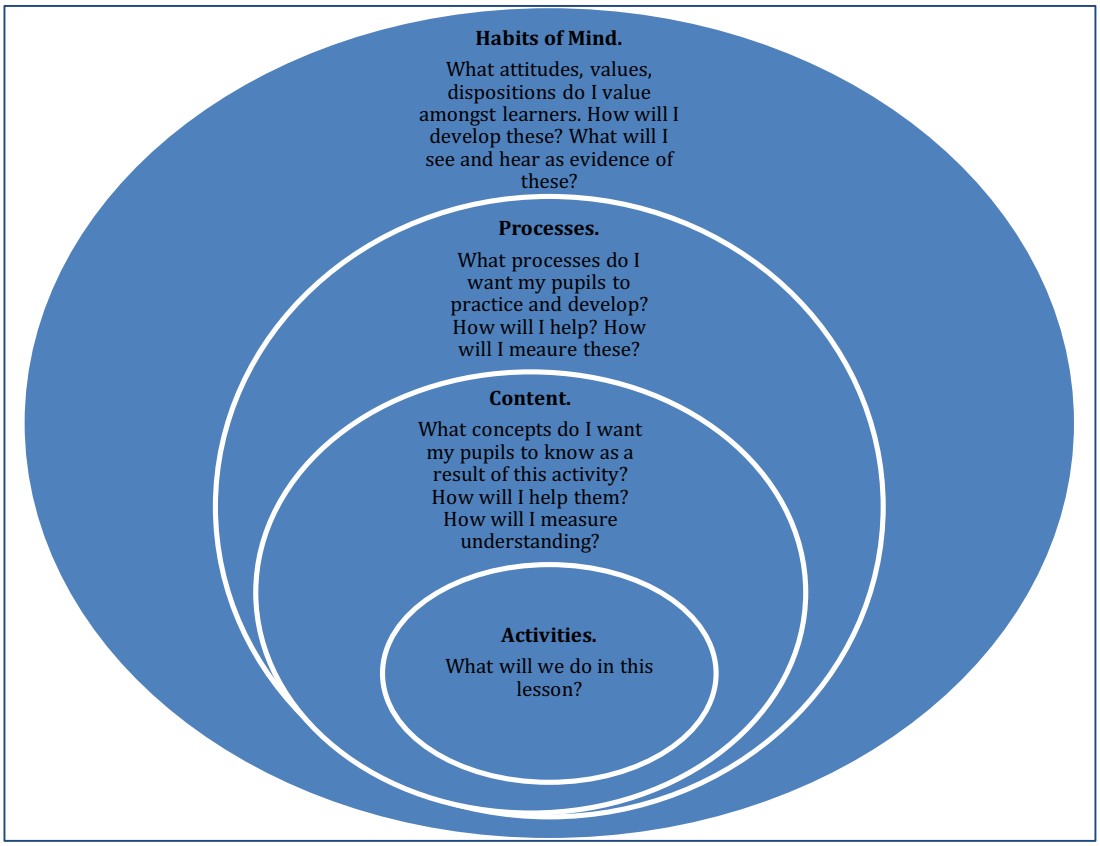


Figure 2.4 Costa and Kallick's model of broad educational outcomes, after Dahlberg and Moss (2000:55)

Costa and Kallick (2014) argue that these dispositions provide learners with the skills, capacities and abilities to make sense of, and deepen learners' understanding of curriculum content. They also suggest that by developing dispositions such as open-mindedness, reasoning, curiosity and flexibility children may be more likely to become lifelong learners, effective problem-solvers and decision makers. Some researchers consider that there is a difference between 'learning dispositions' such as exploring and persisting, and 'thinking dispositions' such as self-concept and decision-making (*eg* Roberts, 2015). Roberts (*ibid*) argues that learning dispositions are innate but that thinking dispositions need to be developed and carefully nurtured. In terms of dispositions might be developed, Katz (1993:19) suggests that children will learn them through social experience, stating that:

> …[D]ispositions are not likely to be acquired through didactic processes, but are more likely modeled by young children as they experience being around people who exhibit them.

Costa and Kallick (2000) describe the relationship between habits of mind, cognitive skills and thinking skills as hierarchical, with discrete thinking skills such as 'compare' at the centre of the model. These can be taught discretely, and then used, often together as cognitive operations, which are context led. This is referring to the application of the skills. The outer level is where the habits of mind appear – and at this level learners demonstrate the inclination to use skills and operations. This relationship is illustrated by the following diagram:

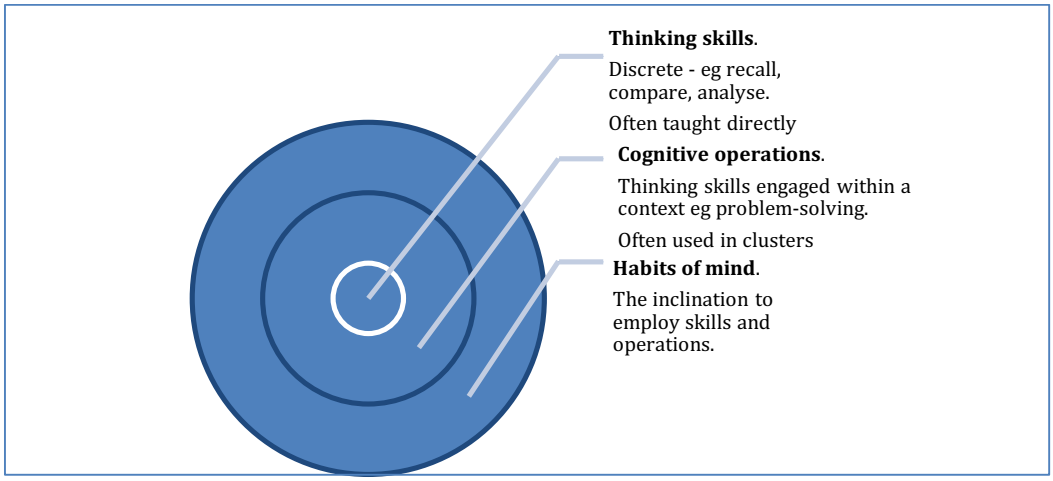


Figure 2.5 The relationship between thinking skills, cognitive operations and habits of mind, after Costa and Kallick (2000:14).

Costa and Kallick extend our understanding of the relationships identified in Figure 2.4 by using the broader term 'cognitive operations', which includes 'problem-solving'. An individual can also make decisions about when to apply a skill – and this reflects their dispositions towards learning. There is clear evidence of dispositions aligned with those mentioned earlier in the chapter, in the curriculum guidance (DCELLS, 2008) – *eg* persevering and collaborating, as well as the discrete skills such as enquiring and evaluating. But just having the disposition to apply a skill does not mean that the individual will apply it efficiently, or effectively. Swartz (2001) considers that good thinking is skillful and involves generating, clarifying and evaluating ideas, problem solving and decision-making.

2.1.4 Thinking skills and curriculum requirements

There are a wide range of skills that feature within the curriculum and which could be described as 'thinking skills'. For example, when considering young children, Dame Tickell (2011: 79) identified the following creative and critical thinking skills as essential in their development:

- having their own ideas
- using what they already know to learn new things
- choosing ways to do things, as well as finding new ways.

Tickell's Review (2011) was based on substantial evidence received from an extensive range of organisations in the field, including leading academics, universities, charities, schools, trade unions, inspectorates, education consultants and parent groups. Among Tickell's recommendations, the report concluded that children should be encouraged to express new ideas through activities such as designing, creative writing, planning, reconstructing, inventing, formulating and composing. Underpinning this is the concept of teaching for understanding which is supported 'within contingent interactions' (Tickell, *ibid:*102) *ie* where both the adult and the child (or the child and another child) in an interaction are responsive to one another. Tickell (*ibid*:89) sees children as 'inherently proactive' in developing their own potential within a social environment.

In the context of Wales, as noted in chapter 1, thinking skills have had a high profile in primary and secondary schools (DCELLS, 2008). The current National Curriculum in Wales also identifies clear opportunities to promote the kinds of skills identified in the Tickell Review. Table 2.2 illustrates the thinking verbs that can be found across all key stages and in all subjects/ areas of learning in the Welsh curriculum documentation *eg* analyse, apply, classify, compare, connect, contrast, describe, discuss, explore, identify, interpret, observe, organise, predict, respond, reason, solve, synthesise, summarise, simplify, represent. The following table shows an example of some curriculum areas and associated thinking skills to illustrate this point:

Area of learning/ subject	Thinking skill
English	*Eg* Use language creatively; describes links and similarities in language; use their knowledge of language to explain and predict
ICT	*Eg* Plan ideas identifying appropriate hardware or software; use ICT to explore and solve problems; reflect on strengths and weaknesses of their solutions
Creative Development	*Eg* responding, discussing, thinking, reflecting, problem solving, persevering, collaborating, evaluating (their work and that of others)
Knowledge and Understanding of the World	*Eg* observing, comparing, classifying, enquiring, making decisions, reflecting, predicting, thinking, evaluating

Table 2.1 Examples of how thinking skills appear within some of the Welsh National Curriculum guidance. Source: DCELLS (2008)

Yet the nature of thinking skills is not discussed in detail within the documentation. How teachers plan to develop 'thinking skills' and the dispositions to use these skills effectively needs to be considered. This is important because, as noted by Higgins in Gardner *et al* (2011):

> 'the quality of the interactions that take place in lessons where thinking skills are highlighted and developed is higher than in lessons where they are not. When teachers undertake to 'teach thinking skills' the lessons are different, and that difference seems to me to be worth investigating.'

Whilst in the quote above the authors do not provide examples of empirical evidence for the statement, other sources also support the view that making thinking explicit is beneficial. For example, Estyn (2011) found that in classrooms where teachers embedded thinking approaches into their pedagogy, the quality of interaction improved. In the longitudinal Effective Provision of Pre-school Education (EPPE) project (Siraj-Blatchford *et al*, 2006), evidence collected from 141 pre-school settings over a ten-year period was analysed. The researchers identified effective settings (basing their definition of 'effective' on child outcomes) as offering children more opportunity to highlight and share their thinking with adults.

However, the looseness of the term ‘thinking skills’ can sometimes cloud classroom planning and teaching. For example, many teachers may not reflect upon this complex concept, equating thinking skills to problem- solving (Robson and Hargreaves, 2005). Even within curriculum guidance, there are challenges for teachers. For example, within the Creative Development and Knowledge and Understanding of the World Area of Learning within the Foundation Phase curriculum (DCELLS, 2008), certain thinking skills are identified. These include observing, comparing and classifying. However, the guidance also then suggests that teachers should also develop the skill of ‘thinking’. This could be interpreted as thinking being separate to these other skills. Teachers may understandably be confused, and lack clear direction in how to plan for these elements. This is a challenge if we are trying to improve the teaching of thinking, since the research suggests that awareness of thinking processes is an important element in effective practice - thinking needs to be made explicit and visible in the classroom (*eg* Ritchhart *et al*, 2011). This will be discussed further in section 2 of the chapter when strategies to teach thinking are considered.

2.1.5 The importance of teaching thinking skills

The importance of promoting thinking skills in school has long been recognised. Leading theorists such as Vygotsky suggested that ‘all teaching in schools should be rethought to enhance the thinking of all students’ (1920, in Shayer 2003:3).

More recently, Nisbett (1993, in Shayer and Adey 2002:1) stated that ‘before the century is out, no curriculum will be regarded as acceptable unless it can be shown to contribute to the teaching of thinking’, whilst Robson and Hargreaves (2005:82) suggest that, on an international basis, the teaching of thinking is ‘a vital concern’ for policy makers and teachers. The OECD's DeSeCo Project (OECD, 2005:8) recognises that individuals in today's world need to possess “cognitive and practical skills, creative abilities and other psychosocial resources”

In the context of Welsh education, it is widely recognised that children and young people should be taught creative and critical thinking skills that are essential for lifelong learning. For instance, thinking skills feature strongly in each of the four core purposes identified in the recently published Donaldson review of the Welsh Curriculum (Donaldson, 2015: 33):

- Ambitious, capable learners who…find and analyse information
- Enterprising, creative contributors who… think creatively to reframe and solve problems
- Ethical, informed citizens who… find, evaluate and use evidence in forming views
- Healthy, confident individuals who… take measured decisions about lifestyle and manage risk

Thinking skills are also implicit within the National Literacy and Numeracy Framework (Welsh Government, 2013) and the Digital Competency Framework (Welsh Government, 2016).

In Wales, the government recognises that the skills of the Welsh workforce lag behind the more prosperous parts of the UK, and the world's leading advanced countries (DCELLS, 2008b). Of course, children starting school at the time of writing could well be alive in 2080 or beyond, and we do not know what sort of society they will be living in – and so, we should give them access to cultural tools which are likely to be of value to them. For example, they are part of a generation, which is seeing a rapid information explosion (Grigg, 2015). Costa and Kallick (2014) are keen to encourage educators to align curriculum content with the needs of children in their future lives.

This is challenging because, as mentioned earlier in the chapter, and as Lucas and Claxton (2010) argue, the world is fast changing, and so the challenge for educators is to keep up with the pace of this change, and to prepare children appropriately. Increasingly there is recognition that future citizens need to be flexible enough to cope with rapid technological, social and demographic changes.

This is not to suggest that knowledge is unimportant, but rather perhaps to question what is meant by knowledge.

As Gerver (2010: 47) suggests:

> 'One of the greatest problems in a debate that pits knowledge against skills is that people do not have clarity of understanding around the term 'knowledge'. Knowledge evolves, and it is not always a fixed entity. The acquisition of knowledge relies on a number of skills and intelligences that help process information and experiences'.

Knowledge, of course, can come in different forms (e.g. procedural, declarative, self-knowledge). This thesis focuses very much on how young children can develop self-knowledge, how teachers can support this process and also grow in their own understanding of how to teaching thinking. This self-knowledge or metacognitive awareness is discussed further in section 1.6. The position I adopt is that children need to acquire both knowledge and skills because it is not possible to think and reason in a void. There is of course value in knowledge, as well as the teaching of skills, and knowledge is, as Costa and Kallick argue, 'essential for our students' future' (2014:2).

2.1.6 Metacognition

The foundations of metacognition are based within the tradition of cognitive theories of memory. The word 'meta' is a Greek term meaning 'after, behind or beyond' (Zechmeister and Nyberg). This suggests that metacognition may involve processes beyond simply 'knowing' or cognition. Locke (1924 in Georgihades 2004), referred to the importance of taking notice of the mind's own operations- and he used the term reflection. Dewey was one of the first to explore the nature of thinking and learning and the link between the two (1938). Whilst these earlier researchers did not use the term 'metacognition', they did emphasise the importance of reflection on prior knowledge, understanding and processes. As such, they are clear that thinking is a purposeful activity, leading to reasoning and problem-solving.

Reflective thought, and the monitoring and control of this thought are essential aspects of the thinking process. These are aspects of thinking that are included as part of metacognition in the theoretical framework underpinning this thesis. One challenge relating to embedding metacognition into classrooms is that, within the literature several definitions exist – for instance, Flavell (1976) refers to metacognition as a person's own knowledge about their cognitive processes, and described it as 'thinking about thinking' (Flavell, 1979:3).

Others have defined it as:

- "The knowledge and control children have over their own thinking and learning activities" (Cross & Paris, 1988:131)
- "Awareness of one's own thinking, awareness of the content of one's conceptions, an active monitoring of one's cognitive processes, an attempt to regulate one's cognitive processes in relationship to further learning, and an application of a set of heuristics as an effective device for helping people organize their methods of attack on problems in general" (Hennessey, 1999:3)
- "Awareness and management of one's own thought" (Kuhn & Dean, 2004:270).

Common to all of these definitions is the notion that metacognitive awareness will allow children and adults to be able to make wise and thoughtful life decisions, as well as allowing them greater understanding of themselves as learners. As such, it is of clear importance within the educational context. However, because there have been many alternative definitions of metacognition suggested, in fact Brown (1987 in Georgihades 2004:367) warns that 'metacognition is not only a monster of obscure parentage, but a many-headed monster at that'. Indeed, Tarricone (2011:4) suggests that defining metacognition is a 'thorny issue' because of the complexity of the constructs that relate and contribute to it.

Nonetheless, metacognition is highlighted as a central element within the thinking process (DCELLS, 2008:12). Behaving metacognitively involves conscious monitoring and control of thoughts, as well as the ability to articulate thinking (*eg* McGuinness, 1999). Characteristics of children and teachers who are good thinkers include an awareness of the processes that they are using in order to learn; the effectiveness of these and what they need to do to improve. This is elaborated on by Robson (2006), who suggests that 'good thinkers' need a repertoire of thinking strategies, confident attitudes towards thinking, a willingness to have a go at thinking, and the ability to reflect on their own thinking. Reflective, or metacognitive learners will recognise if there are flaws in their thinking, and will review and amend their thinking strategies appropriately.

There is much debate about the nature of metacognition within the literature, and since looking at the nature and extent to which young children can think in this manner is central to this thesis, metacognition needs to be explored in some depth.

Metacognition is generally viewed as an important factor in improving classroom practices. For example, Higgins *et al* (2011) found that, as well as international studies there were four UK interventions related to metacognition that yielded high effect sizes (of up to 8 months) on pupil performance in literacy and numeracy and wider curriculum areas such as science. Other meta-studies of interventions based on metacognition report improved learning, with large effect sizes (Hattie *et al*., 1996; Hattie, 2012). Hence Hattie (2012:18) suggests that it is crucial to empower learners to 'better understand how to monitor, self-regulate, and evaluate' their own learning.

Of course, it is worth considering some caveats of effect size. Effect size measures differences in learning gains between two groups. But there are many outcomes of schooling beyond the measurable – for example values such as respect, citizenship and dispositions to learn. Effect size may not measure these. Furthermore, it is important to look closely at the details of studies contained in meta-analysis. For example, according to Hattie (2012), homework is shown to have an overall effect size of 0.29, which is well below the average of 0.40. When examined more closely, it appears that whilst primary students gain least from homework (0.15), in fact secondary students have greater gains (0.64). Overall results may need therefore to be analysed carefully (Wiliam, 2010).

Furthermore, evidence specifically relating to the youngest learners is less robust. Higgins *et al* (2015) acknowledge that approaches that help children manage their own learning show up to 7 months progress, but are based upon limited evidence. Few of these studies have assessed the educational impact (*eg* on early mathematics or literacy skills) and it has not been possible to isolate the improvement attributable to these elements.

So, whilst it is clear from the meta-analysis that interventions that develop metacognition score high effect sizes, it is important to look more deeply into why this might be the case, before considering how these approaches could be meaningfully embedded into sustainable classroom practice. These will be discussed in Section 2.2.

Teachers need a secure understanding of what is meant by metacognition if they are to promote it effectively in the classroom (*eg* McGuinness, 1999, Wilson and Bai, 2010). Tarricone (2011) adds that without clear theoretical foundations, research in the field is unlikely to contribute to educational outcomes. In other words, teachers need to be clear about what metacognition is and how they can promote it effectively. Flavell (1976: 232) described metacognition as being: 'one's knowledge concerning one's own cognitive processes and products'. Whilst cognition and cognitive strategies facilitate learning, metacognitive strategies actively monitor the learning. When researchers discuss metacognition they are generally referring to the awareness, control and knowledge that a learner has about their own learning and thinking. Metacognitive reflection allows the learner to revisit the learning – taking a critical view of what has gone on. Self-appraisal allows for self-management and therefore needs an element of critical reflection on the part of the learner. This is not a new phenomenon, nor has it only recently become an area of interest for researchers.

In subsequent publications Flavell (1979) acknowledged the significance of metacognition in a range of activities from literacy to social interactions. He went on to identify four aspects or classes of metacognition – knowledge, experience, tasks and strategies. These are not necessarily discrete, and may happen as part of a 'dynamic interplay' (Flavell, 1979:909). These can be summarised in the figure which follows:

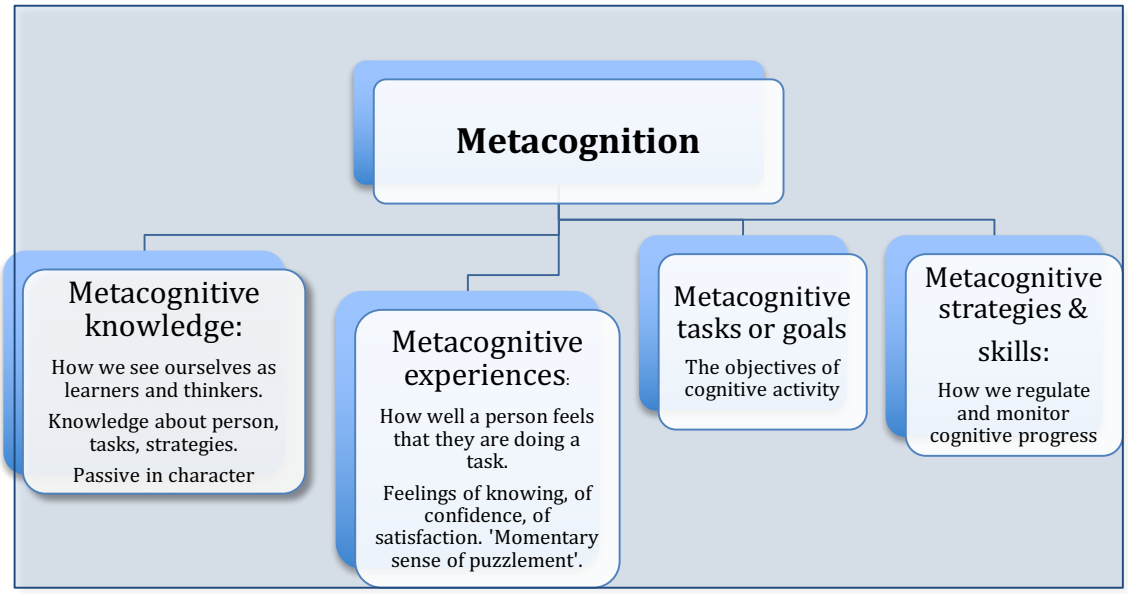


Figure 2.6 Model of the four classes of metacognition, after Flavell (1979).

Metacognitive knowledge is the knowledge or belief a person holds about themselves and others in terms of their cognitive abilities. This can be implicit or explicit knowledge, and it may be unconscious or consciously held. It refers to how we see ourselves as thinkers, learners and cognitive processors. This has connections to the work of researchers such as Claxton (2002) and Dweck (2006) who consider the mindset of learners as important. Thus it is clear that these beliefs can affect our learning behaviours, even though they are subjective in nature.

Flavell (1979) further subdivides this into knowledge about person, tasks and categories. The *person* category refers to everything that is understood about ourselves as a learner or thinker. This metacognitive knowledge can lead to the selection, evaluation and possible abandonment of tasks, goals and strategies – and links to dispositions such as perseverance. This knowledge provides a framework for understanding your own as well as others' cognition (Efklides, 2006). However, metacognitive knowledge may not automatically lead to the appropriate behaviour – it can be accurate or inaccurate – as Veenman and Elshout warn (1999 in Leat and Lin, 2003). For example, a student may know that a particular piece of work is needed but may refrain from doing it. Furthermore, Resnick (1991) suggests that the social world of the classroom may restrict or encourage strategy selection.

This is similar to Ritchart's (2011) view that within classroom cultures, forces can act to shape or inhibit thinking. The classroom culture is an interplay of these forces, which include expectations, opportunities, time, modeling, language, environment, interactions and routines. The very fact that the interplay between aspects of these forces can differ widely from classroom to classroom mean that educational settings can offer widely diverse experiences.

Metacognitive experiences are the experiences that Flavell (1979) describes as a 'momentary sense of puzzlement'. These highly personal experiences can be short or long in terms of duration, and can feel like a stream of consciousness – for example when accessing prior knowledge. Frequently these experiences may be subjective, due to the progress that is being made in an activity. They influence how well a person may feel they are doing something – leading to the establishment of new goals or revision of existing ones. These experiences act like the interface between person and task (Eflikedes, 2006), and so give rise to cognitive strategies (Larkin, 2015). They may also affect metacognitive knowledge by adding or deleting to it, or by leading to adaptation of knowledge. Larkin suggests that most research into metacognition, and indeed, most classroom materials aimed at developing metacognition, focus on the knowledge aspects. However, as shall be discussed later in the chapter, considering the experiential aspects are important as well, possibly particularly when dealing with very young learners.

Flavell (1979) suggested two further classes of metacognitive phenomena. **Metacognitive *tasks*** (or goals) are the objectives of cognitive activity. Achievement of these requires the learner to draw upon both metacognitive knowledge and experience in order to succeed. For example, learners may make careful plans regarding how best to approach a task based upon prior experiences. **Metacognitive *strategies* (or actions**) monitor cognitive progress, allowing for regulation of the learning. These are sequential processes that ensure goals are met.

For example, in a literacy lesson, the goal may be to understand a piece of text. A learner may use a metacognitive strategy such as self-questioning to ask themselves questions about the text. If these questions cannot be answered, the learner may decide to re-read the text in order to meet the goal. Payne *at al* (1988) suggest that our strategies are resistant to change - we often only change from a preferred strategy as a last resort, even if it is not the most effective or efficient strategy.

It is important to note that, emerging from the literature there is clearly an overlap between the concepts of metacognition and self-regulation – described by Dinsmore *et al* (2006:394) as 'a marriage between self-awareness and intention to act'. Self-regulated learning (SRL), is defined by Boekaerts (1999) as thoughts, feelings and actions generated by a learner as they try to attain a goal. These qualities are seen to be desirable attributes of effective learners. For some researchers such as Larkin (2011) metacognition is a part of the overarching concept of self-regulation, where self-regulation refers to the emotions, motivation, context, cognitive monitoring and control process of a learner. For others, such as Eflikades *et al* (2006), emotional responses are embedded into their definitions of metacognition as metacognitive experiences. Brown (1987:66) describes metacognition and self-regulation as 'incestuously related', whilst Larkin (*ibid*) suggests that theoretical models of metacognition tend to emphasise cognitive rather than affective aspects of learning.

There is a common conceptual element between the two - namely 'individuals make efforts to monitor their thoughts and actions and to act accordingly to gain some control over them. It is, in effect, a marriage between self-awareness and intention to act' (Dinsmore *et al*, 2006:394). Larkin (*ibid*) notes that it would be difficult in reality to become a self-regulated learner without metacognitive awareness of the self. With specific reference to working with young children, Bronson (2000) states that emotional, social and cognitive aspects of metacognition are inter-related and in most situations are inseparable.

Another useful way of looking at metacognition is discussed by Yildiz *et al* (2009). Drawing from the body of literature (*eg* Brown, 1978; Baker and Brown, 1984), they suggest that metacognition can broadly divided into two components - knowledge and regulation – more specifically knowledge of cognition and regulation of cognition. Within these two components are a number of categories, as shown in the figure which follows:

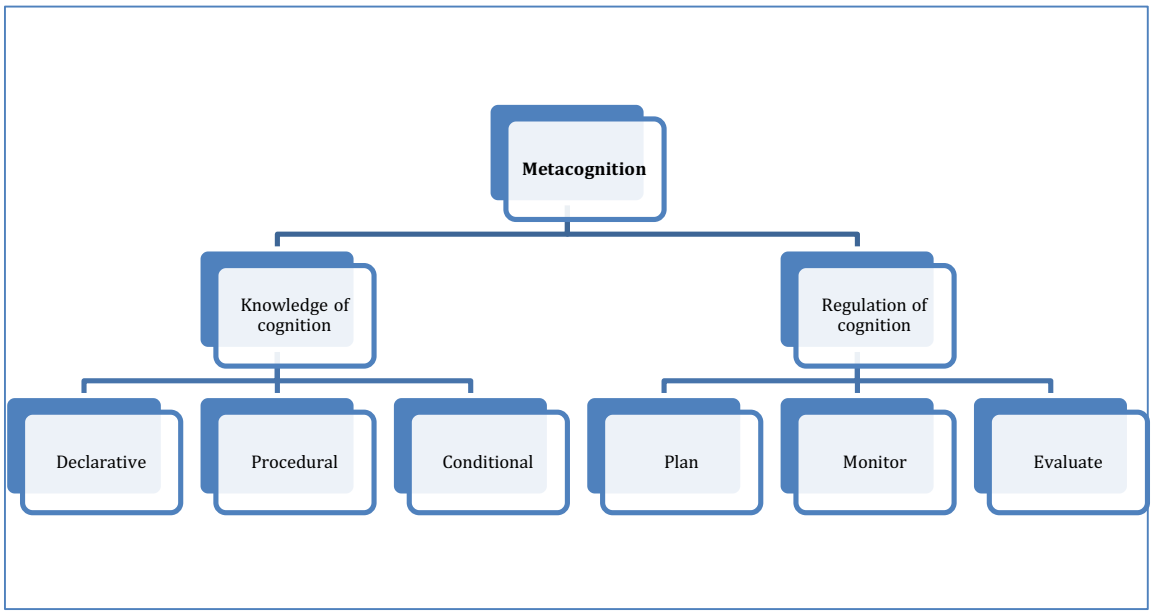


Figure 2.7 Model of metacognition after Yaldiz et al (2009)

Within this model, declarative knowledge refers to an individual's conceptions and beliefs about tasks and their abilities to perform these. Procedural knowledge refers to an individual's awareness of how they perform a task, and conditional knowledge refers to how an individual knows when, how and why a particular strategy should be used. When considering the regulation of cognition, planning refers to how an individual selects appropriate strategies, monitoring refers to an individual's awareness of how they are performing during a task, and evaluation refers to the awareness an individual has of the products of their learning.

So, to summarise, and building on the work of Flavell (1976; 1986), educational psychologists suggest that metacognition involves an individual's beliefs and knowledge about cognitive processes (Eysenck and Keane, 2005), and their ability to manage these processes.

Like any other form of knowledge, metacognitive knowledge may be accurate or inaccurate. It relates to learners' self-awareness and how well they understand their own learning and thinking. Larkin (2010:3) suggests that metacognition involves 'a higher order of thinking, one that is reflective and goes beyond the ordinary level to reflect on thinking itself'.

Clearly, there are many similarities between the views of metacognition. Whitebread *et al* (2005) present a working model that synthesises the literature and suggest three closely related elements – metacognitive knowledge, metacognitive experience (monitoring and reflecting) and self-regulation. After consideration of the body of research, within this research project, metacognition is understood broadly to be conscious reflection by the individual on their own learning, in particular:

- The awareness individuals have of their own knowledge, their strengths and areas to develop, and their beliefs about themselves as learners;
- Their ability to regulate their own actions in the application of that knowledge (Tanner, Jones and Lewis, 2011).

2.1.7 Young learners' thinking

Although the value of metacognition is known (*eg* Higgins *et al*, 2011), Larkin (2015:189) suggests that 'the terms metacognitive experience and early years education fit uneasily together'. There remains debate about the age when young children are able to think in this manner. Although much of the literature does make reference to primary aged children, the debate around metacognitive ability tends to focus on children of junior age. There is little written about those of Foundation Phase age – *ie* three to seven year-olds.

In fact, the question of whether young children are able to think in a metacognitive way is contested throughout the literature (Georgihades, 2004). Piaget would argue that processes such as reflection and abstraction need the individual to have the ability to think in a formal operational manner (1976), and as such metacognitive abilities would emerge at the age of 11-12 years. As a Piagetian, Flavell himself frequently focused on developmental stages of metacognition, which suggest that young children may be unable to

think in certain ways before they reach the formal operational thought stage of development (Larkin, 2015). This would indicate that the young children in my study, who are likely to be at Piaget's concrete or pre-operational stage of development would be unable to think in this manner. In a similar manner Vygotsky (1986: 167) suggests that mastery of abstract thinking emerges in adolescence and not before, because:

> 'The schoolchild, though growing steadily in awareness and mastery of such functions as memory and attention, is not aware of his conceptual operations.'

However, Zuckerman in Kozulin *et al* 2003:184) suggest that 'sparks of reflection' can be seen in both the action and thoughts of preschoolers, suggesting that in some individual cases metacognitive behaviour can be demonstrated. Later, Flavell (1999) himself argued that 3- year- olds have awareness of self – and it is possible this ability to think and act independently is underestimated by practitioners. This is supported by the work of Gunstone (1994 in Georgihades 2004) who states that all children have metacognitive ideas of some kind or another. Sperling *et al* (2000) also found that 4 year olds could use strategies and metacognitive processes in some tasks involving puzzles. Larkin (2000) suggests that it may be that we do not see reflective abstraction in the very young, but we may see evidence of metacognitive knowledge, monitoring and individual control of learning. However, similarly to the suggestion of Walsh *et al* (2006), Larkin also adds that this will depend on the learning experiences that are available – we will not see evidence of metacognition if the activities and tasks do not demand the learner to think metacognitively.

However, it is important to note that merely demonstrating a behaviour is not an indication of deliberate metacognitive action. For instance, Kuhn (2000), would argue that whilst young children may be able to self-regulate their learning, they are often unaware of how they are doing this. If this were the case, they may be dependent on the teacher to orientate, monitor, plan and evaluate their learning (Boekhaerts, 1999). This thinking would therefore lack aspects of metacognitive knowledge and strategies and self-regulation – even if the metacognitive experiences are present.

Veenman *et al* (2006) suggest that it is still widely accepted that metacognition does not begin to emerge until about 8 years of age.
Winne (1995 in Boekhaerts, 1999) also suggests that whilst nearly all students do demonstrate self-regulation (because they are able to plan and evaluate activities) this does not necessarily mean that they can use this to make a difference to their learning. They may not be aware of how to do this. This view is echoed by Flavell (1987 in Georgihades, 2004). He suggests that whilst young children may have conscious metacognitive experiences, they may be unable to interpret them fully. Later in the chapter the possibility that young children are also less able to articulate these experiences will also be explored.

It is difficult to research metacognitive processes, particularly amongst young children. There are methodological difficulties associated with defining terms, framing questions, working within settings which are imperfect for controlled research purposes and establishing sensitive lines of enquiry such as naturalistic observational coding, that may 'reveal' young children's abilities (Whitebread *et al* 2009). Robson (2016) suggests that research based on children's self-reports may not reveal the true extent of metacognition. Shamir *et al* (2009:57) suggest that some of the differences in the literature relating to the age that metacognitive abilities develop are based on four possible explanations:

- young children (4-5 years old) are unaware of metacognition and therefore cannot describe it;
- young children may only report on what they perceive to have 'worked' and so may not mention everything they are aware of;
- young children may not have the verbal skills to describe their metacognition;
- young children may find it difficult to talk to 'elders and strangers'.

These points were useful to me as I sought to develop an appropriate research design (described in Chapter 3). Wood and Attfield (2005) suggest that effective interaction between adult and child can support the development of both the conditions and the time for children to reflect.

They argue that the development of these skills requires more than self-discovery on the part of the child – adult support is necessary. This is similar to the views of Wertsch (1978, in Larkin, 2015) who suggests that the development of metacognition is a highly social process.

One of the challenges when researching young children's thinking is determining the extent to which they are able to express their thoughts and how this can be evidenced. Georgihades (2004:370), draws upon the evidence from the work of researchers in thinking skills, when he states that 'the question at issue is not whether children have potential to engage in metacognitive activities; rather it is one of finding the right ways and the right activities for initiating and enhancing such activities'. For example, Robson (2010:228) suggests that:

> 'in naturally occurring social contexts which have meaning and purpose for children, they show evidence of self-regulation and metacognition at a much earlier age'.

Garner and Alexander (1989), suggest that in order to find out what children know about their learning researchers need to use three methods:

- asking them;
- have them 'think aloud' when solving problems;
- and have them teach a younger child a solution to a problem.

'Out-loud thinking' – where children verbalize their thinking, often in play – revealing choice and agency is seen by Wood (2015) to be an important measure of metacognitive skill. With some children however, their ability to verbalise their thoughts may cause difficulty when trying to find out about their thinking. However, research suggests that this talk can be developed. Coltman *et al* (2013) conducted the 'Children Articulating Thinking' or ChAT project. In the ChAT project an intervention which involved introducing a specific pedagogical framework to encouraged and clarified 'Rules for Talk' was used. Children were encouraged to work together in groups of three to solve problems, using the rules for talk. Teachers involved in the ChAT project acted as co-researchers, and were supported in developing pedagogies which facilitated talk to support metacognition in their classes.

Albeit with a small sample (n=51 children), results indicated that children who used this framework, within a supportive classroom environment, were better able to engage in metacognitive activity.

However, verbal articulation is not the sole form of evidence that can be gathered. Hattie (2012), suggests that professionals need to become more aware of the nature of learning. They should listen and observe children carefully – seeing the learning through the children's eyes, and not just reflecting on the overt demonstrations of learning that are evident. We may miss the process of learning since it may be less apparent than the products of learning. To overcome this, teachers should observe children carefully and not just reflect on their overt demonstrations of learning that are evident. This articulation may not rely solely on spoken language. The Reggio Emilia Approach highlights the phrase 'the hundred languages' (Smidt, 2005:45), suggesting that children need the opportunity to express their ideas and thoughts in many different ways. Similarly, Coates and Coates (2015) suggest that careful observation of evidence such as young children's drawings may allow a train of thought to be followed by observers.

Children and teachers who are behaving metacognitively will be aware of the processes that they are using in order to learn. They will be able to consider the effectiveness of these. They will be able to reflect on what they need to do to improve their understanding. This involves conscious monitoring and control of their thoughts. The process of thinking may initially become slower, as we take time to 'marvel at the ability we have' (Larkin, 2012:5) to consider our thoughts, but should result in more mindful learners. Paris and Winograd's (1990 in Georghiades, 2004), work has links to these definitions, since they discuss two essential features of metacognition – the self-appraisal and self-management of thinking. A common theme then relates to an awareness of how the thinking process is proceeding, as well as an awareness of how and when it needs improving. Developing reflective practice in children and teachers is challenging, and I will explore this further in section 3 of this chapter.

Video is one tool which allows children's thoughts to be captured in ways other than verbal interaction. Hattie (2012) suggests that teachers do not see actually about 70% of what happens in classrooms, and so therefore using video as a means of capturing events and then analyzing these in detail offers great potential. The process of 'classroom videography' (Haw and Hadfield, 2011:23) allows the researcher to capture a detailed representation of observable events, can collect rich data, and then offers opportunity for detailed, multilayered (and if required, repeated) analysis. Mead and Winsler (2015) suggest that children's private speech *(ie* that speech that is not directed at another individual) may also be captured by video. This is relevant to the framework underpinning this research because private speech is a method by which an individual may guide their own thinking (Vygotsky, 1962). As such it may provide insight into thinking processes. Nonetheless, thinking, and metacognition in general, is an activity that takes place largely in private, and in young children is not always easily observed.

Perhaps more sensitive research methods would better reveal such awareness in young children (Whitebread *et al*, 2007). For example, studies which do not rely on children's verbal ability, but which infer metacognition from behaviours tend to report young children as being more knowledgeable (*eg* Whitebread *et al*, 2009). The use of video also may offer a way to explore metacognition – in essence often an internal process. Within the research literature, there is a substantial body of knowledge that supports this approach.

For instance, in previous projects, Video Stimulated Reflective Dialogue (VSRD) facilitated access to pupils' metacognitive processes by providing a focus for collective reflection between children and researchers (Tanner and Jones, 2007). VSRD was used with children to offer important insights into their own learning processes. Robson (2010) used reflective dialogue to discuss videos of 3 and 4-year-olds playing. In her study, Robson filmed children whilst they were engaged in self-initiated play, and then discussed the video with them. She found that this method helped make implicit understanding more visible, and revealed young children to be capable of metacognitive and self-regulatory behaviours.

However, in these studies the video episodes had been selected by the researcher, and the children were 11 years or older. In my research, I wanted to address these two gaps by enabling young children (4-7 years) to video their own learning and us this as a stimulus for discussion. In Section 3, I will consider what the evidence-base suggests regarding the use of video to support teacher reflection.

2.2 Teaching Thinking

This section explores the literature relating to three areas: a brief resume of what is known about effective teaching to provide the context for a discussion over whether thinking can be taught and, if so, possible pedagogical approaches.

2.2.1 What do we know about 'effective teaching'?

Teaching is a complex process. Since the 1980s there has been a growing interest in the question of teacher effectiveness and school improvement due largely to perceived underperformance in the educational system (*eg* Hay McBer, 2000; McKinsey, 2007; Reynolds, 2010; Coe *et al*, 2014). Although in-depth consideration of this is beyond the scope of this thesis it is worth acknowledging that while there are ongoing debates over how to measure 'effective' teaching, there has been a discernible shift towards focusing on the impact of teaching on learning outcomes. For example, Coe *et al* (2014:) note that effective teaching can be viewed as that which leads to 'improved student achievement', but acknowledge that the factors which influence this may be varied, and that available assessments may not 'fully capture the range of outcomes that we might specify as desirable aims for education' (Coe *et al, ibid*:9). In different studies, teaching has been evaluated in a number of ways – including classroom observation, teacher self-report, external reports and student achievement, but many studies rely on using one measure rather than multiple ones (Goe, Bell and Little, 2008). I am therefore aware caution must be taken when interpreting any research into teacher effectiveness.

In the Welsh context, and based upon school inspection data, Estyn highlight shortcomings in learning and teaching, notably:

> 'opportunities are still too few to develop higher-order skills, such as the skills of synthesis, inference, deduction and prediction [in reading non-fiction texts]. Teachers also do not do enough to encourage pupils to develop the skills of verbal reasoning and argument.'(2015:12)

In the most recent Estyn Annual Report, teaching is identified as one of the weakest areas of provision, particularly relating to a lack of challenge and inconsistency within schools (Estyn, 2016).

To address these concerns, teachers need to possess both subject and pedagogical knowledge. Shulman (1986) introduced the term *Pedagogical Content Knowledge* (PCK) to describe how teachers communicate subject knowledge in meaningful ways, for instance through the use of metaphors and illustrations. This awareness may relate to different types of materials available to teach a given subject, the progression students will make within this subject year on year, and the other aspects of the curriculum that their students may be studying with other teachers that year. How teachers actually transmit this knowledge, in its varying forms, to students may also depend upon their own underlying values.

In 2007, Galton considered that current educational practice in the UK was firmly rooted in a transmission model of teaching, stating that primary classroom practice was typically fast paced and dominated by teachers who controlled the discourse.

In fact, Alexander (2008) suggests that there may be as many as six versions of teaching – these are illustrated in Figure 2.8 which follows. These are not discrete, but rather are a continuum, influenced by sociocultural, historic and personal factors.

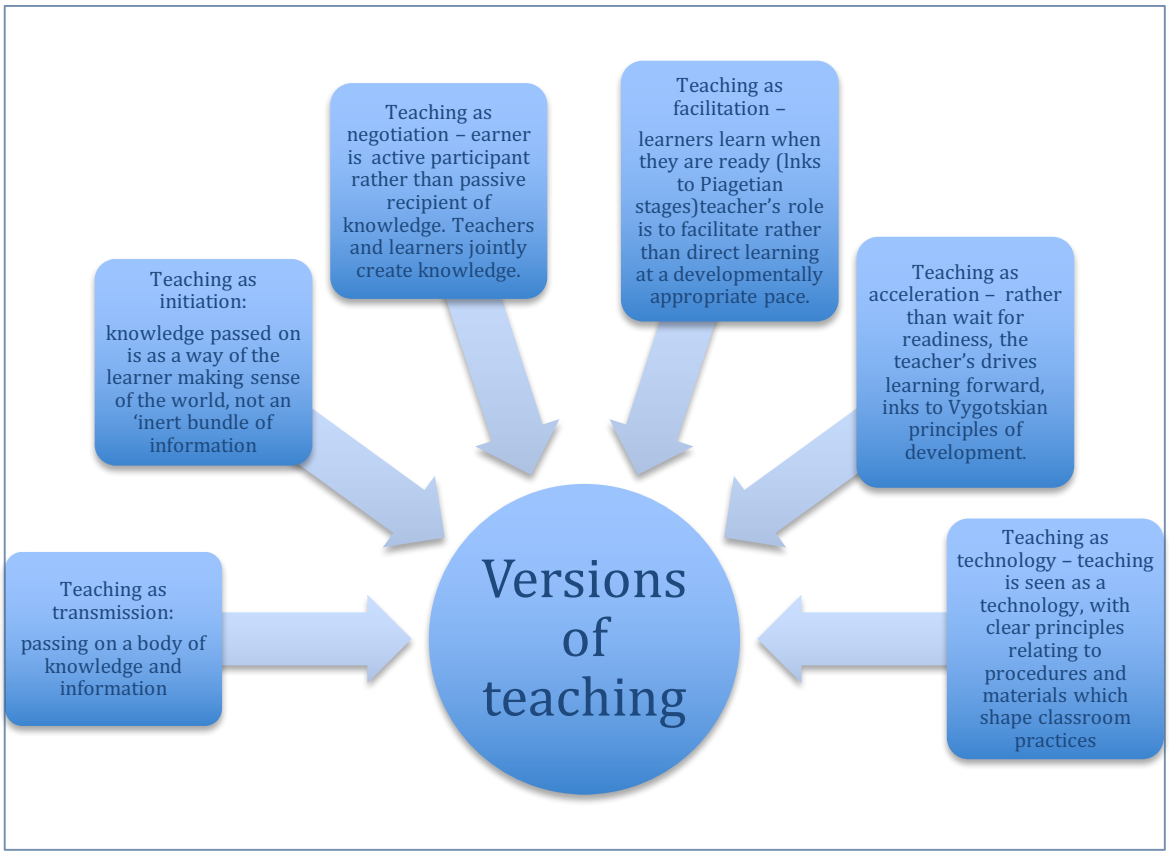


Figure 2.8 Representation of Alexander's (2008) versions of teaching

Alexander (2008) says that teachers are likely to have an 'espoused' theory that they align themselves towards, but also a 'theory-in-use' which is the actual practice that they use on a daily basis. In other words, they may hold one set of beliefs, but operate according to a different one. This is possibly because individual classes and pupils are very different from one another – one size does not fit all. As such, he warns researchers about trying to reduce the concept of effective teaching simply to 'best practice' case studies from which all should shape their practice. However, Estyn and other inspectorates adopt a best-case study approach in several publications.

For instance, in explaining what effective early years' provision looks like Estyn (2015:11) report that:

> 'Good early years providers offer a wide range of stimulating and interesting experiences for children. They enrich the language environment by talking to children in full sentences and in a structured way. Probing questions encourage learners to think and to provide answers in their own words.'

As a former practitioner, I recognise the value of sharing good practice but I am also mindful of the dangers in assuming what works well in one context necessarily transfers to another.

Within the Foundation Phase in Wales, practitioners are given clear guidance on principles of 'effective practice'. These include open questioning, encouraging children to reflect on their thinking and a balance in terms of adult and child-led and initiated provision (Taylor *et al*, 2015). The quality of classroom interaction is seen as critical to children's progress in learning in a number of studies (*eg* Alexander, 2008; Sylva *et al,* 2004; Walsh and Gardner, 2005). Developing teachers' understanding of what constitutes effective interaction is an important thread within this study, and will be explored in the next sections of this chapter.

2.2.2 Can we teach thinking?

The rationale for developing thinking is clearly underpinned by theories of learning and development, such as those discussed in Section 1, and it is 'increasingly popular' to teach thinking skills in schools (Burke and Williams, 2008). There are a number of reasons why this is the case, for example McGuinness (1999) indicates that in developing thinking skills, learners' active cognitive processes are supported – making for better learning. In a small-scale study of practitioners' perceptions and practices, Robson and Hargreaves (2005:92) report that teachers generally see the development of thinking as a 'good thing' to promote in learners.

There is agreement within the literature that thinking and more specifically, metacognition can develop and be taught (*eg* McGuinness, 1999; Robertson, 2004; Robson, 2010). There are challenges however, and Estyn, suggest that there is still great variation in the quality of teaching, and that not all lessons teach thinking skills 'in a meaningful way' (2011:3).

Walsh *et al* (2006) found that play-based settings do not always promote higher levels of cognitive challenge needed for higher order thinking skills to develop.

Those that did manage to do this, *ie* those that scored most highly on the indicators, were the ones which provided a 'balance of play-based, practical and written tasks and a more equal distribution of time between child- and teacher-initiated activity' (Walsh *et al*, 2006:219). Put simply, teachers need to provide challenging opportunities that require learners to think. This was an important consideration in my research design.

2.2.3 Approaches to teaching thinking - infusion and enrichment

A review of the research literature highlights two main approaches to the teaching of thinking: enrichment or infusion (McGuinness, 2005). Enrichment approaches generally draw on a specific cognitive theory. Examples include Cognitive Acceleration programmes (CA *eg* Adey & Shayer, 1994; Shayer & Adey, 2002) and Instrumental Enrichment (IE, Feurstein *et al*, 1980). Infusion models place thinking within the curriculum and can be subject-specific or may be developed in a cross curricular manner. Infusion approaches place thinking in the context of normal classroom practice so that topic understanding and thinking can be taught simultaneously. Infusion is described by Swartz *et al* (1998) as the approach that teachers use when they blend explicit teaching of thinking skills with content instruction. The underpinning principles of infusion are based on taxonomy of thinking (Swartz and Parks, 1994) and the importance of metacognition (McGuinness, *ibid*).

There was debate about whether infusion or enrichment is most effective, and it is acknowledged that most research has focused on particular packages of thinking materials rather than seeking to ascertain whether infusion or enrichment is more effective (*eg* Burke and Williams, 2008). Overall however, there is support for the idea that thinking skills need to be taught and then applied across the curriculum. This is a central premise to this thesis. Infusion approaches encourage learners to recognise their thinking, make connections and use common patterns of thinking to deepen their understanding of curriculum topics (McGuinness and Sheey, 2008). This may be particularly appropriate for primary settings where the teacher is in charge of the whole curriculum in one classroom, and in turn specifically

suited to the Foundation Phase where the approach to the curriculum is holistic.

Furthermore, and of interest to my study is the view that through infusion there is a focus on pedagogy of thinking – teaching for thinking has an explicit focus in infusion models (*eg* Burke and Williams, *ibid*).

Many researchers suggest that there is a social element involved in the development of thinking – and that through a process of social construction we build knowledge. For example, Kuhn (2005:14) suggests that thinking rarely remains a solitary activity, taking place in one person's head. She instead argues that thinking is frequently a 'social activity, embodied in the discourse people engage in to advance their individual and shared goals.' What we talk about is also important. Astington (1994:185) notes that in effective learning environments 'talk is not just about things in the world, it is also about the children's thoughts about the things in the world.' When evaluating teaching and learning relating to thinking skills, Estyn (2011:5) report that:

> 'In the best lessons, teachers involved in the programme facilitate, rather than direct, learning. They speak less and allow increased dialogue with pupils in group and whole-class situations. There is a greater focus on open questioning and on encouraging in-depth answers. This stimulates pupils' thinking, leads them to be more engaged, and can help to develop the higher-order thinking skills involved in critical thinking, analysis and problem-solving.'

Whilst this suggests that dialogue is important, it also indicates an assumption that the role of effective teachers includes facilitating, and there is a need for teachers to sometimes speak less. The next section explores the empirical evidence base related to classroom talk and interaction.

2.2.4 Classroom talk, interaction, dialogue and 'Sustained Shared Thinking'

Classroom talk has been acknowledged as a key element in developing children's understanding (*eg* Alexander, 2009; Mercer and Hodgkinson, 2008). Much recent focus has been on dialogue and 'dialogic teaching' (Alexander, 2010b; Mercer, 2000). From the perspective of dialogic teaching, thinking becomes a process of taking on ideas from different viewpoints,

participating in conversation, and explaining and reasoning about thinking – and talk is a reciprocal process.

This model 'resonates with the work of Bruner (1996), who supported the fostering of discussion and collaboration' (Morgan, 2007:216). For example, the Thinking Together programme (Dawes *et al*, 2000) explicitly focuses on dialogic teaching. Children are taught explicitly to interact with one another in problem-solving situations, and the programme focuses on supporting teacher-pupil and pupil-pupil talk. The key findings were that this approach improved the quality of students' talk, the quality of group work and individual attainment in mathematics, science and non-verbal reasoning.

As discussed in Section 2.1, Vygotsky (1986:36) argues that 'the true direction of the development of thinking is not from the individual to the social, but from the social to the individual'. When teachers make the language of thinking explicit to learners, they are therefore providing the learner with tools that they can adapt, use and practice (Wolberg and Goff, 2012). Vygotsky (1986:56) suggests that children's conversations are characterized by the 'desire to understand and to be understood'. Donaldson and Elliot (in Grieve, 2001) indicate that explanation extends our understanding of the world because it moves beyond simple observations to the causal links underpinning them. Tsamir and Tirosh (2009) found that in certain mathematical tasks, five and six-year old children were able to plan, monitor their own progress and express their thinking about the task. Interestingly, suggest that there may be a relationship between justification of ideas and monitoring – by asking a child to justify their answer they may monitor their own progress more closely, and vice versa.

However, the predominant style of interaction in many classrooms remains based on closed questions that are usually asked to elicit short and factual answers (*eg* Galton *et al*, 1999; Burns and Myhill , 2004; Smith *et al*, 2010). Closed questions do have merit in some teaching situations. For instance, they can also 'acquaint learners with the social conventions' needed to interact in the classroom (Alkubadi, no date:3).

However, within the literature, the consensus is that, in order to elicit higher-order thinking – where more than one answer is possible – open questioning is essential (*eg* Galton *et al,*1999; Alexander, 2000).

Many classroom interactions are characterised by a three-step sequence of 'Initiation', 'Response' and 'Feedback' (IRF, Sinclair and Coulthard, 1975), which are mainly associated with closed questioning. There is also mention in the literature of 'IRE' – Initiation, Response, Evaluation interactions (Mehan, 1979). IRE is seen as more authoritarian by some researchers (*eg* Wanderlei de Oliveira, 2008). For the purposes of this thesis I shall refer to these 'three turn sequences' (Bateman, 2013: 275) as IRF interactions, since I did not necessarily distinguish feedback from evaluation.

The literature suggests that both IRE and IRF interactions can be seen as limiting children to recall and recitation (*eg* Alkubadi,no date) or as a sign of teacher control (*eg* Wright, 2005). Generally the teacher nominates a child to respond, and responses in IRF exchanges are often brief. However, it is important to note that these exchanges can be useful - for example to check understanding, or attention or to provide feedback (Mercer and Hodgkinson, 2008). Nonetheless, Bateman (2013:276) indicates that emphasis on an IRF interactional style can be problematic given that ' open-ended questions and a co-construction of knowledge around a task problem are promoted in early childhood education'. The child is limited to making a response in only the second 'R' stage of the interaction, which means that they do not engage in extended dialogue.

To illustrate the longevity surrounding the issue of classroom talk, Wood *et al* (1980) looked at the nature of conversations between nursery aged children and their teachers, and found that nearly half of input made by teachers during conversations were controlling – questioning or managing the children rather than encouraging dialogue. Nearly twenty-five years later, the Researching Effective Pedagogy in the Early Years (REPEY) study (Siraj-Blatchford *et al*, 2003) found that only 5% of questions asked by early years educators were open-ended in nature. In a review of 225 studies published between 1972 and 2011, Howe and Abedin (2013) found that most reported

that classroom interaction is based around IRF models, and little had changed over 40 years.

More recently, Mercer and Dawes (2008:56) report that much talk between pupils and teachers is 'asymmetrical', where one participant – usually the teacher leads the interaction and has 'the priviledge, and responsibility, of being in control.'

The literature clearly indicates a need to support teachers so that they feel able to develop episodes of quality talk and discussion with pupils. Mercer (2000) suggests that teachers should develop opportunities for 'exploratory talk' in which pupils share, elaborate on, challenge and evaluate their views. By justifying what they say, children get into the habit of making their reasoning visible in the talk, which represents a distinctive social mode of thinking. Language becomes a tool for thinking. However, Mercer *et al* (1999) suggest that incidences of exploratory talk are generally low, and that most interactions in the classroom tended to be of an uncooperative or competitive nature (disputational) or, if cooperation does occur it shares and builds information (cumulative). Howe and Abedin's (2013:341) meta-analysis supports this early claim, indicating that 'teachers find it extremely difficult to promote exploratory talk in classrooms'.

In promoting dialogue, one possible approach is to ask probing questions and to encourage pupils to think out loud. Myhill (2006) recommends that teachers should refrain from giving answers when 'critical moments' arise and instead encourage pupils to use 'think aloud' strategies. However, there seems to be some debate within the research literature about when discussion and dialogue, particularly with peers, should begin. For example, Venville (in Shayer and Adey, 2002:37) reports that whilst Vygotsky supports the value of social interaction in development from birth, Piaget suggests that peer collaboration is less valuable *before* the concrete operational stage of development. Others, such as Howe and Mercer (2007), Fernyhough (2008b) and Lever and Sénéchal (2011) suggest that young learners at the beginning of their educational journey can benefit from talking out loud,

interaction with peers and engagement with activities such as dialogic book talk.

Another interaction highlighted as effective in early years settings is 'sustained shared thinking' (SST) (Siraj-Blatchford *et al,* 2002) where meaning is jointly constructed through dialogue. This term refers to the sharing of thinking and to the importance of the sustained nature of such an interaction. This emerged as an analytical node within the 2004 Effective Provision of Pre-school Education report (EPPE; Sylva *et al,* 2004), which was a longitudinal study to look at practice in early years settings. SST occurred most commonly in effective settings, where researchers observed higher cognitive outcomes in settings where SST occurred frequently (Siraj-Blatchford, 2009). As such SST has been described as an 'effective pedagogic interaction' (Sylva *et al*, 2010:257), and it most commonly occurs in 1:1 interactions between adult and child (Siraj and Asani, 2015). There is a clear link to Vygotskian principles such as co-construction and participation (Sylva et al, 2010). For example, during SST interactions, an 'effective' adult uses a variety of techniques such as scaffolding, challenge, discussion and modelling in order to promote learning.

There are connections from the concept of pedagogic interactions to the concept of metacognition. For example, through skillfully orchestrated dialogue children will have opportunities to reflect on their thinking, considering how their understanding may have developed during the activity, and considering what they would still like to find out. Indeed, Whitebread *et al* (2007) found that children working with adults reflect on their own learning more frequently than those children working independently. In effective environments, children will have greater opportunity to have their learning scaffolded, for example through appropriate questioning and modeling by adults (and possibly more knowledgeable peers), and may change and adapt their ideas (*eg* Sylva *et al*, 2004; Durden and Dangel, 2008). Teachers are not passive in their role – they need to act intentionally – *ie* with purpose, with goals in mind and by using the pedagogical strategies most likely to help children achieve the intended outcomes of an activity (Epstein, 2007). Although, because of the complexities of teaching, there is a danger in trying

to reduce it to a set of effective 'component parts' (Coe *et a*l, 2014), there are certain practices which are consistently identified as useful practices.

For example, to support SST, adults need to engage in a variety of behaviours – such as listening carefully and showing genuine interest in the child's contribution, respecting their choices and decisions and inviting children to elaborate and clarify their ideas. They also need to model some thinking skills of their own - such as offering alternative viewpoints and speculating (*eg* Siraj-Blatchford *et al*, 2002). Pianta (2003:5) defines intentionality as:

> 'directed, designed interactions between children and teachers in which teachers purposefully challenge, scaffold, and extend children's skills'.

However, SST in general 'does not happen very frequently (Siraj-Blatchford *et al*, *ibid*:10), and whilst SST as an approach is advocated in the FP, suggestions for how to achieve such interactions are not explicitly outlined within Welsh curriculum documentation. This could lead to potential inconsistencies in practice. In a recent review of the Foundation Phase, it was found that:

> 'discussions with practitioners suggest that some teachers are 'afraid' to let go of traditional formal pedagogies. This is compounded by the perceived need to ensure children perform well in the recently introduced Year 2 reading and numeracy tests.' (WG, 2014:3).

The same report also noted that whilst teachers in the Foundation Phase engage in a balance of adult and child led activity, sustained interaction did not always take place during focused teacher led tasks. In fact,

> 'peer collaboration was most often observed during continuous and enhanced provision, and adult-child sustained interaction and co-construction was most often observed during enhanced provision' (WG, 2014:3).

This suggests that opportunities to engage in dialogue may not occur as frequently as they could. Focused tasks, where the teacher works directly with groups of children would seem the ideal place for dialogue to occur, but the evidence suggests this is not always the case. Indeed, Robson and Hargreaves (2005) found that some practitioners are wary of leading conversations with pupils for fear of restricting their ideas, or of taking too much of a lead in the learning. This is important – if teachers are wary of

leading pupils then they may miss opportunities to engage in dialogue. Teachers may also need to develop their observational skills and their awareness of how to spot opportune moments to engage in a conversation. They may also need some training or support in developing awareness of how to recognise ways a child may demonstrate thinking through for example, gesture and action as well as verbal communication (Robson and Hargreaves, 2007).

Furthermore, within processes like 'collaboration' and 'group work' there are complexities. Just because children are engaged in an activity together, there may be different types of interaction occurring, and these may not all support active construction of understanding or metacognition. For example, Goos *et al* (2002:196), distinguish between 'peer tutoring', 'cooperative learning' and 'peer collaboration' (see Figure 2. 9 below). Of these three approaches, peer collaboration is argued to have the most opportunity for shared exploration of a problem. This shared exploration is likely to include dialogue, justification and clarification of ideas.

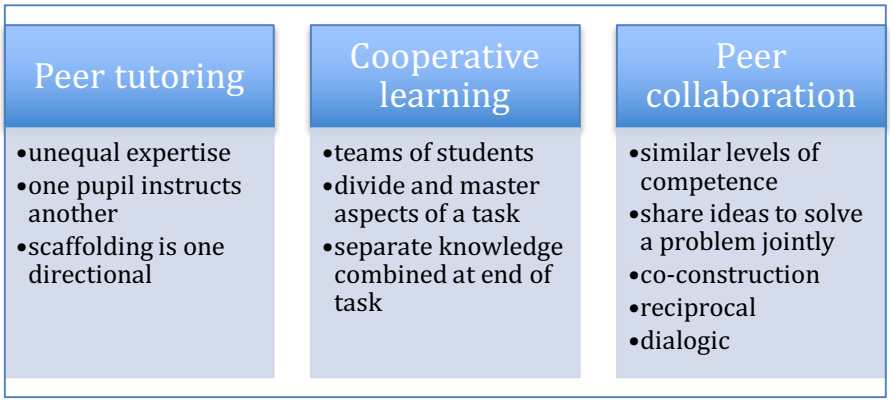


Figure 2.9 Types of group work, after Goos et al, 2002

So, it may be that teachers plan for discussion and group based activity, however, they do not manage to facilitate genuine peer collaboration – in other words there is not opportunity for social sharing and construction of knowledge. It is also important to consider that providing opportunity for such collaboration does not necessarily improve pupil's metacognitive skills - for this to happen Goos *et al* (2002) suggest that the task needs to be challenging enough to require the pupils to explain openly 'how' and 'why' to

their peers. Based on a longitudinal study, the authors argued that more challenging exchanges may promote the social means to encourage personal review of strategy and approach. In the most successful cases, Goos (*ibid*) also indicates the importance of a teacher who intervenes sensitively and appropriately.

To help develop thinking, Ritchhart *et al* (2011), suggest that teachers should name, notice and highlight thinking when it occurs. Ritchhart *et al* (*ibid*) have developed a set of materials, 'Visible Thinking Routines' (VTRs), which offer simple, structured strategies for teachers to develop key thinking skills such as comparing and contrasting; reasoning and justifying. These have an emphasis on talk and discussion, and have been used in early years settings through primary and secondary school and into university and wider educational venues (*eg* galleries and museums) in the United States, the Netherlands, Sweden, Belgium, and Australia (Ritchhart and Perkins, 2008). These will be explored in more detail later in the chapter.

To improve talk and interaction, Alexander (2008) suggests that teachers need to develop a repertoire of teaching pedagogies, and these are based around developing effective interactions and classroom talk. He divides these into three categories as illustrated in Figure 2.10 below:

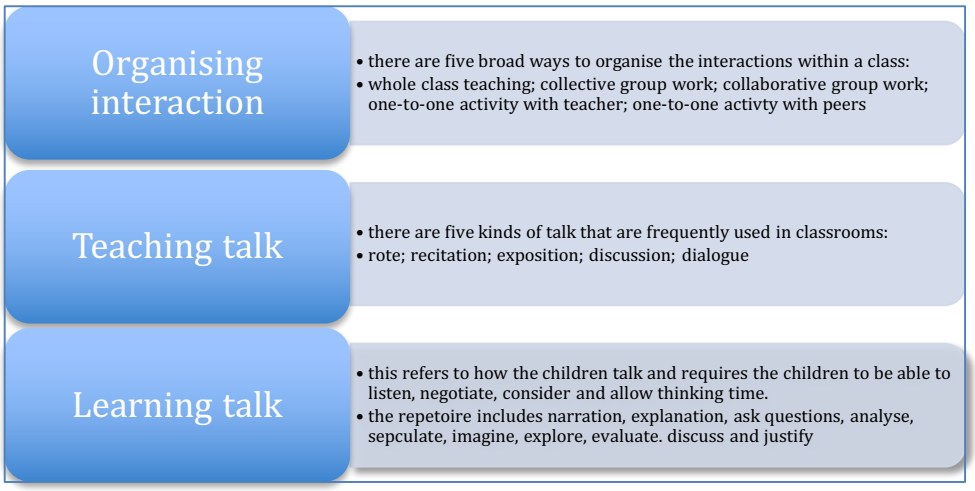


Figure 2.10 Three broad aspects of pedagogical interaction, after Alexander, (2008)

The first two of these – interaction and teaching talk have been discussed earlier in the chapter. When considering 'learning talk' we should remain

aware that children may possess the ability to think effectively, but the dominant discourse within the classroom may disadvantage them.
For example, Hart and Risley (1995) found that children from families on welfare (*ie* of low socio-economic status) had, by the age of starting school had exposure to 12 million utterances, compared to children from higher socio-economic groups who had exposure to over 44 million utterances. Pappas *et al* (2003) found that children from higher socio-economic backgrounds were better able to provide descriptions of their thinking than peers from lower socio-economic backgrounds, even if their non-verbal reasoning skills were similar.

Children's inability or ability to answer a question or engage in a discussion or collaborative task is not necessarily a reflection upon their understanding of the concept being discussed or the question posed. Light and Perret-Clermont (1989:103) suggest that young children's mistakes in research tasks may be 'conversational' rather than 'conservational'. It may be a reflection of teacher expectations, language barriers or the level to which a child has access to the classroom culture. This access to the classroom culture may allow certain groups of children to engage with the educational process more successfully than others. Children possess cultural capital, a term first used by Bourdieu and Passeron (1990). This suggests that some children may be advantaged in the classroom because of their backgrounds. Some children may come to school equipped with knowledge and skills that, to a greater or lesser extent allows them to make sense of, and interact with classroom practices. Children from more affluent backgrounds for example, may be more familiar with the art of conversation. Since the schools in my study were all in areas of socio-economic deprivation, as defined by a high/ above average percentage of children being entitled to free school meals (a proxy for poverty), it is possible that teachers themselves may find it difficult to interact with some groups of children (Harris and Jones, 2012), and will be considered when I analyse my data later in the thesis.

Equally, children may possess the ability to think effectively, but the dominant discourse within the classroom may disadvantage them. Exploring strategies to make the largely invisible thinking process more visible, and which

develop a shared vocabulary of thinking may benefit such children. This leads to consideration of teaching materials designed to develop children's thinking.

2.2.5 Teaching materials and interventions

Interest in improving thinking is well established. It could be argued that teachers need to be made aware of a range of useful strategies and techniques that could promote effective thinking. To do this, a combination of knowledge, memory and habit are used. The challenge for learners is to make an appropriate selection from the different strategies that they possess – and the challenge for teachers is to provide opportunity to develop these strategies. Hattie (2009) suggests that good teachers challenge students, they teach skills of thinking and know their subject.

There are many materials available for teaching thinking skills and thinking strategies. Dewey and Bento (2009) suggest that because of the recent interest in thinking skills, there has been an increase in the number of thinking skills packages available – but many of these are not based on scientific evaluation. Burke and Williams (2008:104) state that in fact, it is:

> 'difficult to ascertain' clear messages from thinking skills evaluation, since many do not incorporate intervention-specific or standardised measures, and, because of the diversity of approach comparisons are difficult'.

The term 'metacognition' in particular may be misunderstood or its potential undervalued by classroom teachers. Indeed, the Welsh Government also acknowledges that this may be an issue within the education system in Wales. They state that there remains a need to extend materials and promote their use more effectively (WG,2014). In order to help teachers select appropriate materials to teach thinking, Burke and William (2008) suggest that it would be useful to identify pedagogical features common to thinking skills approaches, and evaluate the benefits of these features when they are integrated into teaching methodology.

Through my review of the literature, it has become apparent that many approaches to teaching thinking have an emphasis on:

1. collaborative talk and collaborative learning

2. the importance of active involvement
3. the inclusion of appropriate challenge, and
4. the encouragement of metacognitive approaches.

Adey (2012:211) indicated that whilst there are many approaches to teaching thinking, some 'have failed to show any convincing evidence of an effect'. Within the context of this thesis, there is not scope to explore many of the approaches to teaching thinking in detail, and so two will be discussed in more depth, and with evaluation of the evidence underpinning their effectiveness – Cognitive Acceleration (CA) and Visible Thinking Routines. Adey (*ibid*) suggests that there is a more sound empirical evidence base for Cognitive Acceleration (*eg* Adey and Shayer, 2011) than for many other approaches. Within my study, Cognitive Acceleration will be considered because of its clear connection to the work of Piaget and Vygotsky. The second approach - Visible Thinking Routines (Ritchhart *et al*, 2011) are discussed because these became a key tool within the intervention, and are firmly rooted in an infusion model within a social constructivist framework.

2.2.5a Cognitive Acceleration (CA).

Certain interventions identifying metacognition as a key element and therefore arguably teaching and modeling metacognitive strategies, have been used successfully with young children, and these include cognitive acceleration (CA). 'CA' is a generic term encompassing a range of intervention programmes each suitable for specific ae ranges, from early years to secondary school. CA materials can be found in a range of subjects, such as science and maths, but also with materials for the early years which are more holistic in nature. All CA materials share certain principles: there is an emphasis on social construction of knowledge, they challenge learners to think, and they encourage metacognition.

The literature reports promising results relating to the impact of CA on long-term achievement, across, for example certain GCSE subjects and standardised tests(Adey *et al*, 2002). There have been numerous empirical studies into CA, and these are extensive, detailed and span over thirty years

(Adey and Shayer, 2011). There is a significant evidence base, and meta-analysis shows a mean effect size of 0.61 (Trickey and Topping 2004, in Higgins *et al*, 2005), and Hattie reports effect sizes of 0.60+ for CA approaches (Hattie, 2012). Cognitive acceleration programmes have also been successfully adapted to educational contexts in countries outside the UK such as Finland, Australia, China, Ireland, Finland and the USA (*eg*, Oliver and Venville, 2017).

Of particular relevance to this thesis is the work of Shayer and Adey (2002) who, based on empirical studies, argued that there is already a differential between children's potential and their achievement by the age of 5 years. CA materials were developed and designed for use with this age group to attempt to decrease this differential. Because primary teaching is generally less specialized than in the secondary school the materials were designed around general mental abilities such as classifying or sorting, rather than for a subject context. The premise of this approach is that it is valid to consider that there is some form of general cognitive processing function in children; this function develops with age and this function is influenced by the environment as well as maturity. Adey *et al* (2002) reported success in terms of learning gains when using the cognitive acceleration materials 'Let's Think' with 5-6 year old pupils.

The work of Piaget and Vygotsky has influenced CA significantly. Collaboration in learning can lead to gains for all participants in a task, as long as the teacher is aware of the fact that the concept of acceleration needs to be balanced by what is developmentally appropriate for a child at any given moment. It is important to consider the appropriateness since Piaget (1950) also suggests that whilst pedagogical intervention can speed up development, each time a child is taught a concept prematurely, this may act to prevent true understanding.

This is because the child has not invented the understanding for himself, and so may not truly understand it (Muller *et al*, 2009). Indeed, Muller *et al* (*ibid*) argue that young children cannot distinguish between the content of thought, and thought processes themselves.

The benefit of the CA materials is that they are designed to boost transition from concrete to formal operations, but in a supportive manner – through careful teacher scaffolding, social interaction and appropriate challenge.
In this way, knowledge moves from the social to the individual – rather than from the individual to the socialised (Alexander, 2008). Adey and Shayer (2011:18) suggest that the structure and principles (or pillars) of a CA lesson are interrelated:

> 'In practice it is the cognitive conflict that generates the social construction and it is the process of exploring explanations through dialogue which maintains the cognitive conflict. Metacognition is another opportunity for social construction and it, too, brings its own quota of cognitive conflict. Interestingly it is sometimes the more able students, for whom it is difficult to generate cognitive conflict, who find difficulty with the process of explaining how they learned something, or how they solved a problem. "I just did it", "It's obvious" are typical responses.'

Oliver and Venville (2017) suggest that the success of CA approaches is due to the cognitive challenges that are set, the pedagogy that drives the discussion and metacognition – they suggest that these strategies together improve student reasoning.

However, this opportunity to discuss and develop understanding through social construction may be challenging to achieve in practice, and, as mentioned earlier in the chapter, numerous studies have commented upon the difficulties of developing exchanges that contain high quality of adult-child interaction (*eg* Robson and Hargreaves, 2005). Certainly Adey and Shayer (2011:18) provide words of caution – CA materials are not simply 'a set of print and IT resources which can be bought as a package and implemented without thought'. From this brief summary it is clear that many of the important themes already discussed in this chapter are present within this CA approach.

Metacognition is an explicit component to be modeled and emphasised by teachers when using CA interventions, and again, the literature suggests key challenges with defining and understanding this concept. CA offers learners the chance to think deeply and reflect carefully on the process of learning that has happened in the lesson, and to consider ways to improve.

Importantly, this approach supports the principle that young children, when in a learning environment which promotes challenge and collaboration can improve their thinking. This is a central tenant within my own research.

2.2.5b Visible Thinking Routines

The second approach that I wish to discuss in more depth relates to materials known as Visible Thinking Routines (VTRs) (Harvard Project Zero 2007; Ritchhart 2002; Ritchhart *et al*, 2011). Routines are a part of everyday classroom life – teachers develop routines for lining up, for answering questions, for having snacks. These are designed to support children become part of an accepted classroom culture. Katz and Chard (2000) indicate the importance of routines as a way to engage young minds to strengthen their intellectual dispositions. In the same way, VTRs can help develop children's ability and inclination to think. VTRs provide a useful structure for teachers who want to develop effective thinking in their settings (*eg* Salmon, 2010).

VTRs are tools designed with the overriding goal of encouraging, involving and supporting thinking. The use of VTRs develops children' thinking through a process of enculturation - by immersing children into a rich environment of thinking. In such a culture, thinking is valued and given time, rich opportunities for thinking exist in their day-to-day classroom experience and models of thinking are present in the form of seeing teachers and peers as fellow thinkers. This approach shares similarities with researchers such as Schwartz and McGuinness' (2007:21) who suggest developing school environments to be 'thinking classrooms'. Such thinking environments not only provide for the practice of children' thinking skills but also help them tofoster an inclination toward thinking and to develop a greater awareness of thinking.

Salmon (2008) found that the use of VTRs promoted thinking dispositions in children and allowed the teachers opportunity to engage their students' minds in ways that strengthened their thinking dispositions. This, suggests Salmon (*ibid),* was achieved because the VTRs were flexible, and allowed

the teachers to respect children's interests, needs and developmental characteristics.

But these environments are challenging to establish. Ritchhart *et al* (2011) has critically explored Bloom's Taxonomy (Bloom *et al*, 1956), stating that this model is often the only resource used by teachers when they are asked to consider what kinds of thinking they develop in their classes.
Ritchhart *et al (2011*) argue that both the original and revised versions of the taxonomy have limitations when we are thinking about the nature of thinking in our classrooms. For example, Bloom's original model suggests that the ability to comprehend something precedes the ability to apply it. Both original and revised models suggest a linear progression from lower to higher order skills. Instead, Ritchhart *et al (ibid*) suggest that teachers would be better to think about the quality of thinking that happens within each process rather than between processes. Teachers should see understanding as the goal of learning, rather than one of the processes involved. As such, there are certain types of thinking that can be seen as very important, namely:

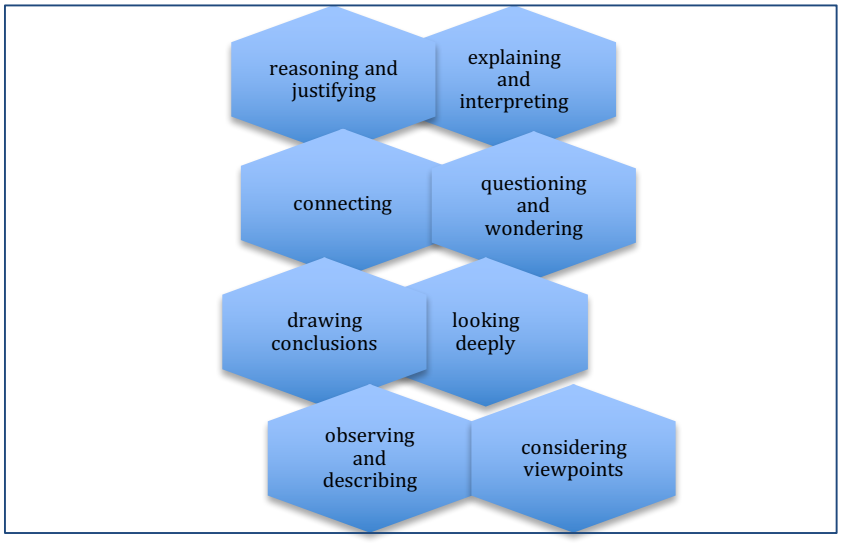


Figure 2.11 Key thinking moves (After Ritchhart et al, 2011)

The development of understanding is the basis of VTRs. The use of VTRs creates patterns of learning and thinking that become part of the intellectual character of a child (*eg* Perkins, 2003). Each routine is aimed at developing specific thinking processes, such as making connections or comparisons,

providing explanation, considering different perspectives or justifying an opinion. These routines act as scaffolds for children, and typically consist of a series of questions and prompts.

VTRs have a few, clear steps so that they are simple to embed into practice. To become 'routine' they need to be used frequently, and the intention is that children will use them quickly and almost automatically. Once embedded, these routines can be transferred to situations beyond the classroom, and applied to many aspects of daily life.
Furthermore, routines can help foster high quality classroom conversation since they provide structure and make the thinking visible to the learner and the teacher (*eg* Salmon, 2008; Ritchhart, 2011). The routines have been shown to develop positive attitudes to thinking, and to support quality interaction (*eg* Project Zero, 2007; Wolberg and Goff, 2012). Some of the key principles underpinning TRs include:

- they are easy to teach
- they are specific to particular types of thinking
- they easy and quick to use, and easy to learn so that children can use them with increasing independence within day-to-day activities.
- they are flexible enough to be used across many themes
- they are adaptable, to meet the needs of children of all ages and stages of development.
- they act to help establish a structure to classroom dialogue – guiding (but not forcing, leading or dictating) the discussion.
- they enhance children's cognitive development.
- they raise children and teachers' awareness of the thinking processes that happen during learning.

Although during my study visit to Project Zero in 2011, I was able to hear firsthand about the experiences, and associated enthusiasm for VTRs amongst the staff and teachers (over 250 of us, from over 30 countries) the evidence base regarding the use of VTRs in the UK is limited. The underpinning principles of the social construction of thinking fit within my

overarching theoretical framework. As such I wanted to include them in my research to be able to evaluate them as a novel, and appropriate resource.

Furthermore, the research suggests that bringing a thinking skills approach into classroom practice may also have a positive impact on teachers' pedagogy (*eg* McKinsey and Topping, 2003; Dewey and Bento, 2009). This may be related to the use of the materials encouraging teachers to become increasingly aware of their practice, and to begin to teach thinking more explicitly. Leat (2010) suggests that the nature of different types of thinking skills materials may promote certain professional development.

For example, a premise of thinking skills teaching is that there is increased collaboration and listening – and this focus may influence teaching styles. The approach of making thinking visible is also beneficial for teachers, Barahal (2008) suggests that if teachers create a culture of thinking, they revisit their own beliefs about and understanding of thinking. Furthermore, when teachers think about thinking, their teaching style tends to be more child centered. This leads to consideration of what is known about teacher professional learning and development.

2.3: Teacher's professional learning and development

As has been made clear in the previous sections of the chapter, within the context of this thesis, the role of the teacher is important to consider. This is because teachers are not simply responsible for delivering 'a curriculum' model. They interpret the curriculum, they develop it and shape how it is delivered in their classrooms. Teachers have their own thoughts, values and belief systems which impact upon their own practice, and Alexander (2008:4) defines pedagogy as 'the act of teaching together with the ideas, values and beliefs by which the act is informed'.

Therefore, whilst the teaching of thinking may be something that is expected within Welsh educational policy, how individual classroom teachers implement this in practice is likely to be different depending on individual's interpretations. Hargreaves and Fullan (1992) suggest that the way teachers teach is determined by skills, but also by their personal background, opportunities and aspirations. Understanding this is important, because the

evidence from the research literature seems clear - good teachers really do make a difference (*eg* Sutton Trust, 2015).

Becoming a good teacher suggests that teachers as well as children need to remain open to learning - and Timperley *et al* (2007) suggest that teacher learning can have a sizeable impact on student outcomes. Of particular relevance to this thesis is the finding that professional development for the early childhood workforce has been shown to positively influence the quality of early childhood classrooms (Linder *et al*, 2016).

Here, what is known about effective teacher development is considered. Ongoing teacher development is seen as an important element of professional practice. Historically, teacher development opportunities have been criticized in terms of their perceived effectiveness. In 2001, Lord Adonis commented that:

> 'for most teachers, professional development has traditionally been haphazard, off-site, barely relevant, poorly provided, and a chore at best' (p14).

Rather, several types of development activity are identified in the literature as having potential regarding effectiveness, however certain types – such as coaching and immediate feedback - may have more impact than others on student outcomes (Joyce and Showers, 2002). Indeed, many teachers report a disconnect between their professional development opportunities and their own classroom practice, and Borman (2005) found little evidence of professional development impacting on classroom practice. The duration of professional development courses may also impact on the depth of teacher change.

Garet *et al* (2001) suggest that the professional development of many teachers does not improve their classroom practice because it is often delivered in a 'one-shot' workshop – which has little impact on standards of teaching and learning. Such courses are often not followed up with any further input or support, and the design of the courses can be fragmented, or lack coherence (Parsad *et al*, 2001).

2.3.1 How do we support teacher development?

In order to support professional learning and development, Fullan (2009) suggests that developing learning cultures amongst teachers is essential – he emphasises the importance of developing a climate where people are able to learn from one another in order to put knowledge into action. Hargreaves and Shirley (in Fullan, 2009), also indicate key principles that are necessary to sustain meaningful change. These include high quality, highly trained teachers and lively learning communities, which foster cultures of collaboration.

Cooper (2013), suggests that an appropriate model of teacher development involves four key elements, which take into account adult learning and research into effective development. These are illustrated in Figure 2.12 which follows:

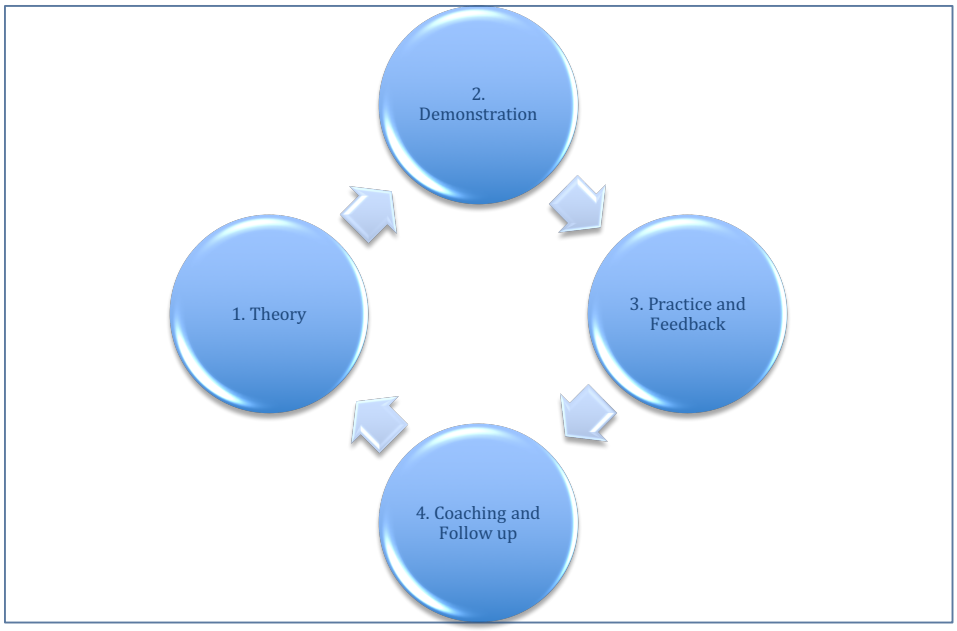


Figure 2.12 Aspects of effective teacher development, adapted from Cooper (2013)

Cooper (2013) argues that development opportunities need to involve the teachers being exposed to evidence-based theory in the area of practice they are seeking to develop. They should then have the chance to observe examples of good practice before trying these out in their own contexts. They should then receive feedback on their practice. Coaching and discussion should follow this – ideally with colleagues as well as the trainer. According

to Joyce and Showers (2002), this final stage is the one most likely to lead to sustained change in practice. However, in this model, the trainer seems to take most responsibility for delivering feedback and there is no reference to the role of the teacher. Furthermore, there is limited evidence of the impact on student outcomes from teacher development models based on observation by external trainers (Coe *et al*, 2014).

On the other hand, Clark (in Hargreaves and Fullan, 1992:76), uses the metaphor of teachers as 'designers of their own professional development', because they need to plan, sketch, select, refine and rearrange the 'furniture of the mind'. This view acknowledges the voluntary nature of professional development, and the importance of the teacher as being an active participant in the process of their own professional learning.

Timperley (2008) reviewed research into teacher development, and summarised some key advice regarding principles underpinning effective teacher development. Amongst these principles are:

- the importance of teacher development taking place within a climate of trust and challenge;
- the importance of focusing development on integrating knowledge about the curriculum with how to teach (and assess) this knowledge effectively;
- involves expertise external to the group to challenge assumptions and develop new knowledge and skills.

Action research as an approach is seen by some as a process of 'self-reflective enquiry undertaken by participants in social situations in order to improve…their own practices, their understanding of these practices' (Carr and Kemis, 1986:8).

However, review of the literature demonstrated that the concept of 'reflective practice' is a complex one, which will now be explored.

2.3.2 Reflective practice

The need for teachers to reflect upon their own practice, has long been acknowledged as an important aspect of teaching and development. It is generally agreed that reflection is an important element of improving the

capacities of teachers (*eg* Day, 1999). Shulman (2007) refers to the 'wisdom of practice' that practitioners possess - the ability to reflect on and reason about their own teaching, which leads to them taking action to improve. One of the most influential researchers in the area, Schön (1983), refers to a number of key ideas relating to reflection. Table 2.2 identifies these key ideas:

Key idea	Description
Technical Rationality	Teachers act as technicians, working in schools, which are worlds of practice. Reflection can help us value and use the type of knowledge that is embedded in these worlds.
Knowing-in-action	Our knowledge is reflected in what we do, how we teach and is revealed through action. It is often tacit – and difficult to articulate. This connects to Schön and Argyris' (1992) model of espoused theory and theory-in-use (*ie* what we say or what we want to do compared to what we actually do).
Reflection-in-action	This is reflection in the midst of action. We interpret the situation and make decisions as to how to proceed. This type of reflection determines what we will do next.
Reflection-on-action	This refers to reflection after the event. It is 'deliberate, conscious and public' (Ghaye and Ghaye, 1998:5) and may result in changes to professional knowledge. It is a research process, designed to improve future practice.

Table 2. 2 Types of reflection, after Schön, 1983

My study focused primarily on reflection-on-action. However, Moyles *et al* (2003:149) comment that teachers often do not think about their teaching in a reflective manner at all. Moon (2000) warns us that whilst many teachers do reflect on their practice, few do so in a manner that is deliberate or which informs and develops their teaching. Effective reflection should lead to transformation of practice not just examination of practice.

Larrivee (2000:296) comments on the challenges facing teachers in order to achieve this. She says that they need to be able to move in many dimensions and manage many dilemmas. Key to development is the need to become critical – and effective reflective practice means teachers 'challenge assumptions and question existing practices'. This is a continual process but cannot be prescribed. Figure 2.13 which follows, shows Larrivee's cycle of reflective practice which leads to transformation.

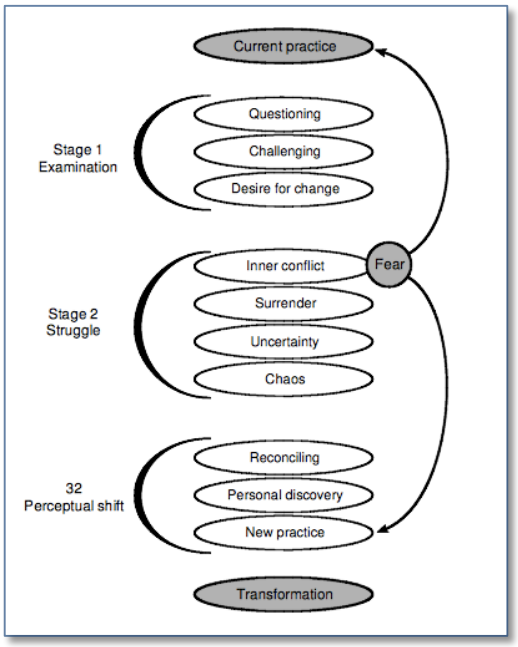


Figure 2.13 Stages in the critical reflection process (Larivee, 2000:305)

This cycle includes aspects of examining one's own practice, experiencing conflict and fear, and making a shift as a result of this to new practices.
Of course, the second stage of struggle may prove too challenging, and teachers may find themselves remaining with their existing practices. The art of reflection requires teachers to be aware of the events that are occurring, and to be willing to consider these in depth. One of the key components of reflective practice is an assumption that we can be critical of our own teaching (Coats, 2015). Teachers of course, cannot be forced to reflect effectively upon their practice, but also, as noted by Sherin and Van Es (2003:93) there is a limit to a teacher's ability to transform a situation if they do not notice what is important.

They argue that there is an issue in how teachers are supported in their professional development, suggesting that 'teacher education and professional development generally focus on 'learning to do' rather than 'learning to notice'.

It could therefore be argued that it is difficult to improve if you are unaware of the improvements that need making. Day (1999) suggests that when reflection is done individually there is a limit to the objectivity of the reflection.

Reflection can be influenced by how an individual views themselves as a learner, and involves the ability to recall, re-evaluate and revise our own performance honestly (*eg* Cranton and Carousette, 2002). It might be the case that teachers are unaware of their existing pedagogy, and how to align more closely with recommended effective practices. Of course, there may be other explanations, but within the scope of this thesis the concept of awareness is important.

Ghaye and Ghaye (1998) suggest that reflection-on-action is a discourse – a conversation, enacted by critical thinkers who are engaged in enquiry. These reflective conversations may be private conversations with the self initially, but they then need to become public. This might involve discussing reflections with a knowledgeable other (*eg* mentor, coach, peer, guide). These should enlighten and empower the teacher, assisting them to question and develop their practice. Zwozdiak-Myers (2012:98) suggests that such 'learning conversations' should be a 'planned, systematic approach to professional dialogue.' Dialogue in reflective practice requires the teacher to be willing to distance themselves from their day-to-day practice, and allow themselves to be influenced by others (Day, 1991).

Kennedy and Landor (2015) stress the success of their model of Video Enhanced Reflective Practice depends on the both skills of the guide and the teacher – both must be willing to learn from the experience. Jarvis and Lyon (2015) support this view and comment that in reflective dialogue situations, the quality of the relationship between mentor and teacher is essential if practice is to develop. The next section explores how the development of reflective practice can be supported.

2.3.3 Collaboration and teacher development

Having noted the importance of reflective practice, and some of the challenges that are identified in the literature, Moyles *et al* (2003:4) describe a tool that allows 'an opportunity to reflect with a knowledgeable research partner on one's own teaching'. This is known in this thesis as Video Stimulated Reflective Dialogue or VSRD. Video itself is long recognized as an appropriate tool to help teacher development. Historically, its use has

been to inform the understanding of researchers rather than the participants, but within the literature there is increasing reference to the use of video to also promote reflection amongst participants.

One particular strength is that video can act as a method of presenting teachers with alternative (and sometimes contradictory) images of themselves in the classroom. This may act to challenge their current conceptions (Haw and Hadfield, 2011). It allows a teacher the chance to 'look back and make sense of practice' (Ghaye and Ghaye, 1998:2) and to 'embrace the dissonance' (Snoeyink, 2010:102) between what they think or remember happening in a lesson, and what they can later observe happening. Video allows the teachers the chance to pause, rewind and replay their lesson, and it preserves the verbal and non-verbal elements in an interaction (*eg* Quigley and Nyquist, 1992). Kennedy and Lander (2015:24) see video as a tool that acts as a 'retrospective mirror', and Wels (2004:52) indicates that the video allows an individual to confront himself or herself – with the video acting as a 'neutral messenger'.

Whilst Larrivee (*ibid*) suggests that time for personal, individual reflection is very important, she also indicates the importance of gaining multiple perspectives – from colleagues and learners in order to expose and re-examine beliefs, assumptions and expectations. Lipponen *et al* (2015) suggests that visual methods – in her case photographs – are both participatory and practical to use with young children.

Using these as a stimulus for joint reflection provided a scaffold for discussion. This process of encouraging children to discuss and reflect upon their thinking using the video may also support their cognitive development.
Von Glaserfeld (1995) suggests that reflection on mental operations may result in the individual becoming more aware of their thoughts and changes in knowledge. Robson (2010) suggests that using video to support children's reflection is both a valuable research tool but also a useful stimulus for pedagogical purposes since it acts as a stimulus for discussion.

Hargreaves (in Hargreaves and Fullan, 1992) suggests that teachers learn a great deal about their practice from both students and colleagues. He refers to ‘cultures of teaching’, whereby the culture carries the ‘communities historically generated and collectively shared solutions’ (1992:217). Collaborative planning and dialogue amongst colleagues are also seen as being important factors in effective professional development. For instance, when individuals engage with others in close observation of teaching and student work, they are more likely to improve their own practice (*eg* Hord, 1998 in Steiner, 2004; Lieberman, 1996). This depends on creating the right kind of culture for this kind of engagement.

Hargreaves (1992), distinguishes between different types of teacher culture, from individualism to collaboration. Establishing a collaborative culture amongst the participants in my study was an important element of my study, as Day (1999) suggests that the move from descriptive to critical reflection happens when there is opportunity to systematically discuss the practice with another person acting as mentor or critical friend. Researchers such as Day (1999) and Muir and Beswick (2007) suggest that there are different levels of reflection that can take place, which move from descriptive to critical forms. These are illustrated in Figure 2.13 which follows:

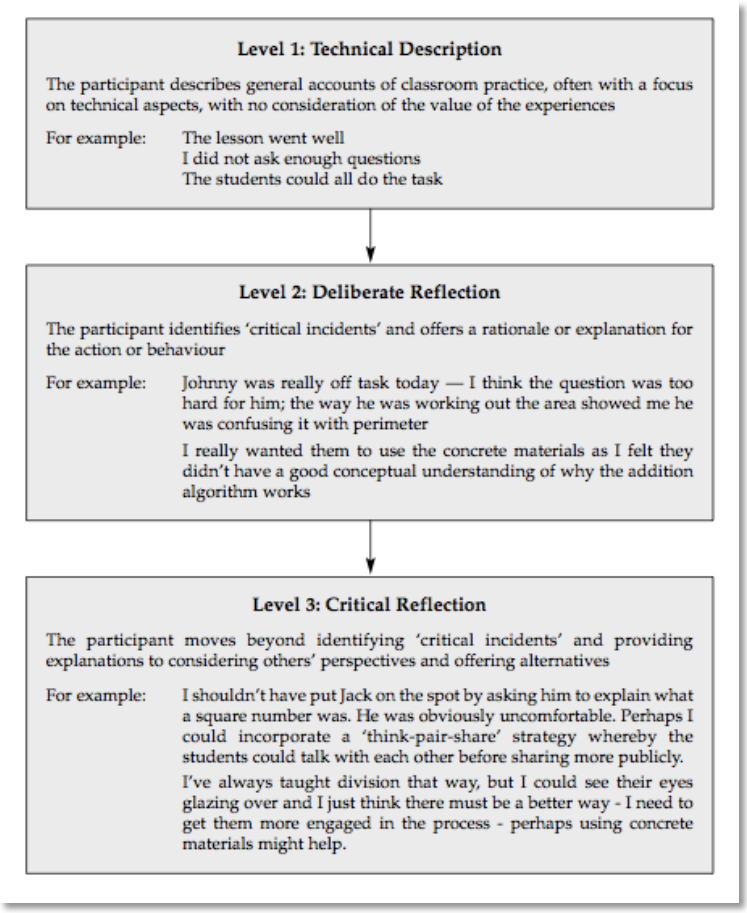


Figure 2.14 Levels of reflection from Muir and Beswick (2007:79)

There is also evidence within the literature to suggest that professional learning opportunities are more successful if they take place in or close to the teacher's own working environment (Lovitt and Clarke, 1988) and is viewed by the teacher as part of their teaching – not an additional responsibility (Darling-Hammond and Sykes, 1999).

My own values, beliefs and prior knowledge and experience also shaped my research. Such self-awareness (Giddens, 1976) or reflexivity can be understood in a variety of ways depending on the theoretical or methodological tradition of the research (Lyngsnes, 2016). It calls for honesty and ethical maturity in conducting research so that researchers `stop being "shamans" of objectivity' (Ruby, 1980:154). As such I acknowledged my role in the research process, and the values and beliefs that I brought to it. I used the literature review to shape my research questions but am aware that what I read, and how I interpreted this reading was a personal interpretation.

In Chapter 3 I explain how I designed a study where I tried to ensure that my voice was not the only one being heard – I wanted the design to reflect a co-research framework and I also reflect further on my own reflexivity and position within the research design.

Chapter Summary

This chapter reviewed the literature in three key areas: what is meant by 'thinking skills' and 'metacognition', approaches to teaching thinking and teachers' professional development. Section 2.1 highlighted the lack of consensus over defining thinking skills and metacognition, but that their central role in influencing learning and achievement in school and beyond is widely acknowledged (*eg* Boekaerts and Cascallar 2006:199). While there is evidence in the literature that thinking can be taught, there is also debate regarding how and when metacognition emerges. For this thesis, these debates helped me to formulate one of my research questions – namely Research Question 3: 'To what extent did children in the study demonstrate development in their awareness of thinking?'

Section 2.2 focused on key approaches to developing thinking that shaped my research design, notably the infusion model, cognitive acceleration programmes and Visible Thinking Routines. I found support in the literature relating to Cognitive Acceleration for the idea that children could be taught explicitly to think, and could be accelerated in their development if the opportunities provided were appropriately challenging, social and metacognitive. I also identified Visible Thinking Routines as a set of flexible materials that aim to support a culture of naming, noticing and discussing thinking to make it visible to learners. I also identified a gap in terms of the evidence relating to the use of these routines within the UK. In this study, as detailed in chapter 3, teachers were encouraged to use, adapt and reflect on VTRs (Ritchhart *et al*, 2011) as tools to promote thinking amongst the children in their classes because these were based on scaffolding thinking, and thus fitted with my overarching theoretical framework.

This shaped the development of another of my research questions – namely Research Question 1: 'How were Foundation Phase teachers in Wales teaching thinking?'

In Section 2.3 the importance of sustained, collaborative professional development was noted. The research literature suggests that this model may have more impact on teaching and learning (*eg* Loucks-Horsley *et al*, 1998; Askew *et al*, 1997) than models of one-off training. On reflection, there were elements of contrived collegiality, in that some of the teachers had not chosen to join the project – they had been directed to it. Each teacher came from a different school and so the development of the collaborative culture was not initially evolutionary. However, it became apparent as the research developed that there were opportunities for a collaborative culture to develop – and this is discussed more in Chapter 4/5.

This shaped Research Question 2. 'How did the teachers involved in the study develop in their teaching of thinking through the course of the intervention?' I also wanted to know whether the intervention I designed had impact on the children and so asked Research Question 4: 'What was the impact of the intervention on children's performance on a limited number of standardised tests?'

Finally, the importance of reflection by the participants (teacher and pupil) and the reflexivity of myself, as the researcher, were discussed. How I went about designing the study is discussed in the following chapter, Chapter 3.

Chapter 3
Methodology and Research Design

Introduction

This chapter outlines and justifies the theoretical framework and the research design that I selected and developed. The chapter is divided into three main sections: Section 3.1 refers to the ethical considerations that I made throughout my research. Since this research involved working with teachers and young children, I wanted key principles relating to ethics to be a part of all aspects of the study, not just a process to be considered prior to the data collection. This is because, otherwise, there was the risk of 'compartmentalizing ethical aspects of research, and shutting them off into a preamble to research.' (Shaw, 2008:403).

Section 3.2 considers the theoretical framework I adopted, and so refers to the philosophy and paradigms underpinning my research. These framed and informed all aspects of my study, and this section will make my stance clear. I had to understand how my own values and beliefs shaped my enquiry, and also consider how best to ensure that the right tools were designed and used within the study. It is important to acknowledge that all research takes place within a context that shapes the way that studies are planned, implemented and evaluated. The research process is unavoidably influenced by the attitudes, beliefs and values held by the researcher and the research community within which they operate (*eg* Hughes, 2008; Cohen *et al*, 2011). For the research in this thesis, for example, it is important to acknowledge that I hold personal beliefs regarding the capabilities of young children, and a personal perspective on the nature of learning. These beliefs shaped the research that I conducted, and the interpretations that I made. So, whilst it is important to consider the methods that I chose, it is also important to acknowledge the frames within which these operated, making them transparent to my audience.

Discussion of the theoretical framework that I adopted should therefore provide an explanation of the research position I took, which will then be used to provide justification of the methodology used, the research design and the tools selected in the study.

Section 3.3 considers the tools I selected and the reasons why I felt that these were appropriate to answer my aims and research questions. This section discusses these decisions and provides justification for them. To recap from Chapter 1, I had two key aims for this project – firstly to explore the nature and extent of young children's thinking, and secondly to better understand the pedagogical practices teachers use to effectively support the teaching of thinking. To explore these aims, I devised the following research questions:

1. How were Foundation Phase teachers in Wales teaching thinking?
2. How did the teachers involved in the study develop in their teaching of thinking through the course of the intervention?
3. To what extent did children in the study demonstrate development in their awareness of thinking?
4. What was the impact of the intervention on children's performance on a limited number of standardised tests?

In order to answer these questions, a number of decisions regarding the nature of methodology and research tools had to be made. Overarching all of my study was consideration of how I would behave ethically as a researcher. Section 3.1 discusses the ethical considerations that I made.

3.1 Ethical Considerations

I wanted to ensure that quality, integrity and impartiality characterised my research. To do this, I referred to the BERA Ethical Guidelines (2011), and the University of Wales Trinity Saint David guidance on ethics throughout the research. The BERA guidelines are set out under four headings:

1. 'Responsibilities to Participants
2. Responsibilities to Sponsors of Research
3. Responsibilities to the Community of Educational Researchers
4. Responsibilities to Educational Professionals, Policy Makers and the General Public' (BERA, 2011:5).

3.1.1 Responsibility to participants:

Respect for the individuals taking part in the study was an extremely important value underpinning my research design. Because the project involved adults and children, some of the strategies that I used differed between these groups, although when working with all participants especially when on a face-to-face basis, I wanted to make them feel at ease.

The issue of informed consent was one key consideration. Although Oliver (2003) suggests that informing people of the purposes of research may influence their natural behaviours, I ensured that all participants were clear about the research aims, to avoid any deception. Those who responded to the questionnaire were made aware that they were free to choose to participate. This was made clear in the covering letter that was sent with the questionnaire. I interpreted the action of returning a completed questionnaire as indication of respondents having consented to take part in the study.

Some specific ethical issues related to the use of questionnaires – for example, whether the questions actually provide respondents with a voice – rather than promoting the researcher's agenda must be considered. If questions are not neutral it is possible for bias to creep into the results (*eg* Cohen *et al*, 2011). As such, a pilot questionnaire was develop, analysed and subsequent refinements made, before sending out the finalized version. The piloting process itself can also be considered a limitation, with regard to the time required to develop, pilot and refine the questionnaire (Cohen *et al,* 2011), as well as the consideration that must be given to how flexible responses can really be. However, I felt that it was an important element of my research design as I wanted to ensure that the questionnaire that was sent to FP settings was clear and fit for purpose. The questionnaire design and piloting will be discussed more thoroughly in Section 3.

The questionnaire included my contact details, and so any teachers who wished to get in touch with me were able to. Respondents to the questionnaire did not have to provide information about themselves or their school or setting.

For teachers in the action research phase, gaining consent involved giving a handout with a summary of the project and a letter to explain who I was, and what I hoped to achieve. The teachers were also made clear about the processes that they were going to be involved in before we got underway. They were made aware that they could ask questions about the project at any time, and that they were free to withdraw at any time with no need for explanation as to why. The action research phase involved teachers being videoed, and completing reflective journals. I was keen to ensure that these materials remained the property of the individuals concerned. These were not shared amongst the group (or other members of staff/ wider audience) unless the individuals wanted to do this, and the purpose of the materials was made clear – these were not for staff appraisal or related purposes within the school. The teachers were made aware that they did not have to agree to be videoed, nor were they required to complete the reflective journals – as I was aware that this may have been seen to add to their 'bureaucratic burden' (BERA, 2011:7). They were informed about how I would analyse and write about their contributions, and who would see this information. I also met with any additional adults working in the classroom settings so that I could explain the project to them and ensure that they were willing to be in the classrooms when I was observing and the children were making videos.

Anonymity within the parameters of the study were discussed – for example, the teachers were made aware that I would give them pseudonyms so that they could not be identified as individuals within my thesis. I made it clear that my findings may be disseminated within the research community; I also explained that this dissemination would not identify schools or individuals. However, I also considered Walford's (2005) work – he suggests that some participants in research may actually wish to be acknowledged.

For example, in the current Estyn Common Inspection Framework (Estyn, 2010), schools can be recognised as 'sector leading', and I was aware that for some teachers, involvement in the project could be valuable for their own development and that of the school. One teacher, for example, wanted to work with me to do a presentation about her findings as part of her leadership role within the school.

As such, whilst I maintained the anonymity of each individual when I wrote up my thesis, and offered all participants the opportunity to remain anonymous, the teachers were able to ask to be identified in other types of dissemination if they so wished.

Because of my research design, the action research participants were invited to attend network days where we reflected upon the project. Whilst no teacher was required to share their personal experiences, they were encouraged to discuss and contribute when they felt comfortable doing so. During these discussions, whilst we could not be anonymous, the group understood that the content was confidential, and only to be discussed within the meeting. At the end of the action research phase of the project there was a debrief session, and copies of any publications or presentations (*eg* JURE, 2012; EECERA, 2016) were made available to the action researchers. They were offered the opportunity to read the final copy of their own personal journey (but not those of others) during the course of the project, and their comments were sought as a valuable aspect of co-research.

Confidentiality also extended to the other types of data being collected *eg* children's test scores. Data was stored on password-protected devices, and no school or individual could be identified within the data once it was analysed. The participants were also aware that they could ask to see any of the data that related to them at any point in the study.

The other participants in my research were the children, and when working with children, BERA offers clear guidance relating to their rights as individuals:

> 'The Association requires researchers to comply with Articles 3 and 12 of the United Nations Convention on the Rights of the Child. Article 3 requires that in all actions concerning children, the best interests of the child must be the primary consideration. Article 12 requires that children who are capable of forming their own views should be granted the right to express their views freely in all matters affecting them, commensurate with their age and maturity.' (BERA, 2011:6).

The issue of voluntary informed is more complex when working within the parameters of a project that involves young children. The United Nations Committee on the Rights of the Child has stated that:

> "it is not necessary that the child has complete knowledge of all aspects of the matter affecting her or him, but that she or he has sufficient understanding to be capable of appropriately forming her or his own views on the matter" (2009:para 21)

I wanted to ensure that my research gained appropriate consent. Because young children may not understand the research, or be in a position to sign a consent form, some research may tend to rely on adults to give consent on children's behalf. So, firstly I gained permission from both the schools and parents to work with the children. I went into schools and discussed the study with the head teacher and participant teachers. A letter was sent out to parents, introducing myself and outlining the project. This informed them of the focus of my study and that I would be working with teachers and children, and that videos would be made. I invited them to contact me to ask any questions that they might have. Parents were asked to provide written consent for their child to participate by returning a signed form to agree to their child being involved. Only one parent refused permission for their child to be videotaped and this was something I was aware of and respected when I visited that school. This meant that this child did not feature in any of the films that were made.

Key principles relating to the gaining of consent were important for both adult and child participants in my study. However, I acknowledged that this might look different in practice (*eg* Mukerji and Albon, 2010). Roberts-Holmes (2011) warns that the inevitable power dynamics between children and adults means that there is a significant barrier in place regarding the collecting of evidence in any study involving young children.

Because my view of the child is that they should be active participants with the right to have their voices heard in the research I felt that a view of them in the process as 'competent but vulnerable' (Lahman, 2008:285) was appropriate.

I wanted to gain consent from the children themselves as well as their parents – I felt that children and adults needed to be afforded equal consideration in the research. I was aware that in some research with young children, they are asked for their 'assent' or willingness to take part, rather than to give 'informed consent' (*eg* Dockett and Perry, 2011).

Whether the term consent, or assent is used, the principle underpinning this concept rests upon giving participants access to appropriate information, ensuring voluntary involvement and taking a 'moment-by-moment' approach (Langstone *et al*, 2004) in negotiating involvement. In other words, with young children:

> 'informed consent should be regarded in terms of ongoing negotiation as opposed to something that is agreed to purely in advance or 'achieved' (Albon and Rosen, 2014:6).

Therefore, I needed to make sure I explained the study to the children in a clear and understandable manner. I met the children who were going to be involved and explained in appropriate language what I was interested in finding out about, and what I was going to do. I expressly informed them that 'I will always ask you if you want to join in. You don't have to and you can change your mind whenever you want to.' This was done on an on-going basis, every time I visited the school. The observations that I made were part of normal classroom practice. Had any child wished to withdraw I would not have asked them why, or tried to persuade them to stay.

Mukherji and Albon, (2010:38) argue that a researcher working with young children also needs to be aware of subtle signals from children that may suggest that they are giving or withdrawing consent. Such signals may include becoming very quiet or turning away from the researcher – and adults should remain aware of these signals. Therefore, non-verbal cues suggesting that a child may not wish to participate were something that I looked for throughout my data gathering visits.

I also wanted to consider how I was going to listen to the children effectively, and encourage participation. I wanted to enable them to share their perceptions and ideas about thinking.

It is also important to appreciate the distinction between being involved in a project, and participating in it. Involvement is not necessarily the same as participation. Within research contexts with young children, Alderson (2000) breaks the broad term 'involvement' down further and defines three levels of involvement. There is the child as the 'unknowing object' of research, where their opinions and consent are not sought, and they may indeed be unaware of the research occurring.

The second level identifies the child as the 'aware subject', who is asked to consent to be observed or interviewed, but within adult designed and managed projects. Finally there is the situation where the child is an 'active participant', taking part willingly in research that has flexible methods, and where they are increasingly involved in the entire research process. Sinclair (2004) suggests that we need strategies to listen to children's voices when working with them, and in my project I wanted to encourage each child to be as active a participant as possible.

Finally, with regard to my responsibility to participants, I possess a valid and clear Disclosure and Barring Certificate (DBS) which I took to each school on each visit. In each school I visited I familiarised myself with the Child Protection Policy, and was aware of who designated safeguarding officers were in each of the schools I visited.

3.1.2 Sponsors:

There were no commercial or external sponsors of this research.

3.1.3. Responsibility to the Community of Educational Researchers:

Throughout my research, I aimed to 'protect the integrity and reputation of educational research by ensuring they conduct their research to the highest standards' (BERA, 2011:9). For example, I did not falsify findings, criticise the work of other nor intend to 'sensationalise' my findings in any publications.

Throughout my thesis, I aimed to make my data and methods clear and transparent. Ethics approval for my research was gained from the awarding institution's Research Degree Committee, in accordance with the procedures in place at that time (Appendix 1).

3.1.4. Responsibilities to Educational Professionals, Policy Makers and the General Public:

BERA (2011) guidelines suggest that researchers have a responsibility to make the results of their research public for the benefit of audiences such as the educational community. Appendix 2 contains a list of the publications and seminars and conferences where I have been able to disseminate some or all of my research. This has involved communicating in a manner appropriate for different audiences - students, peers, teaching professionals and the academic community.

3.2 Explanation and justification of my theoretical framework

In this section I argue that for my research, a mixed method, pragmatic approach was the most appropriate, and explain why I came to this decision. I considered it necessary to avoid being caught in a 'research rut' as described by Newby (2010:19). In other words, rather than being driven by a particular research paradigm or philosophy, it was important to select approaches and tools most suitable for answering the research questions. In adopting this standpoint, I have been influenced by researchers such as Clough and Nutbrown (2010) who consider research to be a 'creative' act – blending and mixing methods in order to best fit the research question. They argue that designing a research study is not simply picking methods from a list, but rather careful consideration needs to be given to the purpose of the study:

> 'for research is by definition a search for form quite as much and at the same time as it has any content to report: methods should be seen as being constructed (for particular purposes) rather than selected (for any general usefulness).' Clough and Nutbrown (*ibid*:18).

I realised that situating the study within a purely quantitative or qualitative design would not be advisable given the nature and scope of the research questions under consideration.

Furthermore, given my overarching socio-constructivist stance, I was aware that John-Steiner and Mahn (1996) suggest that researchers adopting this standpoint do not see a dichotomy between quantitative and qualitative research. Instead, they seek approaches that emphasise process and development and acknowledge the multiple ways in which both can be revealed.

I therefore took a mixed methods approach, positioned towards the qualitative, interpretative side, but where appropriate I also gathered quantitative data. I drew on a pragmatic philosophy to justify mixing my approach in a manner that best framed, and ultimately answered my research questions (*eg* Burke Johnson *et al*, 2007). Although Johnson and Onwuegbuzie (2004) warn that a mixed methods approach can be more time consuming and challenging for a researcher who has to become familiar with a number of methods, they also argue that the data that is collected can be superior to that collected using only one method. Teddie and Tashakkori (2009:16) suggest that mixed methods research is a useful approach – because it provides different types of data, and argue that 'in many instances both forms of data are necessary'.

A mixed methods approach has been taken by other longitudinal studies of young children, for example the Effective Provision of Pre-School Education (EPPE) project (Sylva *et al,* 2004; see Chapter 2). The research design for EPPE was mixed method, influenced by a pragmatic argument in which the authors suggested that 'mixed methods can offer complementary strengths and minimise the weaknesses associated with reliance on only one paradigm' (Sammons *et al,* 2005:221). Taking a pragmatic approach also means that researchers focus on what can be done with the results of the research, rather than 'abstract arguments about the possibility or impossibility of generalizability' (Morgan, 2007:72).

This seemed appropriate within the parameters of my research – although the questionnaire that I planned was a general scoping survey, I was not looking to make generalisations from the action research phase.
Rather I intended to explore how individuals changed their practice as a result of the cycle of enquiry.

Johnson and Onwuegbuzie (2004:17) suggest that the 'basic pragmatic maxim in mixed methods research is choose the combination or mixture of methods and procedures that works best for answering your research question.' Within this study, in order to answer research question 1 ('How were Foundation Phase teachers in Wales teaching thinking?), I decided that quantitative data was the most appropriate. This question sought information regarding the current situation regarding teaching thinking in the Foundation Phase, and I decided that making some broad generalizations about this was suitable. For example, I wanted to find out information regarding how often teachers indicate that they teach thinking, and the types of materials that they use to do this. I wanted to find out information from across Wales in an attempt to involve as many teachers as possible. As the researcher, I wished to remain neutral, not influencing the information being provided, thus adopting a broadly positivist approach to this question. Positivism emphasizes the importance of evidence to inform knowledge, and the researcher is assumed to accept that the world around them is real, and that there is a body of knowledge that can be discovered (*eg* Cohen *et al* 2011). This knowledge can be revealed through careful, systematic investigation. Researchers believe that they can make generalizations about the world based on the data that they collect. This is what I hoped to achieve through the use of a questionnaire – finding out general data about the teaching of thinking skills across Wales.

Furthermore, I wanted to ascertain whether the intervention that was part of my study had an effect beyond what was expected as part of normal cognitive development. Because my intervention extended over a period of time (one academic year), some cognitive development amongst the children would be expected. To try and distinguish any potential effect from the intervention from normal cognitive development, part of my research design

was based upon a prospective, quasi-experimental design (*eg* MacNaughton *et al,* 2008).
The children were assigned to intervention and control groups at the start of the year. This was the data that informed Research Question 4 of my study.

However, I was aware that there are limitations to conclusions that can be drawn from quantitative evidence. For example, I could have concluded that all teachers were teaching thinking in a certain way, but if I only received feedback from a limited sample that all happened to respond in a similar way any generalisations may be flawed.

Further criticism of the positivist philosophy would argue that this perspective does not take into account the fact that human behaviour is influenced by how individuals view the world. A purely positivist research project may reveal certain information, but the reasons underpinning this may not be clear. Newby (2010:36), suggests that 'whilst positivism could tell us how many people were poor, it could not help us to understand what it was like to be poor.' Such a view is also supported by Aubrey *et al* (2000:158) who state that positivism could be viewed by some as a 'disregard for the humanity, the 'inner life', of the people involved, treating them as if they are observable and measurable, data-generating machines.'

In this study, the questionnaire may reveal how often teachers claim to be teaching thinking, but would not inform us of why they make the choices that they do (or indeed, what they mean by 'teaching thinking'). I would be able to gain some test score data from children pre and post intervention, but would not understand their feelings, attitudes and understanding about thinking unless I planned to explore these aspects more deeply. Individual understanding is shaped by many factors, such as attitudes and perceptions, and so I wanted to move beyond generalisations to gain a more detailed insight (*eg* Mukherji and Albon, 2010) - in this case into the teaching of thinking. This led to the need to adopt an interpretivist paradigm to try and answer questions 2 and 3. In this way, the voice of the participant was actively sought and listened to by the researcher.

Interpretivist research tends to adopt qualitative research methods (*eg* Mukherji and Albon, 2000). Certainly, when working with children, many aspects of research would not be possible to conduct under experimental, controlled conditions due to the ethical considerations that must be made. Instead, researchers need to gather data whilst 'getting to grips with the complexities of the social world of early childhood' (Edwards, 2001:72). Qualitative analysis does not seek one truth – researchers believe that people may have different views, attitudes and beliefs, and they seek to explore these (*eg* MacNaughton *et al* 2001). Enquiry tends to be done in as natural a setting as can be managed, to try and minimize the effects that a different research environment may bring – for example children may respond differently if observed in a familiar classroom context than if observed in a novel environment. In this study, this paradigm was adopted to try and answer the remaining research questions. This was because I wanted to explore teachers' and children's attitudes, beliefs and feelings about the teaching of thinking before and after the intervention. This part of my research would be mainly conducted in school, where I would observe lessons that were being taught as a normal part of the curriculum. I would also talk to children and teachers to explore their perspectives, understandings and opinions on thinking.

As mentioned in Chapter 2, I also needed to acknowledge aspects of reflexivity – *ie* the concept that the process of research also impacts on how the researcher views the world. Finlay (2002:211) highlights that this is important, especially within qualitative research where she suggests:

> 'Most qualitative researchers will attempt to be aware of their role in the (co)-construction of knowledge. They will try to make explicit how inter- subjective elements impact on data collection and analysis in an effort to enhance the trustworthiness, transparency and accountability of their research.'

This view of the role of the researcher is in contrast to a positivist approach where neutrality is crucial – and sometimes researchers are viewed as a 'potential contaminant' (Fine *et al*, 2000:108). The notion of reflexivity

suggests that 'researchers are inescapably part of the social world that they are researching' (Hammersley and Atkinson, 1983:14).

As such, I needed to remain aware of the interactions that I had, the responses I made and the possible biases that I held during the research process. For example, I was aware that when carrying out the reflective dialogue with children and teachers, I would be shaping the discussion to a certain extent. What information I would select to probe further or to present as findings would be influenced by my own actions, beliefs and data selection choices. Furthermore, in interpretivist research the researcher may come to adapt and change their own practice in the light of their observations. I felt that this was not a negative feature of the research design – rather I saw it as valuable, as I hoped that the research would enable the teachers in the study, and ultimately myself, to become better teachers of thinking.

3.3 Research tools and research design.

This chapter has so far outlined the reasons behind adopting certain paradigms and methodological approaches to the research. It is now important to consider the design of the study in depth. Research methodology refers to the gathering of research tools and the application of appropriate research rules (*eg* Newby, 2010; MacNaughton *et al*, 2001), whereas the research methods are the tools themselves. Different questions need different tools to be designed in order to try and answer them. Hughes (2008) for example, defines research methodology as 'what to investigate, how to investigate it, what to measure or assess and how to do so.' Figure 3.1 shows an overview of how the research questions were addressed through the use of different research tools. Each of these is described and justified in more detail in Section 3, and the following diagram summarises these:

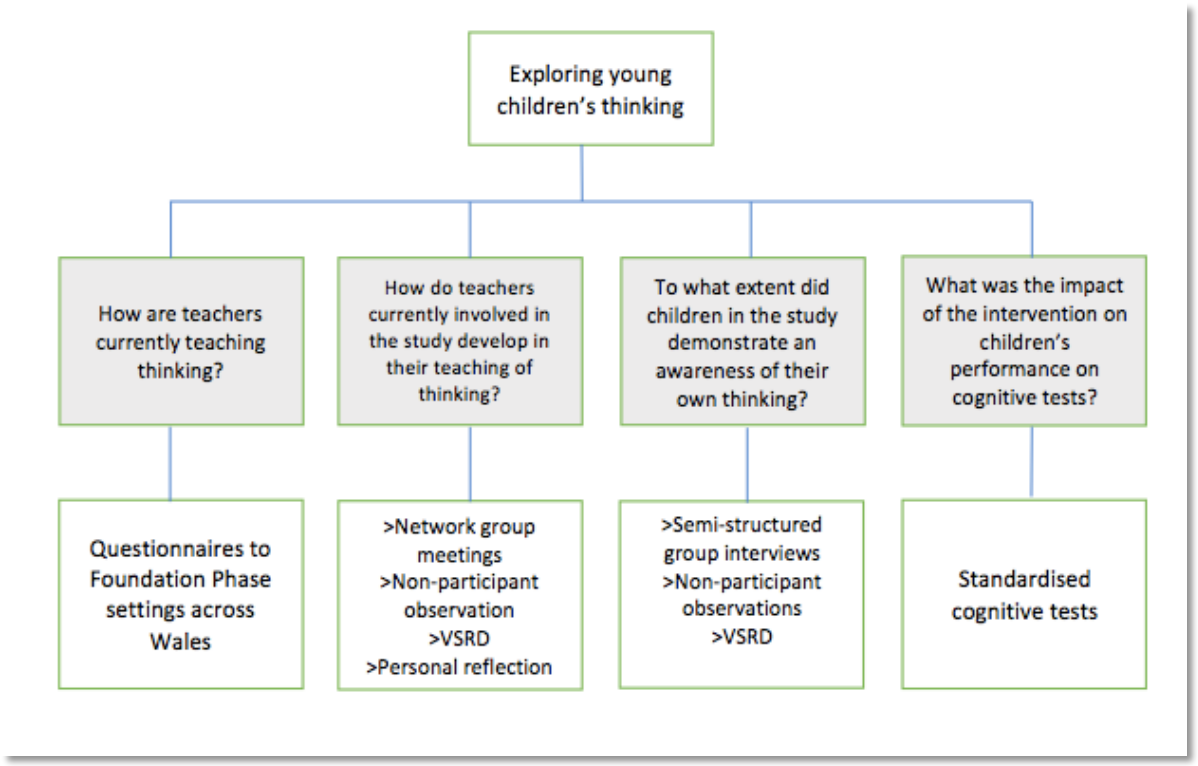


Figure 3.1 Overview of research tools used in the research project

3.3.1 Exploring Research Question 1:

The first question that I wanted to explore was:

- How were Foundation Phase teachers in Wales teaching thinking?

To investigate this research question, I selected a questionnaire as the most appropriate method of data collection. I considered it necessary to gather information regarding how thinking skills were being taught in Foundation Phase settings in Wales. In order to do this, I considered a survey – in the form of a postal questionnaire, to be a suitable method to use.

There are a number of advantages of using questionnaires, and they are widely used in research activity to gather both quantitative and qualitative data. Generally speaking, questionnaires can be distributed widely amongst the sample population. They can be a relatively effective and efficient way of targeting a large number of participants if this is required in the study. In this project this was important.

I needed to gain an overview of current practice. Since there are over 1400 FP settings in Wales, the advantages of being able to post these questionnaires out and ask individuals from geographically distant parts of Wales to respond were important factors. Questionnaires hold an additional advantage in that they are comparatively quick to administer. A large number of respondents can be surveyed far quicker than if the individuals were to be interviewed using a face-to-face strategy. It would have been impossible to conduct interviews with a population of 1400 given the time constraints of the study.

Questionnaires can act as a flexible tool for researchers, since they can be tailored to fit the research aims through the development of specific questions. However, questionnaires do have associated disadvantages, and it was important to also consider, and try to minimise these. Since there was no face-to-face contact with respondents in this study, there are issues to consider. Respondents may have felt less pressure to provide the perceived correct response as they would when sitting with a researcher, and so may have given less thought to responses. Although there is less likely to be interviewer-respondent bias in questionnaire use, bias can still exist due to the actual nature of the questions that are asked. Care had to be taken to ensure that the questions were not leading in style, and that they provided reliable and valid data. Respondents may not be motivated to answer fully; they may misunderstand items or may try to second guess the 'correct' response. Whilst the fact that the researcher does not need to be present may allow a larger population to be sampled, without someone there to deal with misconceptions the results may be less reliable. Indeed, as pointed out by Cohen *et al* (2011), there is no way of knowing whether respondents answer truthfully or not. However, this could also be true of responses in face-to-face interviews, and I felt that the questionnaire would offer advantages.

It is also important to remain aware of the fact that what people say they do in response to a question may not actually be what they do in practice, and this could affect the validity of the findings.

For example, Robson (2002:231), found that in many studies, there was no positive relationship between attitude and behaviour. So a response suggesting that a teacher highly values the teaching of thinking, and that they teach thinking throughout every subject on a daily basis may not be borne out in that teacher's actual classroom practice.
This is also discussed in chapter 2, where I considered the work of Argyris and Schön (1974). As such, these questionnaires could only be expected to provide insight into teacher attitudes, beliefs and perceptions rather than actual classroom behaviour. To try and minimise these potential limitations, a pilot questionnaire was designed and trialled, and questions refined as a result of this.

The pilot questionnaire was initially designed and then used in Greenwich and County Durham. There were several reasons for piloting in two English authorities - firstly because the research sample would include every Foundation Phase setting in Wales, I could not pilot it in any Welsh authority. I had worked with colleagues who were advisers in both these local authorities and they were willing to distribute questionnaires in conferences for me. Although the purpose of the pilot was to ensure the quality of the questions, and the coherence of the questionnaire, it was interesting to note that County Durham shares similarities with Wales in terms of industrial and farming heritage and socio-economic factors such as average salary (*eg* Office for National Statistics, Census 2011). The pilot questionnaire had a return response rate of 44%. This was a high figure, perhaps influenced by the fact that the questionnaires were given directly to respondents by my former colleagues. These colleagues may have encouraged responses – for example by providing time during the meeting to complete the questionnaire.

The final questionnaire consisted of three main parts. Participants' background information was sought in the first part (role, responsibility, size of setting etc) in order to gain a sense of who was responding. The second section contained questions aimed at gathering information on how thinking was taught (frequency, strategy, who delivers the sessions, what materials are used, what training has been received).

The final part of the questionnaire was designed to elicit participants' perceptions of effectiveness and impact of teaching thinking. The questionnaire contained both open and closed questions. This was for several reasons. Newby (2010: 300), suggests that:

> 'there is no compelling evidence that one or the other is better at collecting quality data. In fact, the evidence is rather more robust in suggesting that they are equally good.'

Closed questions are generally quick for respondents to answer and are useful in large sample populations such as the one in this study, since data can be relatively quickly collated. However, these questions do not provide opportunity to explore individual's opinions and experiences in the same way open questions do. Open questions do not impose the researcher's agenda on respondents in the same way as closed questions do – although I would argue that the researcher's framework is still in evidence since the open questions are written by the researcher (*eg* Cohen and Manion, 2011). Whilst closed questions can provide some useful data – for example regarding how often thinking skills are being taught, I also wanted respondents to have the opportunity to comment further on issues such as the training that they had received or just to have an opportunity to add personal reflections. This is important because whilst closed questions have many advantages, open questions allow the researcher to ensure that possible responses are not omitted – for example, in this study I wanted to know which Thinking Skills materials were used by schools. In the pilot study I listed the materials I had identified in a closed question format – and ask respondents to tick those they used. I also included an open category to this question – 'other' materials.

From the pilot responses several materials that I had not included, such as Kestrel's 'Mind Maps' were identified by respondents. Without the inclusion of the 'other' category this data would have been omitted. This was important, because, as suggested by Cohen *et al* (2011:389), if certain categories are omitted, then respondents may feel 'forced' to respond in certain ways.

Additionally I wanted to include opportunity to gain a richer insight into respondents attitudes to teaching thinking skills so there were questions that invited open responses, and the final question asked for 'any other comments'. The risk of including such a question is that people who are rushing to complete the questionnaire may ignore it – and this was the case for some respondents in the pilot study. It is possible that they felt the questionnaire had asked for enough detail, or that they were simply unmotivated to add additional comments. However, although not every respondent completed this question, I decided to keep that item in the final version of the questionnaire.

Another consideration in the questionnaire design related to the actual wording of the questions themselves. Newby (2010) suggests that we must consider the command of language that respondents in the sample are likely to possess. The questionnaire needs to be clear and easily understood by the respondents. With this in mind, although I felt that the majority of respondents would be professionals with a secure command of education-related language, I endeavoured to avoid jargon or over-long, complicated statements. I also made sure that there were no abbreviations, as the meaning of these may not have been clear or familiar to the respondent. When looking at responses from the pilot study I checked to see if there were patterns in the responses – for example if several people had missed out or misinterpreted a question I would have looked closely at this to see if it needed clarification. There were no particular patterns in the responses from the pilot although three questions were refined and adapted for the final questionnaire. Additionally, wording had to avoid bias. Questions could be asked in a way which actually leads the respondent, or which influences the likely response. So, by analysing the responses to the pilot I checked for bias.

Another consideration I had to make since the questionnaire was also translated into Welsh, was that it was important to check that meanings were the same in both languages – as slight variations in translation could potentially have influenced the meaning inferred by respondents.

A professional translator, who was familiar with working in an educational context, completed the translation. The translator was able to query any unfamiliar or unclear vocabulary. This meant the questionnaires were comparable in terms of the vocabulary and meaning across the two languages. However, the Welsh version was not piloted in Greenwich or Durham for obvious linguistic reasons.

Some of the questions in the questionnaire required respondents to answer on a rating scale. This was intended to see the intensity of a response – for example one question asked how useful the teacher felt teaching thinking skills was. The scales were constructed using words from 'not at all' to 'highly effective', which generated ordinal data that was sufficient for my purposes.

Although Cohen *et al* (2011:383) warn that most of us 'would not wish to be called extremists' and so may avoid the ends of the continuum of responses on such scales, the pilot study indicated that all respondents answered this type of question, giving a range of responses and so I included rating scales in my final questionnaire.

In the case of the final questionnaire, the target population was Foundation Phase settings within Wales, and, as such I decided to try to include all of these in my sample. This is because if I managed to identify all settings then I could gain the most representative data possible. As such, questionnaires were sent to all Foundation Phase settings in Wales. Walliman (2010:97) suggests that there are three main ways to distribute questionnaires - 'personally, by post or through the Internet.' In this study, I wanted to try to gain opinion from all regions and Foundation Phase contexts in Wales, so postal distribution was judged to be the most effective method to use. Cohen *et al* (2011:404) suggest that this is 'frequently the best form of survey in an educational enquiry' and in my case I agreed. Distributing the questionnaire by post meant that I could send a copy to all settings within the country quickly and efficiently. The questionnaires were sent out with a covering letter and a stamped self-addressed envelope for return. A copy of the final questionnaire can be found in Appendix 3.

There are associated disadvantages when delivering questionnaires by post – there is considerable time (and some financial expenditure) in sourcing addresses, labelling envelopes, and actually posting questionnaires. Additionally, the rate of response can be difficult to predict or control, and respondents cannot easily ask for clarification of questions. There is no way to control whether or not the questionnaire gets to an appropriate person within the school – I addressed them all to headteachers, but asked for them to be completed by the person with responsibility for thinking skills in the school – I have no way of knowing whether that person did complete the questionnaires.

Response rates can be an issue, so it was important to take steps to try to improve the number of responses received. Otherwise the accuracy of the data gained may be brought into question. For example, in my study those who responded may not be characteristic of the general population of Foundation Phase settings. This is because those who did respond may have an interest in thinking skills, as so provide a skewed perspective. Or, they may have been required to respond by a member of the school senior management team and so have no interest at all in thinking skills. Either extreme could potentially alter the validity of the results, and of course, there is no way of knowing if those who chose not to respond would have provided responses that were in any way similar to those who did respond. As such, any conclusions drawn must be tentative in nature. However, Newby (2010:257) suggests that in a population of 1000, a response of 278 will put confidence intervals and confidence levels within 5% of the actual value for 95% of occasions. Although this figure is not as high a level as a 99% value, for a project of this size I felt that it provided a reasonable level of accuracy, and a substantial amount of data and so this was the target figure I set out to try and achieve.

Existing lists of settings in each Local Authority were sourced directly from the authority, and a computer database was used to code questionnaires and envelopes, meaning all questionnaires were given a unique identification number.

This meant that, whilst the name and location of the respondent on the actual questionnaire remained anonymous, follow up letters and questionnaires could be sent to those settings which had not responded within the given time period (three weeks). This follow up letter reminded settings about the questionnaire. To try and increase response rates an envelope with freepost return address was provided. These identification numbers were not kept once the follow-up prompts had been sent and the return date was passed, and so the data that was analysed was totally anonymous. In total, 312 questionnaires were returned. The analysis of the responses will be discussed in Chapter 4.

3.3.2 Exploring Research Question 4:

I also used a quantitative approach to answer Research Question 4; 'What was the impact of the intervention on children's performance on a limited number of standardised tests?' Data about the children's cognitive and language skills was collected at the start and end of the project. I used the British Ability Scale II (BASII, Elliot, Smith and McCulloch, 1996) to measure these skills.

Whilst I acknowledge the tension that exists with the term 'ability', I chose this measure for a number of reasons. The test items are practical and engaging, and can be used with children from 3 years to 17 years and 11 months – and therefore were suitable for the age of children I would be working with. The BASII has been extensively tested for reliability and validity, and does measure, albeit at a particular moment in time, aspects of cognitive development such as reasoning, vocabulary and early number concepts. In a previous project, an experienced researcher had trained me to use the tests appropriately, so I was experienced in using them. BASII was used in the EPPE study to provide 'a baseline against which later progress and development could be measured' (Sammons *et al*, 2005:212). I used the appropriate age-related starting points, and used decision points to ensure that the tests were terminated as soon as appropriate. I did this so that children would not be put in a position of feeling anxious if they were finding the items challenging.

Data was gathered as a raw score, an ability score (sic) (which takes into account the starting and ending point of the test and the raw score) and the standardised score (which takes into account chronological age and ability score). There were planned – *a priori* – comparisons between groups. The children were assigned to one of two groups at the start of the project - either the intervention or the control group. The participating teachers selected the intervention children. They chose children who they felt would benefit from the project. These children were involved in VSRD episodes with me, the teachers taught specific focused tasks to them and reflected upon these, and the children also worked with me on the school visit days. The control children were matched as closely as possible by gender, age, 'ability' (as determined by the teacher) and home backgrounds. Although in two schools they were also taught by the participating teacher (due to the size of the school), in four schools they were in different classes to the intervention children. The control group did not take part in VSRD episodes, their only contact with me was during the cognitive testing and the teachers did not video themselves teaching the control children.

The data was then analysed using analysis of covariance (ANCOVA), which is 'useful in situations when you have quite small sample sizes and only small to medium effect sizes' (Pallant, 2007: 291).
Preliminary checks were conducted to ensure that there was no violation of assumptions. Effect sizes range between 0 and 1. The size of the effect can be described as small, medium or large depending on the value. These are commonly accepted (Cohen, 1980) to be:

Effect size *r*	
Small	0.10
Medium	0.30
Large	0.50

The results of this analysis are discussed in Chapter 6.

3.3.3 Exploring Research Questions 2 and 3

The two remaining research questions (Research Question 2: 'How did the teachers involved in the project develop in their teaching of thinking through

the course of the intervention?' and Research Question 3: 'To what extent did children in the project demonstrate development in their awareness of thinking?') sought to examine the thinking that was taking place in classroom settings in more depth. This part of my study was concerned with working alongside teachers and children, rather than conducting experiments, observations or interventions on them as subjects. As such, a methodology needed to be identified that provided opportunity for the participants as well as myself to reflect and explore issues, beliefs and attitudes using appropriate tools. For this study, the overall and key methodology adopted to answer the two questions above was an action research model, involving practitioners as well as myself in a cycle of enquiry and reflection.

Action research is viewed by many as 'a powerful tool for change and improvement at a local level' (Cohen *et al,* 2011:344). The work of Stenhouse (1975) is relevant as he suggested that teachers are active agents in the process of research. This implies that rather than being passive or neutral subjects in a study, in an action research design participants are able to explore the context within which they work from a knowledgeable perspective. This is in contrast to views of research suggesting that the researcher holds the power and authority within the research process. In such cases, teachers (or children) are not seen to be active agents, they are the observers of and consumers of research processes and products (Hall, 2009). Since the study aimed to help teachers develop their own practice in the light of reflective dialogue it was necessary to design a study that facilitated participation.

Action research is designed to bring theory and practice together, and Lewin is credited with the first use of the term action research to describe work that 'did not separate the investigation from the action needed to solve the problem' (McFarland & Stansell, 1993:14).

McNiff and Whitehead (2012:7) define action research as 'a form of enquiry that enables practitioners in every job and walk of life to investigate and evaluate their work.' Although there is debate about, for example the balance of time spent in 'action' and the amount spent in 'research', there is agreement that this is a powerful methodology that involves the participants

in reflecting upon and exploring their own practice (*eg* Cohen *et al*, 2011). As such, I felt that this was appropriate within my research design. I wanted to work with the teacher participants to see if the interventions could make a difference, rather than work as an outsider observing and commenting on their practice.

The study design required teachers to be involved in a cycle of enquiry and reflection – key elements of an action research design. As discussed in section 3 of Chapter 2, planning a research project that involved key principles for teacher development was important (*eg* Timperley, 2008). Adopting an action research (*eg* McNiff and Whitehead, 2012) approach was appropriate – here teachers could undertake collaborative learning with myself acting as the external participant, but they individually could take responsibility for the changes implemented in their own practice, and reflect upon these. As such, teachers are acting as researchers on their own practice (Stenhouse, 1975). It does share commonalities with Cooper's model, but allows the participants more ownership, and involves reflection on the part of the participant. Implicit in the process was the idea that teachers would begin the cycle by identifying some issues and posing questions about these, gathering data, reflecting, and deciding on a course of action. Through an ongoing cycle of action, analysis and reflection, teachers should become aware of how to do things more successfully. In my study, teachers would also have the opportunity to plan for improvement - deciding the next steps for their own development. There are many models of action research within the literature, and figure 3.2 illustrates one possible view of this cycle:

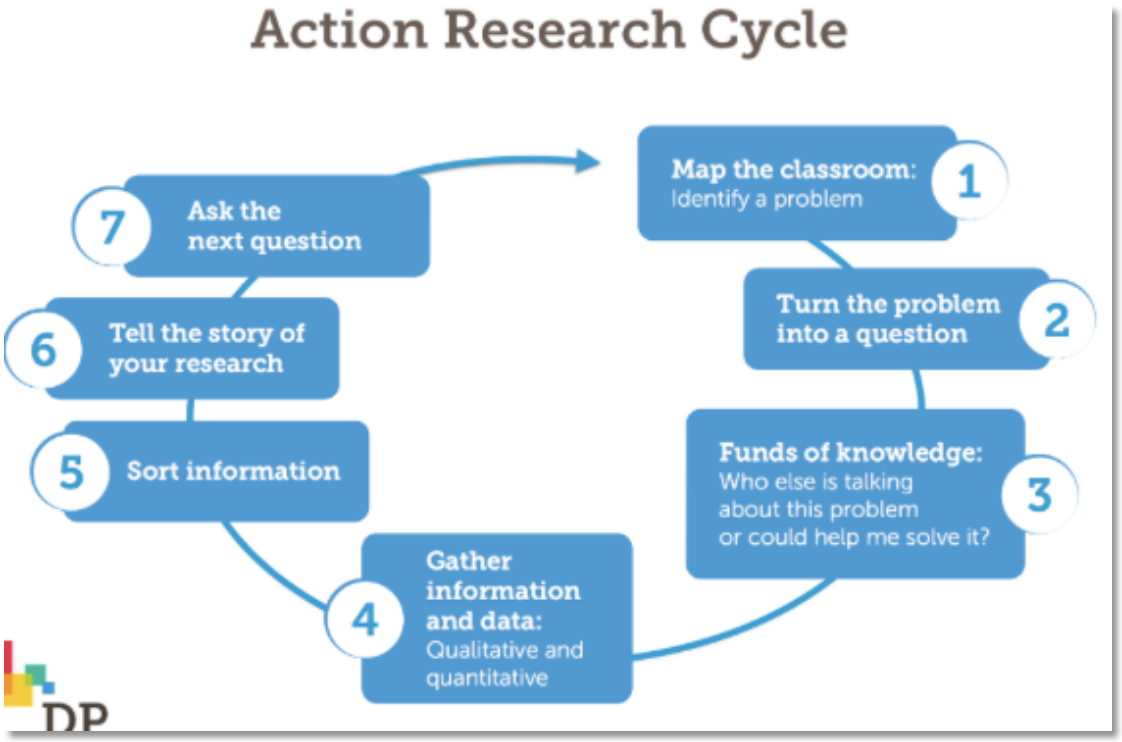


Figure 3.2 Action Research Cycle (source:DigitalPromise.org)

Although there is no specific mention of collaboration or the term 'reflection' in this diagram, there was a clear cycle of enquiry involved in my project as illustrated in the figure. Information was gathered and reviewed by the participants on a regular basis. This reflection informed the way that participants chose to try and refine their own practice. The teachers were in fact acting as 'participants-as-practitioners-and-researchers' (Cohen *et al*, 2011:359). Therefore reflexivity – for example, how their attitudes and values could influence the study was important to consider when I started to look at the data and when the teachers themselves began to examine their own practice. They had the chance to share and discuss their findings with one another as well as with me.

However, it is important to note that actually, although the teachers were researchers, inevitably they were also 'the researched'. I designed the project, and key aspects such as the structure, the overall focus and the research tools were designed by me. The teachers were able to interpret and implement the ideas we discussed in their own individual ways and so they did have some choice and ownership, but I also observed them.

This is in fact in line with Lewin's (1946) original description of action research as a process that was externally initiated. Stenhouse (1975: 162), also described this type of action research process - teachers didn't have the responsibility to explain their own practice unaided for themselves - researchers still supported teachers' work. In my study, teachers were able to work on problems or areas that they identified themselves – within a broad focus identified by myself. They were encouraged to examine their own practice through reflection and discussion, in a context where individual views were seen as valuable. From the pragmatic standpoint, it is worth noting that Oja and Smulyan (1989), suggest that teachers are more likely to adapt their own practice if they are involved in researching it, because they can see for themselves what needs to change or develop and how it can be achieved.

3.3.4 Describing the action research group:

The action research that I designed involved both teachers and children as participants.

Teacher Participants

The six participants worked in five different local authorities, in a variety of settings. One participant worked in a school where the headteacher demonstrated an interest in the project following the questionnaire and contacted me directly. The head recommended Lynda, and Lynda agreed to take part. The remainder responded to a flier that was distributed to partnership schools asking for teachers interested in exploring thinking skills to contact me. As such, this was not a random sample of teachers, but because the nature of the project involved teachers engaging in action research not all would be willing to take part, as so I needed to find teachers who would volunteer to be part of this process.

Background information about the teachers is contained in Table 3.1 below, and further contextual information can be found in Chapter 5:

Teacher	Background Information
1 Olivia	Early years educator, working as SENCo and FP coordinator. 13 years teaching experience.
2 Ceri	Early years educator, FP co-ordinator. Interest in Assessment for Learning and problem solving. 6 years of teaching experience.
3 Lynda	Early years educator, FP co-ordinator. Limited training in thinking skills so keen to develop. Over 20 years of teaching experience.
4 Lucy	Early years educator, mathematics subject leader in school. Interested in problem solving. 4 years of teaching experience.
5 Sam	Early years educator, thinking skills leader in school, involved in several thinking skills initiatives. 6 years of teaching experience.
6 Mel	Early years educator, works part-time. Keen to look at ways to develop language and thinking. 10 years of teaching experience.

Table 3.1 Summary details for the teacher participants

The group contained 5 female practitioners and 1 male. To preserve anonymity of participants all will be referred to by their pseudonym, several of which are names that could be males or female to further preserve the anonymity of participants. Further information about the teachers and their schools is contained in Chapter 5.

The children:

The teachers were asked to select a group of six children to work with during the specific observations, and for me to work with when I came into school. The teachers were asked where possible to try to select children who they felt would benefit from involvement. I didn't specify any further requirements for selection – for instance, I did not feel that gender was a particular issue in my study and did not specify that the groups had to have exact gender balance – although in most classes this is what the teacher did. I acknowledge that the children were selected – rather than self-selected which could invite criticism of inherent bias. However, within the parameters of my research this was appropriate because I could only work with small groups and I felt that the teachers knew the children well and so could choose appropriately. Table 3.2 shows an overview of children selected, and the reasons the teachers felt that involvement may be beneficial.

Teacher	Children – general information/ reasons for selection
Olivia	3 girls, (2 aged 6, 1 aged 7) 3 boys (2 aged 6, one aged 7) • 2 of the girls were considered very shy and did not contribute much in discussions. Olivia hoped the project might improve their self-confidence. • One of the boys had experienced recent upheaval at home, and Olivia felt involvement may be '*special' for him*.' • One girl lacked social skills *eg* ability to take turns and Olivia hoped the project may develop these skills. • Two children had lower than expected literacy skills, particularly orally, and Olivia hoped involvement would help this.
Ceri	4 boys (2 aged 4 years, 2 aged 5 years) 2 girls both 4 years old • Five of the children had lower than expected literacy skills, and of these, two had poor oral language – Ceri hoped that involvement in the project may boost this. • One child was very able, but due to other circumstances was not always involved in classroom activities, and Ceri thought that this project would give him a boost of confidence.
Lynda	3 girls (all aged 6) and 3 boys (2 aged 5, one aged 6) • Lynda selected the group because she felt that these were her '*middle children'* – she explained that they did not receive any additional support as some children in the class did, and she felt it would be '*nice for them to do something special.*'
Lucy	3 girls (1 aged 5, 2 aged 6) and 3 boys (all aged 6). • Three of the children came from what Lucy described as 'disadvantaged backgrounds' and she felt that involvement would '*give them a boost'*. One of the girls was new to the class and Lucy felt that involvement may help her settle. • The other two children were described as *'lively and bright, and sometimes a bit much in a discussion'* and Lucy hoped involvement may have helped them develop skills such as '*knowing when to contribute and when to listen*'.

Sam	2 girls (2 aged 5) and 4 boys (2 aged 5 and 2 aged 6). • Sam selected four of the children because '*although they are below average for their language skills I think that they are good thinkers, the project may help them articulate their thinking better*.' • The other two were selected because '*they are bright kids and I am genuinely interested in how the project may work for them – you know – what they might say.'*
Mel	3 girls and 3 boys (all aged 5) • Mel selected the group '*genuinely quite randomly – I think that most children would benefit from some additional attention, so it was hard to choose. In the end I just looked at those who weren't getting any other extra support and picked 3 girls and 3 boys*.'

Table 3.2 Summary details of the child participants

After an initial meeting with the teachers, three research cycles were undertaken during the academic year, starting in October and ending in July. The first two consisted of a 'Teacher Network Day' (TND) and subsequent school visit. VSRD was undertaken with teachers and children on Visits 2 and 3. The cycle concluded with a final Teacher Network Day to draw the study to a conclusion. The cycle is illustrated in Figure 3.3 below:

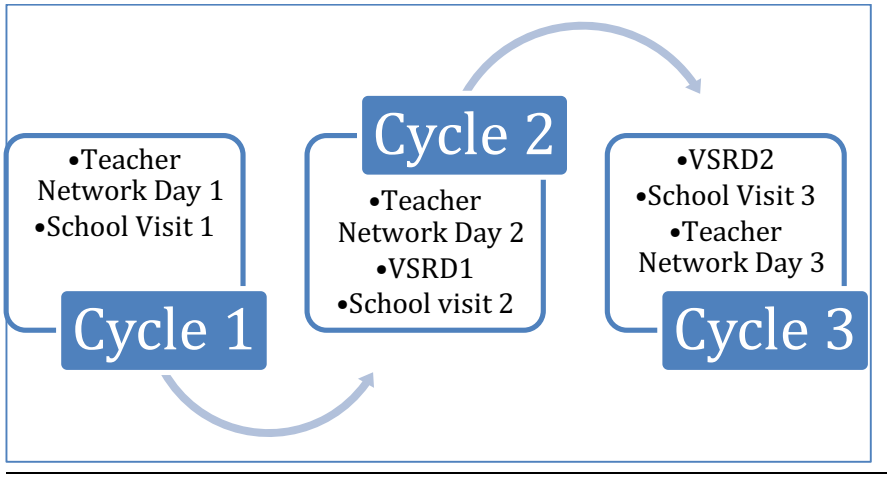


Figure 3.3 Outline of the action research cycle in my study

I chose to use a variety of instruments to gather data during the action research phase. The following approaches were adopted:

- Group discussion with the teacher participants during 'Teacher Network Days' (TNDs)
- Semi-structured dialogue with teacher participants during school visits
- Semi-structured dialogue with child participants during school visits
- Non-participant observation of lessons during school visits.
- Work scrutiny/ learning walks during school visits

3.3.4a Initial meeting with teachers:

An initial twilight meeting was held at the university. During this meeting, the participants met one another and myself. I went through the broad aims of the project, clarifying any questions that they had. I talked through ethical matters and gave practical information about for example, timings of visits throughout the year. During the meeting we discussed the concept of VSRD, and how it would be used during school visits. Once we talked about the process, and the private nature and ownership of the clips, all six teachers said that they were looking forward to trying it out. For all six participants, it was important that they had ownership of the video of their session. Sam was pleased that '*I can select the bit I think is most important to talk about*' and for Lynda it was important that '*I can choose which bits I think are useful to discuss. It is to help me get better – not for anyone else.*' We discussed the pilot study and how the children in that had also managed to engage with VSRD. Mel and Ceri, who had the youngest children in the study said they thought it would be interesting to see how their children got on with the process. The teachers generally felt that this element of the project would give them a different insight into how the children thought about their classroom experiences.

This initial meeting was run as a focus group. Litoselli (2003), describes a focus group as a small structured group with selected participants. These are usually led by a moderator, and are is set up to explore specific topics, and individual's views and experiences through the process of group interaction.

Krueger and Anne (1994:6), suggests that a focus group is one where there is ‘a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment’. Groups are ‘focused’ in that they involve collective activity around key issues and are interactive in that group forces and dynamics are crucial.
This was precisely what I planned for allowing me insight into the initial understanding of members of the group relating to thinking skills and their current experiences through the project in this initial meeting.

The size of group was also a factor to consider, with groups with six or seven members considered ideal to encourage flow and diversity of discussion (*eg* Cohen *et al*, 2011). Therefore having six participants and myself was appropriate. It is important to note that since this was a small group of volunteers, any results discussed could only ever be indicative and certainly not able to be generalised for the whole population of Foundation Phase teachers.

3.3.4b Teacher Network Days (TNDs)

I did not want to keep a focus group approach to be the structure of the three subsequent TNDs, as I wanted those to involve the teachers as co-researchers, constructing a shared meaning about the events that were taking place through the project. As co-researchers, the teachers would be joint contributors to the findings, and jointly investigate some of the research questions with me and this was explained. I felt that this was an appropriate approach to adopt as ‘Co-research establishes a dialectical process of enquiry by drawing on the complementary perspectives, interests, skills, and knowledge bases of academics and practitioners’ (Hartley and Benington, 2010:463). Key themes such as the nature of metacognition were considered in an informal but semi-structured manner. However, this was fluid and flexible agenda, allowing teachers to take an active role in shaping the discussion and developing a shared understanding. The teachers were able to reflect upon their own practice and share ideas with one another in subsequent TNDs.

Teaching materials and resources were also explored and discussed, as were teacher's individual reflections on the progress they perceived themselves to be making. Because action research is primarily concerned with 'enquiry by the self into the self' (McNiff, 2013:23), with others acting as critical friends at appropriate moments the focus for each participant would primarily be on themselves as an individual and their own classroom context.

These TNDs aimed to give me an insight into the teacher understandings of key ideas and constructs. I wanted to allow time to:

- Review progress – teachers were able to feedback and discuss how they were progressing with the project
- Provide input from myself *eg* about VTRs
- Discuss and evaluate the previous action research cycle, within a context of shared insight and support.
- Plan for the next cycle of action research *eg* by refining a focus

Throughout the day, shared understandings were developed, and discussion aimed to provide an insight into teachers' interpretations of key messages. However, within groups there are always factors influencing the dynamics of how the group operates. The selection of participants can affect how the group operates. Krueger (1994:19) suggests that participants in a group setting are 'influencing and influenced by others – just as they are in real life.' To try and avoid situations where one voice dominated or created a false consensus, or where people felt unable to fully participate, as well as having group discussions, part of each day was spent working in pairs, or individually in order to allow individuals the chance to participate as fully as they wished. I felt that the more comfortable people felt, the more likely they would be to contribute openly and honestly, and so started the first day, and each subsequent day with an ice-breaker activity designed to put them at ease. Differences such as gender, age, class and profession can sometimes influence the group dynamics, however in this case the group seemed to gel positively – they all had their professional interests in common and had chosen to be a part of the project so had a personal interest in participating.

My professional experience, for example in running development events for teachers, and in engaging participants in discussions during sessions was useful in this regard.

These TNDs were, by agreement, videoed recorded and transcribed. Although Kruegar (1994) sees videoing as obtrusive and likely to be a factor affecting spontaneity, I felt that video was an important source of evidence. I kept written field notes but was aware that during a discussion it is easy to miss what is being said, so to support me and to allow the possibility to go back and review discussions, the camera was placed towards the rear of room. Participants were informed that they did not need to be videoed, they could sit out of the gaze of the video if they wished, they could withdraw consent at any time, and that the video would only be viewed by myself for the purposes of this research project. All participants were willing to take part in sessions and were willing to be videoed.

The role of myself as the group facilitator was also important. Flood (1999:35) suggests that 'without some degree of reflexivity any research is blind and without purpose', so I needed to remain aware of my own influence on the group. As Litoselli (2003:5) suggests, 'the data produced will be influenced by the presence, role, and perceived background of the moderator, and the actual interaction between the moderator and the participants'. Key qualities suggested to be important are those such as good interpersonal skills, a non-judgemental attitude, flexibility and adapability, and neutrality. There are also ethical questions about power and I felt it was important to form good relationships between the participants and myself. I did not want to be seen as the 'expert' with all the answers, as I felt that this might have influenced contributions. To avoid this I maintained neutrality wherever possible in a discussion, and after each session used the videoed material to look back and reflect on how successfully I had managed the group. This was at times challenging – for example – when introducing the participants to particular thinking materials, I clearly knew about them and the teachers had not come across them before.

However, I made it clear that I was interested in how the materials would work in each different context – and in that sense the teachers would become the experts within their own unique classroom contexts. I kept a notebook in which I noted my own feelings and reflections about TNDs (and school visits) so that I could reflect upon the events of the day.

Teachers were also encourages to think about their practice – and were encouraged to keep a 'Reflective Journal' of their own experiences during the project. This could contain any ideas, feelings and examples of events that happened during the project, noting any shifts in pedagogical understanding. Pollard (2008:26) suggests that 'the aim of reflective practice is to thus support a shift from routine actions rooted in common-sense thinking to reflective action emerging from professional thinking.' Teachers were encouraged to make observations of the children they were working with regarding their thinking throughout the project. The final TND was mainly evaluative in nature, with a group discussion and sharing of the individual experiences that the teachers had had. They also completed a brief questionnaire about their experiences during the project.

The teachers were introduced to certain key Visible Thinking Routines (Ritchhart *et al*, 2011) on each TND (although they were free to research others if they wished), and these became the focus of tasks within the classroom during the project. Although the teachers were free to select any routine to use, the key VTRs that were introduced are outlined below:

Visible Thinking Routine	Thinking skills
See-Think-Wonder	Make careful observation and thoughtful interpretation, ask questions
Chalk Talk	Uncover prior knowledge and ask questions, make connections
3-2-1 Bridge	Activate prior knowledge and make connections
Circle of Viewpoints	Identify and explore multiple viewpoints
I used to think… now I think	Encourage metacognition, explanation and justification

Table 3.3 summary of VTRs used by teachers in this project

These were selected because, as outlined in Chapter 2, within the literature, there were examples of these being used successfully with young children (*eg* Ritchart *et al,* 2011) and they target a variety of thinking skills. I could find little evidence of these being systematically evaluated in the UK, which meant that my study could add to the existing knowledge around the use of these routines.

3.3.4c School visits

The TNDs were followed by a day visit in each school. During this visit I worked with the teacher, the intervention group of children and also observed a teaching session. Stubbs and Delamont (1976:12) suggests that 'anthropological' researchers take a holistic view of the processes occurring within the classroom black box, making no attempt to manipulate, control or eliminate variables. To a certain extent this is true of the study described here – working with six different teachers, in six different schools meant that there were numerous variables present such as class size, teacher experience and catchment area of the school. This study made no attempt to alter or manipulate these, merely to observe and discuss what went on in each setting. As suggested by Stubbs and Delamont (*ibid*) a researcher who works within this type of framework starts with description of what they notice occurring and progressively focuses in on the classroom features considered most relevant. To a certain extent the video reflection in my project allowed teachers the chance to do this – they were able to revisit their teaching and decide on the elements that they wanted to focus on after reflection and discussion.

During the visits, I observed a session where the teacher taught a thinking based activity, and where I acted as a non-participant. These were sessions that the teachers planned to include opportunities for sustained shared thinking. The teachers were encouraged to use VTRs during these activities, although they were clear that they did not have to if they felt an alternative approach would be more effective.

The teachers were asked to work with small groups of children (the same ones who would then work with me to make their own videos) in activities aimed at allowing SST to take place. Immediately after the lesson, the teacher was asked how they felt the session had gone, and any particular strengths or areas they wished to highlight were noted. Teachers then watched their video and used it as a basis to reflect (first privately and then in dialogue with the researcher) upon their teaching and the children's learning. These conversations were, by agreement taped and transcribed, and written field notes were also kept.

Observing a session allowed me the 'chance to gather live data from naturally occurring social situations' (Cohen *et al*, 2011:456). I intended my observations to be non-participant and non-interventionalist – on other words I was a 'fly-on-the-wall'. Observation also allowed the chance to see if what the teachers said was happening in their classes was similar to what actually happened. I was aware that observation has some potential sources of bias (*eg* Robson, 2002; Cohen *et al,* 2011). For example, I could pay selective attention to events that I felt were more significant than others, I could have made selective data entries or I might have inferred intentions from observations. I hoped that by videoing the sessions I could review and revisit them. Of course – video is not neutral – it also has a fixed and predetermined field of view for example, and images are still open to interpretation. To try and make my observations as objective as possible, I devised a framework with which to analyse them. Of course, as Larkin (2010:110) warns compartmentalising interactions is artificial – the researcher devises categories that in reality overlap. Categories are also interpretations of behaviour, but I felt that my analysis would be more rigorous if I had identified aspects of metacognition that I could look for when I watched every session.

To develop this framework, I reviewed the literature on metacognition and considered different researchers work in order to ensure that my framework was appropriate. I decided to use the codes identified by Larkin (2010) to analyse the sessions.

This was because they are:

- Detailed - they clearly related to all elements of metacognition illustrated within the literature.
- Age appropriate - the codes were used for observation of Year 1 children.
- Suitable for supporting classroom observation - the codes were developed to analyse children's behaviour during classroom observation.

Table 3.4 below summarises this information.

Component of metacognition	Type of behaviour	Terminology commonly associated	Citations include	Larkin's (2010) codes	Example
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	Flavell (1979) Kuhn and Dean (2004)	SELF OTH	'I know what to do' 'She doesn't know how to do it'
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	Kuhn and Dean (2004) Flavell (1979)	UNIV SQU	'We've got to solve a problem' 'I think that's right but is it?'
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	Schraw *et al* (2006)	UND COMP	'Something is missing' 'This is like the one we did last week'
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	Whitebread *et al* (2009) Schraw *et al* (2006)	PLAN	'We need to know which way to go'

	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	Whitebread *et al* (2009) Flavell (1979)	RAT COMP	'this is so hard to do' 'this is like the task we did last week'
	Assess processes and products of learning	• Evaluate	Whitebread *et al* (2009)	EVA CHE	'we should build boxes – that would be quicker' 'this one is good isn't it'

Table 3.4 Metacognitive framework for my study, and the underpinning research

As well as analysing the lesson myself and comparing pre and during-VSRD reflections by the teachers (results in Chapter 6), the individual teachers then used this same video to carry out the VSRD process.

3.3.4d Using Video-Stimulated Reflective Dialogue (VSRD)

The teachers then used the film as the focus for the VSRD episode. Chapter 2 reviewed the research literature regarding VSRD. To recap, Lyle (2003:861), refers to 'stimulated recall' as 'an introspective procedure in which (normally) videotaped passages of behaviour are replayed to individuals to stimulate recall of their concurrent cognitive activity.'

Stenhouse (1976), was one of the first to use video as a process to view lessons and take on a 'discovery approach' to pedagogy. Kennewell *et al* (2008), suggest that VSRD is distinct from video stimulated recall or video stimulated reflection because of the use of dialogue as a key aspect of the process. Kennewell *et al* (*ibid*) distinguish between discourse moves that are dialectic (lead the teacher toward an established model of good practice) and those that are dialogic in character (lead to the co-construction of knowledge and deep understanding about the process of teaching and learning).

Within the parameters of this study, I wanted to promote co-construction, and so needed to develop a context of dialogue. I wanted to use the video prompts with both teachers and children as a tool to develop dialogue through deconstructing and reconstructing episodes of practice. During moments of co-reflection we explore and extend our understanding of our own practice, and the video provides an 'empirical focus' for this exploration (Moyles *et al*, 2003:7).

The VSRD was used with the teachers to facilitate discussion and exploration of ideas about thinking. A simple framework of prompts was used as a basis for the VSRD dialogue after lessons, rather than a more detailed set of structured questions. I felt that adopting this approach may have helped to promote a natural dialogue, but I still wanted certain prompts to guide the process. The following prompts provided useful starting points, but each child or teacher was able to guide the dialogue in their own direction, depending on the issues that they felt were most important to discuss:

- The teacher's reasons for selecting the clips
- Approaches/ strategies used or observed in the lesson (and the teachers reasons for choosing them)
- The impact on pupils' learning or understanding of thinking
- Surprises or unexpected events that the teachers or children wanted to talk about
- Impact on the teacher's views of their role in promoting thinking

(*eg* Moyles *et al, ibid*; Kennewell *et al, ibid*)

To analyse the dialogue that took place during reflection both pre and during VSRD, I wanted to develop a framework that would help me to maintain an appropriate focus, thus minimising possible bias – as Cohen *et al* (2011:595) warn, when analysing video, 'what we see is what we look for'. I wanted to consider whether VSRD helped the teachers reflect on their teaching of thinking beyond what they would do in normal, post session reflection. Therefore, I decided to use the criteria that the teachers themselves constructed (during the first teacher network day) as important in the teaching of thinking.

When I analysed the post lesson reflection and the subsequent VSRD dialogue, I noted when the teachers referred to these criteria – they sensitised my analysis. This research does not claim to be rooted in grounded theory and I acknowledge that sensitising concepts are most frequently associated with such theory (*eg* Glaser, 1978; Charmaz, 2003).

However, since Charmaz (2003:7) suggests 'sensitizing concepts offer ways of seeing, organizing, and understanding experience' I felt that this was an appropriate strategy to use. I wanted to have some framework to broadly guide my analysis, and since 'sensitizing concepts merely suggest directions along which to look' (Blumer, 1969: 148), this seemed a useful strategy to employ. Bowen (2006) suggests that sensitising concepts are useful interpretive devices and are often used as a starting point for qualitative study. I was also aware that Gilgun (2002) warns that sensiting concepts may alert researchers to important aspects – but may also direct attention away from others and thus this approach formed only one part of my data analysis. The criteria that teachers identified during TND1 are summarised in Table 3.5 below:

Good thinkers engage in tasks which allow them to:
express ideas clearly
elaborate on their ideas
collaborate with each other
use a variety of strategies to solve problems
reflect upon their thinking
make decisions
make links and connections
share a vision and vocabulary of thinking
work with the teacher to solve problems

Table 3.5 Opportunities identified by teachers as important for promoting thinking

The group felt that in order for children to become better thinkers, they needed to be given the opportunity to engage in tasks that allowed them to have these opportunities. Chapter 5 analyses how the teachers referred these to when they reflected on their own practice, pre and during VSRD.

As well as looking at the kind of pedagogies the teachers referred to, I also wanted to consider whether there were differences in the type of reflective comments teachers made when using their memory (*ie* pre-VSRD) when compared to when engaged in VSRD. To do this, I found that the reflective themes developed by Moyles *et al* (2003) to be useful aide memoires to help structure the discussions, although these were not followed in a rigid structure. These themes included encouraging the teachers to consider the aims of the session, their own feelings about the lesson, the assumptions they made, what they thought worked well, what they focused on during the session and any critical reflections that they made. I analysed the depth of their reflection in line with the model by Muir and Beswick (2007), discussed in Chapter 2. The results of the analysis can be found in Chapter 5.

3.3.5 Working with the children - why I developed certain tools and techniques

The other participants in my study were the children. I needed to reflect carefully on the tools and approaches that I used when working with them, since strategies used with adults may not have been appropriate for use with young children. In the early and mid-twentieth century, research into child development often started from the concept of children being viewed as developing adults or 'human becomings' (Phillips and Alderson, 2002 in Farrell 2005:6). As such, the child was often viewed as incomplete or incompetent, and as such not able to consent to participation in research (Abramovitch *et al* 1991, in Farrell 2005). If practitioners still had this view, there would be little or no value to be perceived in listening to children's views. Researchers such as King (1984 in Farrell 2005) advised against techniques such as interviewing children, since it was argued that young children's capabilities to respond were limited. The research process was seen as something to find out 'about' children.

However, more recently there has been a shift in this view towards a perspective that allows the researcher to consider the fact that the child is a competent and capable participant in their everyday world (*eg* UN General Assembly, 1989). As such, children are able to make decisions relating to issues such as their participation in the research process.

Children are viewed as knowledgeable experts on their own lives, and in order to gain an understanding of this, researchers need to interact with them, rather than on or about them. Children are not mere recipients of their environment; they are active influences upon it (Grieg and Taylor, 2001). This view sits comfortably with the philosophy underpinning the Foundation Phase, where young children are seen as capable and competent. (DCELLS, 2008)

Recent opinion holds that in fact the limitations to a child's competence as the respondent in research could actually be a reflection of the researcher's poor choice of method (*eg* Brooker in MacNaughton *et al*, 2006). Since my personal philosophy is that young children are capable of making informed decisions, and participating in the process of research, I needed to select appropriate tools to allow this to happen. The research tools had to be selected carefully to answer the questions that I posed, and I decided early on in the process that several different tools needed to be used. Additionally, it was necessary to try to select the methodology and tools that would allow the voices of young children to be heard. Within current Early Years approaches, there exists a strong tradition of listening to children, and valuing their voice. For example, the view of children as rich in potential, strong, powerful and competent is fundamental to the Reggio Approach (Thornton and Brunton, 2005). Children are seen as active participants in the learning process, who co-construct knowledge through their social experiences. Children are seen as having a multitude of strategies that can be used to express themselves – the 'hundred languages of children' (Edwards *et al*, 1993) suggest that children are able to understand their experiences and express their views, although this is dependent on both the context and the adult's ability to 'read' their voice.

Delfos (2001) states 'the question is not whether children have an opinion or have information at their disposal, but how we can talk to children in order to find out their opinion or obtain that information.' This is echoed by Langsted (1994:6) who states that 'children are experts in their own lives', and thus have valuable contributions to make.

If we do view children as having an opinion worth listening to, we must seek out strategies to allow this to be heard – and simply expecting children to verbalise may not be sufficient. Indeed, when conducting research with very young children there are particular challenges, for example in the level of verbal communication skills these children may possess. Because my study involved children as young as four years old, designing a research project which allowed them to articulate their understandings – in more than just verbal responses.

The difficulty in research within classrooms is that is possible that whilst the desire to listen to and involve children in worthwhile research and classroom practice is something that practitioners and researchers increasingly value, the challenge comes in the reality of the sometimes 'messy world of practice and real live children' (Darbyshire *et al* 2005:468). For the Foundation Phase practitioners in this project and myself then, it would follow that perhaps the challenge facing them was in finding suitable ways of involving children in the research process.

Clark and Statham (2005) suggest that another barrier could be uncertainty on how best to listen to young children's views and experiences. However, whilst Dahlberg and Moss (2005:97), suggest that practitioners should work within a 'pedagogy of listening' to children, the practicalities of this remain challenging. Smith *et al* (2005), looked at a variety of methods of talking with children. These were based on discussions with a target child about photographs of recent activities the child had taken part in. The context of the discussion varied, and the situations were: group with researcher, group with teacher, one to one interview between researcher and child, interview of target child and friend by the researcher, informal conversation with the child, direct interview with child whilst parent is present. They concluded that photographs were a useful stimulus which helped focus the conversation on lived experience, and that whilst every context had some success, group discussions involved more management issues. Working with just one friend was more successful, they offered support without the danger of the target child's voice being lost in the crowd. Individual interviews varied as some children responded more than others.

The presence of a parent alerted the researcher to a task the child had found difficult, but overcame. The researchers concluded that children's perspectives should form an important part of information collected about learning.

Therefore, in this study, one strategy that was used to find out about children's initial understanding of thinking was through the use of photographs and drawings. Children looked at a series of pictures of children, and talked about whether or not they believed the children shown were thinking or not. This served as an indicator of their perceptions about thinking and also allowed discussion about the sorts of behaviours they may be looking for when making their own movie clips.

Clark and Moss (2001), suggest that when we talk about listening to 'the voice of a child' the suggestion is that we may be relying heavily on verbal information. In fact we should be valuing talking as one tool of gathering information – but not the only tool. They developed the Mosaic approach - a multi-method process combining visual and verbal representations of children's ideas. Young children should be allowed to express themselves in creative ways and we should remember that children speak in 'play, actions and reactions' (Clark and Moss, 2001:5). In this project, as well as interviews and classroom observations, I decided to use children's drawings, photographic stimuli, VSRD and group interviews to gather varied information from the children.

3.3.5a Initial meeting with children

Prior to carrying out the research, I visited each school and met the children who were going to in the intervention groups in each class. The purpose of this meeting was to establish a rapport and trust, and to gain an understanding of what the children understood about 'thinking' at the start of the project. I explained to them that I was going to be in their classrooms because I was interested in finding out about thinking. I explained that I would be working in their classes for a few days, watching some of the work that went on, making notes and sometimes asking questions.

I told them that I would be writing about the things that I found out, but that no one would know which schools I had worked in, or which children I had worked with and so I wouldn't be taking any photographs of them – but I might take pictures of their work if they were happy with that. I explained that I was very interested in their ideas, but that at any time they could leave me and go and do something else in the classroom if they preferred. In fact, throughout the project, all of the children were keen to come and work with me – they all remained interested in the activities that we did and they all wanted to come and do them again. Furthermore, group interviews may be more successful than individual ones since this may be more like the day to day classroom experiences the children have, and it may also allow for deeper answers (Clark, 2003).

Because I worked with children between the ages of four and seven in this project, there were specific challenges to the research process. For example, Einarsdottir (2005), argues that those who work with young children must find new and different ways to observe and listen to them. The interview technique may not be as useful with very young children as it is with older children and adults. MacNaughton *et al* (2006) refer to past views held by researchers regarding interviews with children, who deemed this a flawed research technique. For instance, young children may seek to 'second guess' what they think adults want them to say – especially in educational contexts where children view the teacher as knowing the correct answer (Clark, 2003). This was something that I wanted to avoid, as the purpose of this research was exploratory – I wanted to find out more about the nature of young children's thinking. O'Kane (2000) discusses how adults must try to enter the child's world, often changing and modifying approach and agenda in the process. So, in the first meeting, I used a projection technique (*eg* Cohen *et al*, 2011:434) to show pictures of people engaged in different activities – indoors and outdoors – and asked the children to identify which they thought showed people thinking.

Hutt *et al* (1989) suggests that adults who offer children personal views and ideas receive more elaborate and less predictable responses.

The adult who asks lots of questions may be perceived as needing answers, although these are answers the adult already knows. The adult who offers their opinions, may in fact offer a stimulus for children's thinking. So, in the initial group meeting with the children I encouraged discussion about the photos rather than a question and answer type scenario.

I then wanted to encourage the children to make video clips of their peers 'thinking' to gain an insight into the behaviour and actions that they considered demonstrated thinking. However, one of the questions about using VSRD with the children was whether it would be possible with children of such a young age. Einarsdottir (2005), discusses potential benefits associated with the use of technology (cameras in particular) as a method for gathering data from children. She suggests several advantages – the child has increased power in the research process as they are able to make choices and decisions; they become experts during follow-up interviews since they know the context and content of their photographs; the photographs reflect the child's perspective and there is not an over-reliance on verbal communication strategies. These elements would also be true of using video technology. Einsarsdottir (*ibid*) stresses the importance of the discussion and explanation that the children engaged in after the photographs were printed. At this point, children were able to demonstrate their reality to the researcher, often a reality not shared by the adults. I was interested to see whether using video rather than pictures, in VSRD would offer the chance to have a dialogue with the children.

Morgan (2007) found that children aged 3 to 7 years were able to engage in VSRD, and this was most successful if the VSRD took place within 48 hours of the lesson, and when children had ownership of selecting the video clips to discuss. However, whilst Morgan (2007) used VSRD successfully with young children, she did not offer the children the opportunity to make the videos – the researcher made these in her study. As such, I designed a pilot study to see whether allowing young children ownership of making video to then discuss would be an appropriate design to gain an insight into their understanding of thinking.

I needed to pilot the VSRD process in order to see if children of this age could manage the film making as well as the film watching.

3.3.5b VSRD Pilot with children

In this pilot I intended to explore whether giving children ownership of the video making in sessions would be appropriate. Two schools were selected for the pilot study through local contacts. Both were small community schools situated in areas of economic and social disadvantage. The percentages of children entitled to free school meals were well above local and national averages. Both schools were focusing on developing their teaching of thinking, and staff had recently attended courses on the teaching of thinking skills. In both schools, a mixed year one and two class (pupils aged five to seven years) was selected as the study group. There were sixteen pupils in one class and twenty in the other. I made an initial visit and then spent one day in each school. The research data collected consisted of the transcribed, recorded interviews rather than the video episodes. The video was not used as part of the research data as at this point I was not attempting to infer metacognition from observed behaviour, but rather to use the video to stimulate children to articulate their own understanding of thinking processes.

Groups of four pupils at a time were taken to a quiet area; the discussions were recorded and field notes taken. The groups were selected by the teacher and were the same groupings in which the pupils normally worked. The research process began with some scene setting questions to act as an 'advance organisers' (Ausubel, 1968) to focus the pupils on their understanding of 'thinking'. For example:

- 'We are really interested in what you know about thinking.'
- 'What thinking words do you know?'
- 'When do you do your best thinking?'

Pupils were then set the task of videoing short episodes which would show 'good thinking' in their classrooms.

The clips would be used to explain 'good thinking' to other pupils in the class. Each pair of pupils was given a camera and shown how to use it. In order to

help them be selective, each pupil was limited to videoing two clips, each of no more than one minute. Pupils returned to the classroom and videoed freely. This phase was expected to last between five and ten minutes. Pupils who returned to the researcher very quickly were asked if they had got 'really good films of good thinking' or whether they needed to video further. It was hoped that by offering initiative to children working in small groups they would be able to focus more closely on the thinking processes of other children (*cf*. Whitebread *et al*, 2007).

Each pair of pupils in turn then showed their videos to me. They were probed as to why they had chosen to video each episode. At the end of the discussion, each pupil was asked to choose one 'best clip' which they thought best illustrated 'thinking'. This strategy intended to set up a dialogue in which children would be encouraged to articulate the reasons behind their decisions to each other. I wished to explore the extent to which pupils could explicitly justify their views and gain insight into their awareness of their thought processes.

This initial pilot of the VSRD technique indicated that children could understand and work the video camera, and explain the reasons for their choice of clip (Tanner, Jones and Lewis, 2011). A camera that would connect to a computer through a USB port was selected for the main study for making the videos, as it is simple and quick to use, and because children had shown preference for a 'real' (adult) camera over one designed for children in the pilot. So, I felt that planning for days in school where both teachers and children would engage in VSRD would be possible.

During my school visits in the study itself, the participating children were grouped into pairs. Each pair in turn were then given a camera and shown how to use it. Each child was asked to make a video of other children doing 'good thinking' in their classrooms, while the other child helped them choose whom to film. They then swapped roles. Each pair then came back and showed the two videos to me.

They were questioned as to who and what they had selected to record, and why they thought it was a good example of thinking. At the end the pairs

were asked to decide which of the two clips they felt showed better thinking. This was intended to promote dialogue and justification of decisions, which, it was hoped would allow insight into awareness of thought processes.

Each visit involved the same group of children. All discussions, lessons and interviews were video/audio recorded and transcribed. No videos of children or teachers were used in any context beyond the project and were not saved after the thesis had been completed. All children at all times were very keen to engage in the film making, and also in then talking about what they had done. The data from the work with the children is discussed in Chapter 6.

Chapter Summary:

This chapter has explained and justified the research design adopted within my study, and noted the ethical principles that I adhered to throughout. Because of the nature of my research questions, a pragmatic approach was adopted as the overarching methodological framework.

Throughout the research process I made sure that I acted ethically. I respected the participants and designed a study that would minimise any risk to them. I obtained appropriate permission, consent and assent throughout the project, and protected the anonymity and confidentiality of the participants. I was honest and behaved transparently throughout the process, and designed the study in order to be able to report my findings with integrity.

There were two distinct stages to the study, each requiring different research tools; an initial scoping survey and an action research phase. The challenges of working with young children and adults have been outlined in order to provide a context for the tools that were designed. A key focus was on encouraging the teachers to see themselves as co-researchers, and for my research design to be sensitive to the needs of young children – encouraging them to participate fully in the study. A key research tool that was used in the action research phase with both teachers and children was VSRD. Results and findings are presented in Chapters 4, 5 and 6, which follow

Chapter 4
Questionnaire analysis

Introduction

This chapter focuses on analysing the data collected in response to the first of the Research Questions I designed, namely:

How were Foundation Phase teachers in Wales teaching thinking?

In order to answer this, a scoping survey was carried out in order to explore teachers' approaches to the teaching of thinking, and their perceptions regarding the impact and effectiveness of this. As discussed in Chapter 3, this was sent to all Foundation Phase (FP) settings, both maintained and non-maintained, in Wales. In total, 312 responses were received from a total of 1380, making for a response rate of 23%. My sample therefore consisted of the schools and teachers who chose to respond. This figure provided confidence levels of 95%, with a confidence interval of 4.88 (calculated by www.surveysystem.com/sscal.htm#one).

This means that for a question where the answer from the responses that I gained was for example 50%, I can be 95% confident that, if all 1380 schools had responded between 45 and 55% of the population would have answered in the same way.

4.1 Describing the data.

The first three questions asked respondents to provide information regarding the size and type of school that they worked in and their role within the school. I asked these questions to see whether responses came from a range of schools, staff and settings, or whether they were received from similar contexts and teachers. The greater the range, the closer I felt the sample would represent the actual population of FP contexts in Wales. Analysis of these responses suggests that the 312 responses received came from teachers working in a variety of types of school, as illustrated in Table 4.1 below:

Private pre-school	Nursery	Nursery and Infant	Infant (no Nursery)	Junior	Primary (Nursery, Infant, Junior)	Primary (Infant, Junior)	Special	Voluntary aided
2%	4%	7%	1%	6%	63%	14%	2%	1%

Table 4.1 Sample schools by type

These figures indicate that whilst the majority of responses came from mainstream primary schools with nursery, infant and junior phases (63%), the sample included responses from a wide range of types of schools. This is important as it implies that the responses may be more representative than if they had only come from one or two types of school. The actual distribution of types of school within Wales also reflects a similar picture. Current data from the Welsh Government suggests that there are currently 13 (1%) Nursery schools, 1333 primary (95%), 19 special (1%) and 26 (2%) independent schools with FP classes (http://wales.gov.uk/statistics-and-research/address-list-of-schools retrieved 21.1.15).

If I combine the Nursery and Infant, Junior, and Primary categories of my data, the sample can be compared with the data for the population. Bearing in mind that there may have been some small variations across time in the exact number of settings, this table below still indicates that my sample is broadly representative of the national picture of schools as illustrated in Table 4.2 below:

	Private pre-school Or Nursery	Primary (Nursery, Infant, Junior)	Special	Voluntary aided/ independent
Sample (2011)	6%	91%	2%	1%
Population (2015)	1%	95%	1%	2%

Table 4.2 Schools by type, in sample and nationally

That this sample contained a range of types of school was further echoed by the responses that indicated that responses came from schools of varying size, from very small to large. The following table, 4.3 illustrates this:

Less than 50 pupils	51- 100	101 - 150	151 - 200	201- 250	251+
16%	18%	16%	17%	13%	20%

Table 4.3 Size of school by number of pupils

Therefore, within this sample, roughly one third (34%) of schools had 100 or less pupils, 46% had between 101 and 250 pupils and 20% of schools were large with more than 250 pupils. Again, this demonstrated that the sample was representative of the general population since responses came from a range of contexts. This was important because it is possible that approaches and teaching methods will be different in a small school where all Foundation Phase children are together in one class compared to a larger school where there may be several classes in each year group. For example, Wasley *et al* (2000), suggests teaching styles in small schools differ from those in larger schools because teachers tend to use a broader range of strategies to engage children. Of course, this raises questions as to what constitutes 'large' and 'small', and simply using different strategies may not impact upon standards. However, for my research I was pleased to see that there were broadly similar responses in each of the categories I had created, making a balanced sample.

I was also interested to see who had responded to the questionnaire. I felt that it was important to know respondents' role within school and whether or not they were responsible for managing thinking skills. If they all had been responsible, it could have been that they had more of an interest in thinking skills, and this may have added a potential bias on the responses. They should have a clear understanding of how thinking skills are coordinated across their school, but may respond more positively about thinking and its impact on learners than teachers with less interest.

However, if all of the responses had come from staff without responsibility for thinking skills coordination, they may in fact be less aware of how these skills are being implemented across the school.

If the responses on the other hand came from a range of teachers, and from some who did not have responsibility for coordinating thinking skills as well as some who did then the sample could again be considered to be more representative. The following table, 4.4 shows the range of roles within the school:

Class teacher	Middle manager	Deputy/ assistant head	Head teacher	Other
22%	11%	16%	51%	0%

Table 4.4 Respondents' role within school

So, 67% of respondents were senior leaders within the school. This would indicate that they should have a clear overview of the general approach being taken to teach thinking across the school, and so be able to answer the questionnaire thoroughly. Of the respondents, 56% (n=173) were responsible for coordinating thinking skills in their schools, and so again should have been in a position to provide thorough and detailed information.

Summary of the sample:

So, in terms of the sample, responses were received from a range of schools and settings. The highest number of responses came from primary schools with Nursery, Infant and Junior departments. Respondents had a range of roles within school although the majority were in senior positions, and half were head teachers.

Nearly 60% of those who responded had responsibility for coordinating thinking skills within their school.

4.2 How are schools teaching thinking?

The next series of questions aimed to ascertain what the schools were doing in terms of teaching thinking. Firstly, I wanted to find out the priority that respondents felt thinking skills were given in their schools.

Of course, there may be a difference between perceptions – or espoused theory and reality – or theory-in-use (*eg* Argyris and Schön, 1974:6 as discussed in Chapter 2) but the following table, 4.5 indicates the responses given:

No priority	Low priority	Neither high nor low priority	Some priority	High priority
0%	1%	2%	26%	71%

Table 4.5: Responses to the priority placed upon the teaching of thinking skills

So, responses indicate that virtually all schools feel that thinking skills are given some priority, and nearly three quarters of respondents feel that thinking skills are given a high priority. Although the responses are limited due to the nature of a Likert scale, they do indicate that thinking skills are a pertinent area of the curriculum that the vast majority of schools are giving at least some priority to. Therefore, it was important to find out how respondents feel this priority is translated into regular classroom practice. Question 6 of the questionnaire asked how frequently thinking skills were taught. Responses were analysed by year group (Nursery, Reception, Year 1, Year 2 and Year 3). In all age groups the results were similar. The majority of responses for each age group suggested that teachers taught thinking skills daily. In this, there was no great difference between the year groups. Overall, 62-64% of respondents stated that thinking skills were taught daily, 32-33% stated that they were taught weekly and less than 1% of respondents taught thinking in an intensive block.

So, it would seem that schools are regularly teaching thinking – or at least they are delivering activities that they classify as thinking. The fact that most schools in the sample indicate that they are teaching thinking daily is a finding echoed by Estyn (2011:13), who reported that:

> The 'Developing thinking and assessment for learning' programme has affected the classroom practice of the teachers involved…. Many of the techniques trialled are now used daily by teachers and learners.'

I wanted to find out how this regular teaching was being implemented. Was this being taught in separate lessons, in specific subjects, or infused across the curriculum? The following table, 4.6 indicates responses:

We don't teach thinking skills at all	In specific thinking skills lessons	In all or nearly all subjects across the curriculum	In specific subjects	In a combination of ways
0.6%	4%	51%	0.4%	44%

Table 4.6 How schools are teaching thinking skills

Two respondents (0.6%) said that they did not teach thinking at all. This was an interesting response as thinking is such an integral part of learning and understanding. This also illustrates the limitations of a questionnaire over an interview – it would have been useful to be able to follow this up by asking the teachers exactly what they meant by this. Do the teachers assume that children will develop these skills independently, or do they not value thinking, or did they simply misinterpret the question?

Half the sample claimed to teach thinking skills in all or nearly all subjects, with nearly as many claiming to teach thinking in a variety of ways. This suggests that an infusion model, as discussed in Chapter 3, is being adopted by the majority of respondents. Most respondents teach thinking across the curriculum and this would have been in line with Welsh Government guidance for skills across the curriculum (DECELLS, 2008). Only 12 (4%) restricted themselves to teach thinking in specific thinking skills lessons. Again – being able to ask for clarification here would have been useful – did the teachers mean that they taught specific skills in certain lessons but that thinking happened across the curriculum, or did they really mean that thinking was restricted to certain lessons.

Those teaching in specific subjects identified mathematics and science as the subjects that they taught thinking skills in. This may link to CASE and CAME (Adey and Shayer, 1994) materials which are popular and which provide subject specific thinking skills activities.

The small number of cases may well reflect the Foundation Phase approach to teaching that is an holistic model. This lends itself less well to specific subject teaching, and encourages teachers to teach across areas of learning

The 44% of respondents who indicated that they taught thinking skills in a variety of ways indicated that 'Plan, do, review' sessions and 'Let's Think' materials were some of the ways that this was done. Again it would have been advantageous to be able to question respondents further to find out further details of this.

However, just knowing how often something is taught, and in which lessons does not provide information about the techniques that are being used or quality of teaching that goes on. It is worth noting that the techniques frequently referred to by Estyn are those designed to promote assessment for learning strategies in general rather than a broad range of thinking skills. For example, Estyn (2011:13) suggest that:

> 'Mind mapping, sharing success criteria, talking partners, hot seating and using 'two stars and a wish' are some of the most widely adopted strategies that have affected classroom practice.'

I wanted to find out who took responsibility for this teaching. Would thinking be taught by specialists, class teachers, or be seen as the responsibility of all staff within a school? To create a culture of thinking as defined by Ritchhart *et al* (2011) all stakeholders need to be engaged, so that thinking can be promoted consistently and with understanding. Question 8 asked respondents to indicate who taught thinking in schools. The following table, 4.7 summarises the findings:

Year group	Class teacher	Support staff *eg* LSA	Specialist teachers
Nursery	83%	45%	< 1%
Reception	91%	46%	2%
Year 1	91%	41%	3%
Year 2	91%	39%	3%
Year 3	88%	35%	4%

Table 4.7 Summary of who teaches thinking, by year group.

In every year group responses indicated that 83-91% of class teachers were believed to be involved in teaching thinking. This is interesting, not least because this means that in 17% of nursery classes the responses indicate that class teachers are not seen to take responsibility for teaching this aspect of the curriculum. This may however reflect contexts where the nursery is led by a nursery manager. Very few responses indicated a specialist or expert teacher delivering sessions, although in Year 3 this percentage was 4%. This suggests that teaching thinking is seen to be a part of most teachers' responsibilities.

35-45% of classroom assistants also taught thinking. This figure has higher percentages in Nursery, Reception and Year 1, and decreased in Year 2 and 3. This is unsurprising since in most schools there will be fewer assistants in Year 2 and 3 than in the younger classes. This means that up to 65% of respondents think that classroom assistants do not teach thinking. This figure raises an interesting issue because adults such as LSAs are in these classes on a daily basis, and are significant in terms of the interactions they have with children. If they are not thought to be teaching thinking this could raise issues regarding their training and understanding of the importance of, for example Sustained Shared Thinking. Estyn (2011:16) reported on this, stating that, within the sample of schools they visited:

> 'there is still too much variation in practice within and across schools. Not all lessons observed demonstrate assessment for learning or thinking skills in a meaningful way and most classroom assistants do not have a good understanding of the strategies being used.'

Summary of how schools approach the teaching of thinking:

So, nearly three-quarters of respondents feel that teaching thinking has a high priority within their school, and over 60% report that thinking is taught daily. This figure does not seem to be dependent on the age group taught. Only 4% of respondents report teaching thinking in specific thinking lessons, whereas the majority teach thinking across the curriculum in an infusion approach. Class teachers take the predominant responsibility for teaching thinking, and over half the respondents do not perceive classroom assistants to teach thinking, which is a noteworthy observation.

The next series of questions asked about the training that had been received to support the teaching of thinking.

4.3 What training have teachers received in thinking skills?

In order to explore the teaching of thinking more fully, I wanted to know how much training had been received by teachers and other school staff.
Firstly, the number of hours of training received by individual respondents varied, as shown in the following table, 4.8:

Less than 3 hours	3 – 6 hours	7-20 hours	21+ hours
32%	17%	36%	14%

Table 4.8 Hours of training received by individual respondents

So, a third of respondents have received less than three hours of thinking skills training. Only 17% have received up to the equivalent of a day's training. 36% had received 1- 4 days of training. This means that a half of all respondents have had less than a week of training in this area, and yet the majority, as the earlier questions reveal, hold responsibility for teaching this on a daily or weekly basis. Furthermore nearly 60% are responsible for managing thinking within their schools. I did not ask for figures relating to a time frame – in hindsight this would have been useful – 4 days training in an academic year is different to say 4 days of training over a 10 year career. I carried out a *t* test to compare the number of hours training received by those with responsibility for coordinating thinking skills with those not responsible.
I wanted to see if there was a difference between these groups – the null hypothesis being that there would be no difference in the amount of training. More hours of training were received by those responsible for coordinating thinking skills (mean =16.3 hours) than for those without responsibility (mean = 8.6 hours).

The mean difference between groups was 7.7 hours, and an independent *t* test showed that this difference was significant ($t = 4.217$, df= 253, p=<0.001, two tailed). Because the significance was <0.05 I used the 'equal variance not assumed' data. This data had an effect size of Cohen's d = 0.44.

Cohen (1988) suggests that effect sizes of 0.2 are small, 0.5 are moderate and 0.8 are large for t-tests. Therefore, the effect size in my data is small (although of course, these are 'merely naming conventions suggested by Cohen' Palgrave, 2006:14).

The following figure indicates confidence intervals at 95%. This indicates that whilst the sample mean of hours training for those without coordination responsibility is 8.6 hours, we can actually be confident that 95% of the sample population mean falls between 4.2 and 11.3 hours of training.

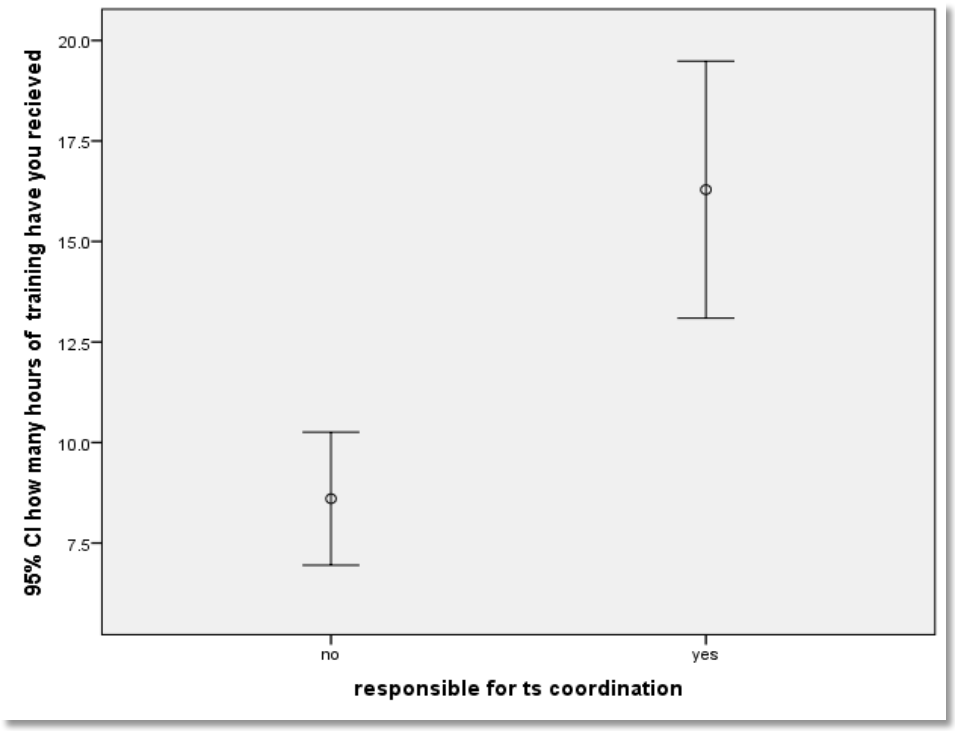


Figure 4.1 Confidence intervals for the numbers of hours training received by the groups with responsibility for coordinating thinking and the group not responsible.

This shows that the 'no responsibility' group has had considerably less training than the 'responsible' group. However, there is less variation within the 'no responsibility' group. There is no overlap because the difference is deemed to be significant. This suggests that there is a wide range in terms of hours training that has been received within the sample, regardless of whether an individual has responsibility or not.

This also leads me to think that there may be a greater development need amongst teachers who do not coordinate thinking skills but who are still teaching this on a daily or weekly basis.

I then broadened this to find out who else in the school had received training. Respondents could tick as many choices as applied to their schools. Estyn (2011:6) suggest that 'The programme has had the greatest effect in schools where the senior management teams support its key principles'. Taking a whole-school approach is widely recognized to be a more effective strategy. For example, in Finland – widely recognized as a world leader in terms of their education system (Pearson, 2014), the whole-school approach is systematically implemented.

In a similar way, the Qualifications and Curriculum Authority (QCA, 2000) confirms the importance of a whole school approach to initiatives. However, as the following table, 4.9 indicates, in my sample training has not been extended beyond class teachers in the majority of schools:

All class teachers	Class teachers and other teaching staff	Governors	Specific members of staff	Other	No-one
56%	48%	12%	5%	<1%	4%

Table 4.9 Stakeholders who have received thinking skills training

So, just over half of schools in the sample were in a situation whereby all teachers had received some kind of training. Of course, this also implies that in half the schools (n≈156) not all teachers have been trained. This could well lead to variation in the quality of teaching within schools as well as across schools. Furthermore, in over half of schools this training had not included other teaching staff. A small percentage of Governors and specific members of staff such as Heads and phase coordinators have received training. Those responding to the 'other' category had trained parents as well. This was a very small proportion of respondents however. Estyn (2011:16) also identify the lack of training, particularly of support staff and other as an issue, stating that:

> '… only a few schools have trained classroom assistants and only just over a half of schools have made parents aware of the programme and how they might support their child.
> As a result, there is a lack of consistency in the support pupils experience as those staff who are not familiar with the new strategies and tools carry on using other methods to teach and support pupils.'

Perhaps this lack of training is linked to the perception noted earlier - that classroom assistants are less responsible for the teaching of thinking. However, it is difficult to say which came first – do they receive less training because it is 'not their job' to teach this element of the curriculum, or do they not teach this so much because they lack the necessary training?

Whilst my questionnaire could not answer this query, when I analysed the data further it became apparent that there is variation, not just in who has been trained, but in the type of training and the amount of each type received. The results made it clear that firstly there are a number of different ways in which schools have received thinking skills training. Most training seems to fall within the region of 3 – 6 hours in duration. Put simply this means that the majority of teachers have received one day or less of training in the teaching of thinking skills. Very few report training in excess of 20 hours - about the equivalent of a week's worth of training. The following table, 4.10 shows the hours and type of training received in each of the responding schools:

Type of training	none	3 hours or less	4-6 hours	7 – 20 hours	More than 20 hours
In-school led by staff	50%	27%	17%	5%	1%
In-school led by LA	61%	16%	15%	7%	1%
In-school led by consultant	72%	8%	12%	6%	2%
Out of school LA INSET	40%	11%	24%	18%	6%
Out of school	63%	6%	13%	13%	5%

external INSET					
University course or module	92%	2%	2%	1%	3%

Table 4.10 Number of hours and type of training received in each school: Hours training received

Of the training received, only 8% of schools have used University courses or modules, whereas 60% have received some kind of out-of-school training with the local authority and 50% have had some training delivered by staff within the school. The most common pattern seems to be either a day or twilight/ half day in school with staff (44%), or 3 -20 hours with the local authority (53%).

Estyn (2011) found a similar pattern and commented that 'many' schools had trained teachers who were not originally involved in the thinking skills programme. They comment that schools use a variety of strategies to do this, such as staff meetings, in-service training, classroom observations and by setting up professional learning communities (PLC). No one commented on the presence of a PLC, however I did not include this as a separate option, so respondents may have included this in one of the other responses. Estyn (2011) reported that the development of thinking and assessment for learning was most effective in contexts where senior leaders supported the principles and a PLC ethos was established.

Summary of training received: One third of respondents in the sample had received less than three hours training in thinking skills. In general, it is class teachers and not other stakeholders who receive training in this, and the most common training seems to be held in school or with the Local Authority. 44% of training in schools is 3-6 hours in school or 3 – 20 hours with the Local Authority. It is interesting to note the lack of training for parents, Governors and particularly classroom assistants. Those responsible for coordinating thinking skills within schools have received significantly more hours of training than those who are not responsible.

4.4 What materials are schools using to teach thinking?

Given the wealth of materials available within the field of teaching thinking, I next wanted to find out what range of materials schools were using to teaching thinking, and what influenced their decisions. Schools were given a list including Philosophy for Children (P4C), Activating Children's thinking (ACTS), cognitive acceleration programmes such as 'Let's Think', local authority models such as 'Learning to Learn' and the Welsh Government's thinking skills materials to choose from. This list was refined after the pilot study, but because I knew that this was not exhaustive I included an 'other' section and asked for details if they selected this option. The data indicates that schools are using a wide variety of thinking materials:

The most popular approaches were those materials relating to cognitive acceleration, such as 'Let's Think' and 'Let's Think Early Years (38%).

These have been the focus of several Local Authority initiatives (*eg* Swansea LA, 2011 http://www.swanseagfl.gov.uk). Perhaps surprisingly, given that it was a national initiative, only 29% of schools report using the Welsh Government (WG) materials. Between 2005 and 2009 almost all local authorities were involved in this programme, and nearly 900 teachers were trained. The exact figures are shown in Table 4.11 below:

Phase	Local authorities	schools	Teachers
Pilot	9	42	110
Year 1	19	357	870

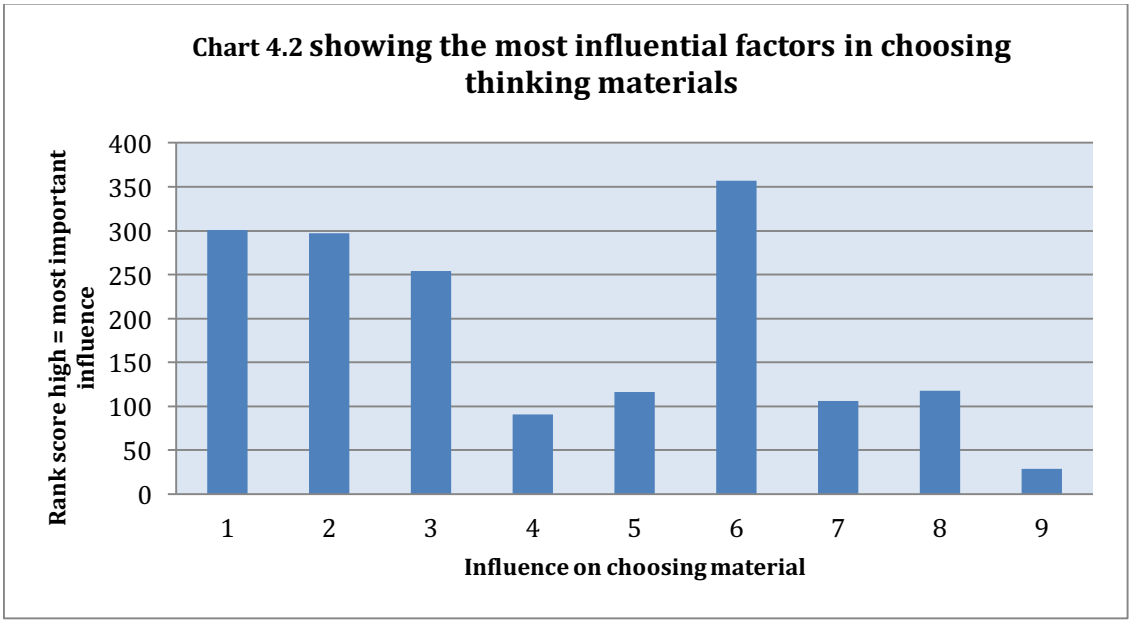
Table 4.11 Total involvement in the 'Developing Thinking Skills and Assessment for Learning' programme Source: Estyn, 2011

The limited reference to the sustained use of this programme may reflect the sample, because we cannot tell if any of those who responded were included in the project. It may also be due in part to that fact that the materials are free of content, which means teachers need to develop and embed them into the curriculum themselves.

To do this, they must understand the underpinning principles, and this is

challenging. Therefore, teachers may not use the materials. Another possibility is that the WG programme actually included cognitive acceleration and ACTS within it, and so respondents were unsure which boxes to tick. If we combine the WG, cognitive acceleration and ACTs segments together, then the overall percentage of respondents using these materials is 77%. This is relevant to this thesis as (as discussed in Chapter 2) these approaches all take a broadly socio-constructivist approach, teaching thinking skills within a context of challenge and collaboration, similar to that used in the intervention phase of my research.

Other materials mentioned included thinking maps, De Bono's hats, Thinking Keys, Building Learning Power and TASC. There was no mention of Thinking Routines, which suggests that my use of these with the teachers in Wales involved in my research would be innovative. What influenced the choice of materials? How did schools decide what to use? I asked respondents to rank three reasons in order of significance, and then looked to see which influence scored most highly. The following Figure, 4.2 summarises the findings:



Legend: 1= School Development Plan; 2 = Local Authority; 3= Personal Interest; 4 = Word of Mouth; 5 =Budget; 6 = External advice; 7 = Ease of use; 8= Training available; 9 = Seeing it used

Figure 4.2 the most influential factors in choosing thinking materials

From this figure it appears that there are a number of factors influencing schools when they select thinking materials. The most influential factor in this sample is external advice. It would have been interesting to find out who this advice came from, and what it suggested. Factors such as the School Development Plan and Local Authority advice were also seen as influential. Personal influence and budget considerations were also influential factors. However, seeing materials used, training being available, word of mouth and interestingly, ease of use were the least commonly selected influences.

Summary of materials used to teach thinking:

Responses indicate that there are a wide range of thinking skills materials and approaches used by respondents. The most commonly used are cognitive acceleration (38%) and WG materials (29%).

A number of factors influenced the selection of materials, of which external advice was ranked highest overall, and seeing materials being used ranked the lowest.

4.5 What is the impact of training on schools?

The questionnaire did not ask about the quality of the training that was received directly, nor on perceptions of the quality of the materials being used. However, it did ask respondents to comment on both the impact and effectiveness of teaching thinking skills. Although similar, my interpretation of the concept of effectiveness considers how well thinking could be taught – the strategies etc. For example, the WG materials may make a difference to the effectiveness of teachers:

> 'The programme has changed the classroom practice of many of the teachers involved. These teachers have become more confident and creative in using a wider range of teaching styles' (Estyn, 2011:4).

In terms of what difference this change in practice makes to the progress of the learner Estyn did not see an impact on standards of literacy and numeracy but did however see that:

> ‘In many of the primary schools visited, there have been improvements in pupils’ behaviour and attitude to learning. The interaction between pupils and adults has improved, and pupils have become more willing to listen to the views of others. In particular, the confidence and engagement of lower-ability pupils have improved.’ Estyn (2011:4).

Of course, one of the challenges of a questionnaire is that I do not know if the respondents interpreted effectiveness and impact in the same way that I did. I could not ask them individually what they thought these terms meant, which is one of the limitations of a postal survey. In my questionnaire, 98% of respondents thought that teaching thinking made a positive impact on pupils. Of these, 50% of respondents reported that the teaching of thinking had high impact, and 48% saw some impact. Whilst we do not know if they have interpreted the term ‘impact’ as to mean impact on standards in literacy and numeracy, or if they have taken a broader view, the overall impression is a positive one. Only a very small percentage felt that there had been no impact, and the analysis is summarised in Figure 4.3 below:

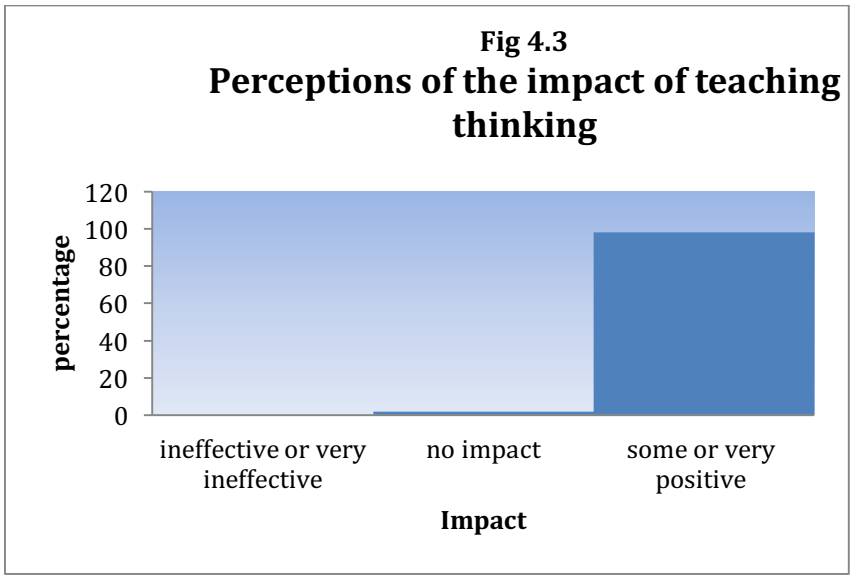


Figure 4.3 Perceptions on the impact of teaching thinking

I also wondered whether opinions varied depending on how much training respondents had received. The following table shows that regardless of how many hours training you received, the mean score given to impact was similar, and high. Impact was grouped on a 5 point scale, where one was very low impact and 5 was very high impact.

The mean impact was 4.48 with a range of 4.31-4.65. Although the highest mean was in the group where respondents had received most hours of training, there is insufficient evidence to suggest that the more training a respondent received, the more positively they viewed the impact of teaching thinking – possibly because nearly all respondents viewed teaching thinking as having a positive impact (χ^2 (3,N=301) =11.887 p=<0.008). Table 4.12 below shows the mean score relating to the perceived impact of training, depending on hours training received:

Hours training	Mean score - impact	Standard deviation
0-3 hours	4.46	.563
>3 - <6	4.31	.466
>6, <20	4.50	.520
21+	4.65	.526

Table 4.12 Hours of training and mean score of impact of thinking skills.

This is important to consider. As earlier data has shown, there has been a variety of approaches to and time spent training teachers and, in some settings, other stakeholders. Estyn (2011:14) suggest that:

> 'In the schools where the programme has had most impact, the improvements in the overall quality of teaching in recent years are linked to the enthusiasm with which all members of staff have embraced new approaches to teaching and learning'.

I also asked how effective respondents felt teaching thinking had been. There was a similar, but not identical pattern of responses to those received when considering impact. Although once again, most people felt positive about the effectiveness, there was a greater variety of response. For example, one respondent (0.3%) felt that teaching thinking was very ineffective and 15 respondents (5%) felt that it made no difference. 60% felt that it was effective, and nearly 35% felt that it was highly effective. The mean score of 4.28 supports this, and the findings are summarised in Table 4.13 below:

Hours training	Mean score effectiveness	Standard deviation
0-3 hours	4.22	.658
>3 - <6	4.28	.573
>6, <20	4.29	.496
21+	4.40	.665

Table 4.13 Hours of training and mean score for effectiveness of teaching thinking

Although the highest mean was in the group where respondents had received most hours of training, there is insufficient evidence to suggest that the more training a respondent received, the more positively they viewed the effectiveness of teaching thinking (χ^2 (3,N=295) =3.025 p=<0.388). The figure below illustrates that the majority of teachers viewed the teaching of thinking as effective or highly effective.

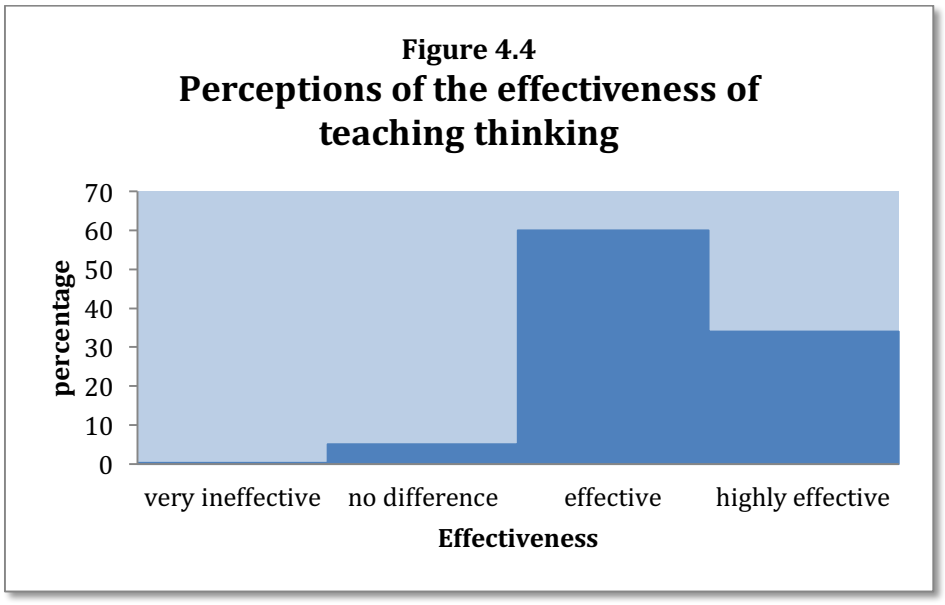


Figure 4.4 Perceptions of effectiveness of teaching thinking

Summary of Chapter 4

This chapter sought to gain a sense of the national picture regarding the teaching of thinking in the Foundation Phase. After a pilot (described in Chapter 3) a scoping survey, in the form of a questionnaire was sent by post

to all Foundation Phase settings in Wales. The resulting sample came from a broad range of types of school representative of the broad national picture.

The simple answer to question 1 (How were Foundation Phase teachers in Wales teaching thinking?) is that they were teaching thinking in a variety of ways, using a range of resources. Teaching thinking is seen as important. A high percentage of respondents consider that the teaching of thinking has a high priority in their schools, and perhaps therefore not surprisingly, most report that they are doing this on a daily basis. In most schools it is seen as the teacher's responsibility and nearly all respondents see teaching thinking as something important, that has a positive impact on pupils. There was considerable variation amongst respondents relating to the amount and nature of training that had been received. Most teachers have had less than a day of training – with nearly half indicating that they have had no training at all. Additional staff and other stakeholders have had little opportunity to engage in training, and the teaching is generally carried out by the class teacher.

The questionnaire could not give me further information because of its design and the limitations and scope of the questions. In order to see what teachers and children were really doing in school, and to explore understanding and the teaching of thinking in more detail I needed to change my research tools. As such, the following two chapters report on the action research phase of my study, where I was able to gain a more in-depth understanding of practices in six Foundation Phase classes.

The following image is a sketchnote to summarise the key findings from this chapter. I found the sketchnoting process a useful one for myself – it enabled me to reflect on the key messages and findings from this chapter in order to summarise them clearly.

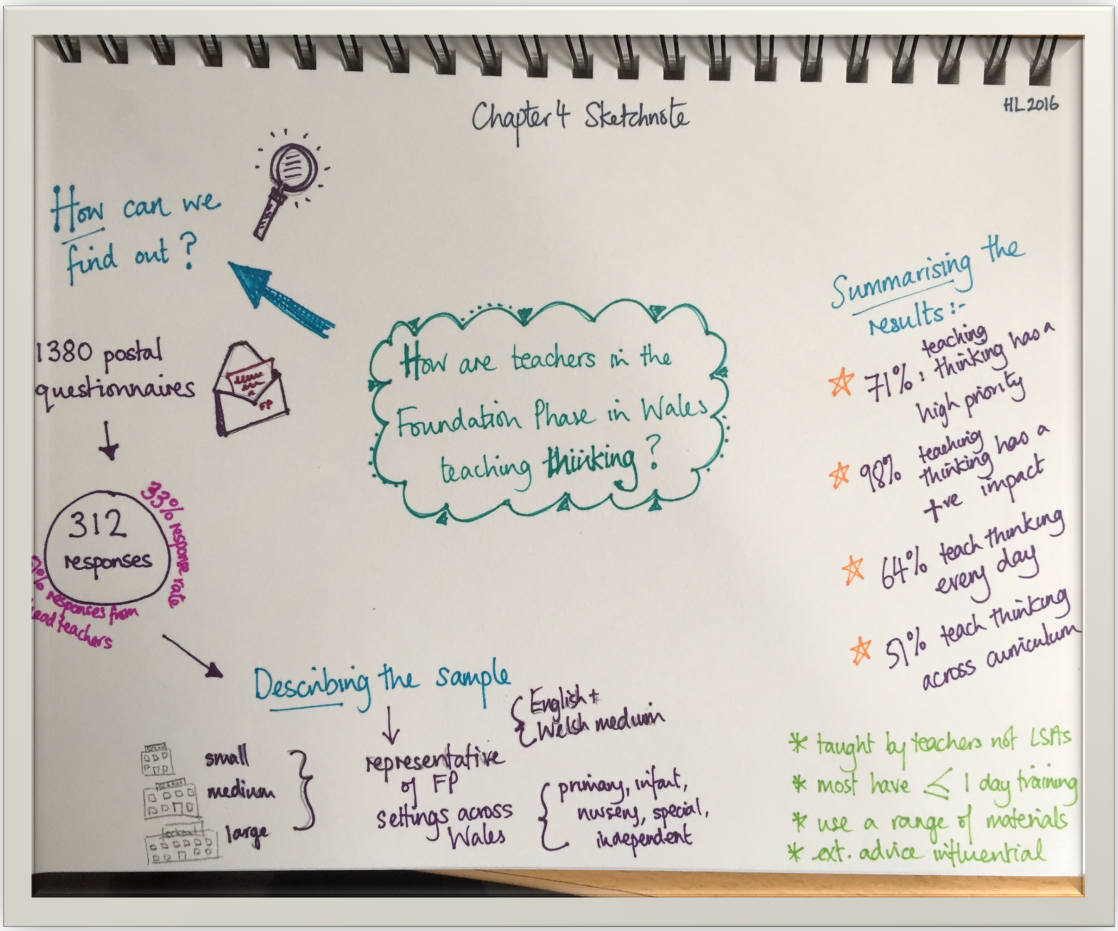


Figure 4.5 My personal Sketchnote, summarising the chapter.

Chapter 5
The teachers' journeys

Introduction

This chapter present the results relating to the question: 'How did the teachers involved in the project develop in their teaching of thinking through the course of the intervention?'

Following an introductory contextual section, the chapter is divided into three main parts and each of these parts report back on key findings. Section 1 presents the findings from the first cycle of action research – the first Teacher Network Day (TND) and the first observation visit to schools, with a particular focus on the reflections made by the teachers regarding the sessions that they taught. This includes analysis of pre-VSRD reflection and the VSRD undertaken with the teachers. Section 2 presents findings relating to TND 2, whilst section 3 considers the data from the final cycle of action research – the final TND and the final observation. Later on, Chapter Six revisits these observation days from the perspective of the children, and their metacognitive development.

Contextual information

Six classroom teachers took part in the study, and remained involved for the duration of the project. The teachers all attended each of the three teacher days, and were present in school on each of the visits I made. During the course of the study, no teacher moved school or changed their role within school. Our first session began with introductions whereby each teacher provided a pen portrait of themselves, their school context and their reasons for becoming involved at the start of the project. The summary of this information is provided in the following table, in which the actual figures relating to the number on roll, free school meal eligibility and number of children with additional learning needs have been rounded to preserve anonymity.

The table indicates that the schools in which the teachers worked in were

diverse - ranging in size from 120 pupils on roll to 600, and were located in semi-rural to inner city locations. Five of the schools had high levels of children who were eligible for free school meals, and the numbers of children identified as having Special Educational Needs ranged from 20-50%. Three of the group were Year 1 teachers (Sam, Mel and Lucy), Ceri had a Reception class, Lynda had a mixed Reception/Year 1 class and Olivia had a mixed Year 1 and Year 2 class. This information is summarised in Table 5.1 below:

Teacher pseudonym	Background Information	School information	Thinking skills materials in school	Reason for involvement in project
1 ON **'Olivia'**	Classroom teacher, working as SENCo and FP coordinator. 13 years teaching experience.	Semi-rural Approx 220 children on roll Approx 30% eligible for free school meals (e-FSM) Approx 30% Special Educational Needs (SEN) Catchment area is described as an area of 'significant economic and social deprivation' 10 full time teachers	WG materials	Always been interested in understanding ways to develop children's thinking, had just completed a two-year project with an HEI partner to develop AFL and had been observing the wide range of interpretations. She said '*I became frustrated watching the increasing use of schemes to develop thinking skills within a curriculum area such as science and maths, where this was used within a single activity followed rigidly weekly*' – wanted to broaden understanding and ideas
2 CK **'Ceri'**	Classroom teacher, FP co-ordinator. Interest in Assessment for Learning and problem solving. 6 years of teaching experience.	Urban Approx 250 children on roll Approx 50% e-FSM Approx 50% SEN the school serves a mixed catchment area but has a considerable percentage of children who come from disadvantaged backgrounds 10 full time teachers	WG materials	The school has a long tradition of working in partnership with the university, and so when the flier came to school Ceri was identified as having a class of children who might benefit from an intervention project, and she was happy to gain some additional professional development experience. She hoped to '*gain ideas on how to use a better range of thinking strategies*'.
3 LP **'Lynda'**	Classroom teacher, FP co-ordinator. Over 20 years of teaching	Semi-rural Approx 120 Approx 20% SEN School describes	WG materials P4C	Limited training in thinking skills so keen to develop. The Headteacher had responded to my questionnaire and so put Lynda in touch as she felt Lynda would benefit from '*something new*'. Thinking skills was an area that Lynda had little training in and at

	experience.	catchment as 'neither socially advantaged or disadvantaged' 6 full time teachers		the start of the project she said that she '*wasn't sure how to use thinking materials with younger learners effectively*'.
4 LE **'Lucy'**	Classroom teacher, mathematics subject leader in school. 4 years of teaching experience.	Urban Approx 600 children on roll 35% e-FSM Approx 30% SEN Includes Flying Start and autistic unit School considers itself to be in an area of socio and economic disadvantage 28 full time teachers	Let's Think WG materials	Interested in problem solving and developing '*excellent FP practice*' in the school. Keen to continue to develop professionally. Felt that the WG materials were not supportive enough and so thought that the project might be '*useful to find out about additional and more effective strategies*'.
5 SL **'Sam'**	Classroom teacher, thinking skills leader in school. 6 years of teaching experience.	Urban Approx 260 children on roll Approx 30% e-FSM Approx 40% SEN The school states that 'Pupils come from a variety of backgrounds, ranging from relatively prosperous to economically disadvantaged- around 35% live in the 20% most deprived areas of Wales' 8 full time teachers	WG materials Thinking hats Mind maps for personal reflection	Has already been involved in several thinking skills initiatives, and was keen to expand knowledge. As thinking skills leader in school, Sam hoped to develop a 'toolkit' of ideas. Sam felt that 'the type of children' in the school would benefit from some new and practical activities to develop thinking skills. Sam stated that '*I am keen both personally and in desire to move thinking on in the school*'.
6 MR **'Mel'**	Classroom teacher, works part-time. 10 years of teaching experience.	Urban Approx 400 on roll Approx 40% e-FSM Approx 50% SEN The local authority describes the catchment as one of the most deprived areas in the city' 18 teachers	WG materials LA materials Let's Think	Keen to look at ways to develop language and thinking. The Headteacher suggested that this would be a good professional development experience. Mel felt that the catchment area of her school was one where children entering school would '*benefit from some intervention'.*

Table 5.1 Contextual information about participants and their schools.

This table illustrates that the group comprised teachers with a variety of classroom experience (between four and twenty years), who came to the project for differing reasons, such as personal interest or a desire to develop professionally. The most common of these was the hope that involvement would improve their classroom practices, and the teachers all said that they were looking forward to the chance to have an opportunity for professional development. Some had more experience with teaching thinking skills than others. All had attended at least one twilight session relating to the national thinking skills/ assessment for learning initiatives (WG, 2008). The project design would allow individuals, however experienced, the opportunity to build their own expertise. Since action research is primarily concerned with 'enquiry by the self into the self' (McNiff, 2013:23), with others acting as critical friends at appropriate moments the teachers would be encouraged to think about their own practices first and foremost.

At this point I wanted them to be clear that their role as co-researchers would be important. We talked about what being 'co-researchers' meant to them. They suggested that this meant that:

- '*We aren't being 'done to' – we are 'doing with you and all of the group*.' - Sam
- '*We can have an input on the pace of what happens*.' – Lynda.
- '*We can have a sense of owning what we talk about. Things might not be thrust upon us*.' – Olivia.
- '*Our ideas will be useful and shared around us all'* – Ceri.
- '*We can all benefit from one another to get ideas, and also we can try and get better'* – Lucy.
- '*We can learn from the project as we should get an idea from you (Helen) of what we can try out'* – Mel.

From these responses, I could see that the teachers had slightly different

expectations of the project. For Sam, Lynda and Olivia the comments they made referred to the opportunity to be involved in something that offered a sense of ownership.

However, for Lucy, Ceri and Mel there was a slightly different focus. They initially felt that they would be given ideas to use. This was especially apparent in Mel's response – which took a more traditional view of professional development as being about 'getting' ideas from the course leader. Lucy also said that she '*wanted ideas'*, and to be offered a chance to be encouraged to 'think outside the box' herself. After revisiting the discussion about co-research that we had held during the initial meeting, and discussing this in more detail all six teachers agreed that being co-researchers was something that they felt would be valuable to them. As a group we acknowledged that the research process might help us discover more about what the effective teaching of thinking looked like, but that it might be different for each one of the teachers in the group. We then discussed what action research would look like in this project. We linked these ideas to McNiff's (2013:90) list of principles – which include:

- Reviewing our current practice;
- Identifying an aspect we wish to investigate;
- Imagining a way forward;
- Evaluating action;
- Developing new action-reflection cycles.

We talked about how each teacher would be encouraged to reflect on their own practice and then bring any aspects of this that they wished to share to the sessions – but that they would maintain ownership of what would be shared. The teachers all said that they felt comfortable about this model – they were keen to develop some course of action that would be relevant to their personal classroom context.

The idea of taking personal ownership was popular – for Olivia in particular because she commented several times about feeling the impact of '*initiative overload*' as she described it – which she said meant that there were constant new ideas to try in classes, but none were given time to embed. For both Mel and Lynda the initial discussion revealed something else - they suggested that they '*had a lot to learn'* and that '*you may not see much from my class – we don't really focus on thinking skills separately*.'

Through these discussions, common, shared goals were revealed. The teachers all wanted ideas to use in the classroom and to find out more about how they could teach thinking effectively. However, despite these common aims, there were differences in understanding and notions of effective pedagogical approaches, which the following sections explore.

5.1 – the first action research cycle: Analysis of the first teacher network day, and of the first observational visit.

Teacher Network Day 1 (TND1) was held in the Autumn term. This section identifies the key themes that emerged from the discussions during the day, and analyses the data that was gathered. The key themes are:

- Teachers' notions of the nature of thinking
- Teachers' notions of 'good teaching of thinking'

Also emerging were some initial discussions around the teachers' thoughts on specific challenges of teaching thinking.

5.1.1 Teachers' notions of the nature of thinking

Following introductions, we discussed views about thinking, and what we thought thinking looked like in Foundation Phase contexts. All of the teachers participated in the discussion. Their initial ideas are summarised in Table 5.2 which follows:

Teacher	Initial comments – what we 'think' about thinking
Olivia	It looks like – making notes, doing things for yourself. It's about how you work around things. It's not always a quiet and solemn process – children can get excited and animated about discoveries.
Ceri	It's about expressing ideas – being able to elaborate and explain to other children. And there isn't always a right answer.
Lucy	The process of thinking happens inside – but it needs to be able to come outside. It happens when we use open questions, and encourage children to express ideas and find different ways of getting information.
Lynda	Can be just a gimmick – another thing to try. Another new idea!
Sam	Young children need to develop an awareness of thinking. We have used 'Let's Think' to promote this. We need to give them a chance to be silent sometimes.
Mel	Good thinking can be habitual and automatic, you don't really have to think about it. It's what we want all our children to do – think well.

Table 5.2 Teacher's initial comments about 'thinking'

This was interesting because of the variety of responses offered, and the differing understandings of thinking that the teachers demonstrated. For some, there was the notion that certain aspects of thinking identified within the research literature (and which are discussed in Chapter 2) were important – for example, Sam referred to metacognition. Lucy referred to elements of teaching such as questioning, and Ceri elaborated on the importance of communication skills. These views are related to a particular view of thinking – taking a broad socioconstructivist perspective – for instance, thinking was viewed by Ceri and Lucy as a social endeavour. For these teachers, the overall focus appeared to be on the process of thinking – for example through activities such as 'discovering', 'exploring' and 'becoming aware'.

However, for others, thinking was viewed as a 'gimmick', or for Mel, there was the view that thinking should become habitual – and not need to be thought about. Therefore, despite all these teachers having been involved in national initiatives relating to thinking skills development, their views of what 'thinking' was differed, as did their approaches to it. There was not one commonly used approach – for example Lucy's school used 'Let's Think' materials, and Olivia's school used P4C, whilst the other schools did not use either. This echoes the findings of my questionnaire (Chapter 4), which found teachers reporting on a range of approaches to teaching thinking being used across Wales. We then considered what the teachers wanted to find out about regarding thinking through their involvement in the project. This is summarised in Table 5.3 below:

Teacher	What aspects do we hope to explore?
Olivia	How can we embed thinking into the classroom? In every sense – from displays to feedback to ideas to teach it really well.
Ceri	They have to get past saying what they think you want them to say. How do we manage to do that?
Lucy	In Foundation Phase it is hard to make records of thinking happening – can there be a way of doing this well? How can I develop quality thinking, thinking displays and encourage discussion?
Lynda	Social skills are important – but to be honest they don't always listen to each other – can we look at how to get those things right? And how to keep records that they are making progress.
Sam	Metacognition is an important aspect that we need to develop in children. This is something I would like to explore.
Mel	What ideas work well? How can we get the children thinking? How can we show thinking?

Table 5.3 What aspects of teaching thinking the teachers wanted to explore during the project

A key theme emerging from this discussion was that of the practical teaching of thinking – how can it be embedded, developed and recorded in the classroom. This is not surprising given that the participants were all classroom teachers. When considering what elements they would like to explore further they also mentioned some challenges for teachers within classroom contexts – for instance, Lucy mentioned the challenge of recording the evidence of thinking and Lynda linked to initiative overload.

Following on from one comment about the need to challenge children, an interesting discussion emerged about the nature of thinking. In the transcript that follows, Sam for example was viewing children who were seen as getting answers 'right' as 'highfliers'. The teachers seemed to agree that these children might find approaches to developing their thinking difficult, because they recognised that thinking involves more than just getting quickly to the right answer. In the following section of the transcript, the teachers were beginning to think about thinking in relation to certain skills that go beyond recall and processing of information. The teachers debated whether good recall is evidence of 'good thinking', or whether thinking involves more than getting a 'quick, right' answer.

The following transcript evidences some of this discussion:

R(esearcher): I wonder what can be done to help the children see that there isn't always a quick, right answer?

Sam: I suppose it's about helping them understand that thinking can be very frustrating – and to be a good thinker you've got to be willing to take a risk. The answer doesn't always come fast or first. And well – that's ok.

Olivia: And definitely levels don't always tell the picture of thinking – a level 3 child may not be as good a thinker as a level 1 child.

R: Could you explain a little more?

Olivia: Well – it depends on the task. You need social skills as well – listening to others and sometimes rethinking because of what has been said. Or being able to wait and hear from someone else. You have to ask them 'what if…?' and that is hard for some of them. Sometimes you need to think around something, a problem umm you know – it takes a while and trial and error sometimes.

Sam: The highfliers who are used to getting it all right can find it hard. So maybe it's about giving different kinds of work.

Transcript 5.1 Exploring the notion of 'good thinking'

In this extract, Olivia began to talk about how the knowledge that you demonstrate in order to meet certain levels of attainment is not necessarily the same as what you need to demonstrate in order to show that you can think.

Olivia suggested that good recall of 'statable' declarative knowledge does not mean that a child can always explain or demonstrate higher order thinking – such as flexible thinking around a problem. She also commented that the knowledge that is assessed within a school context is not necessarily evidence of thinking. The fact that within the group, some members agreed with this indicated that their notions of thinking were aligned with notions of process as well as product. As a group, they moved away from recognising this statable knowledge as necessarily indicating good thinking. They referred more to the process of thinking – and recognised that challenging children to think can be difficult.

Here the teachers were beginning to make connections to dispositions – or Habits of Mind (HOM) – that they perceived to be important for good thinking. Although they did not use the specific vocabulary of HOM – they referred for example to persistence, thinking flexibly and listening to others as qualities important in the development of thinking. They were also suggesting that some children may find the idea of thinking about problems more challenging than others – and interestingly they seemed to agree that this might in fact cause more challenge for the 'highflying' (Sam) children. My research and personal perspective on thinking is based on the literature that suggests that thinking can be taught – and that it is not a fixed ability. In this discussion the teachers were beginning to explore their own understanding of thinking and in fact, through the discussion it became evident that for Olivia in particular, the idea of good thinking did not necessarily align with what is measured by standardised tests. The teachers did not mention that good thinking was about getting things right, or passing tests in particular subjects or areas of learning.

Olivia in particular mentions the collaborative aspects of thinking, which in certain tasks would be important.

To summarise the findings relating to teachers' notions of 'thinking', at the end of Teacher Network Day 1, their notions of thinking appear to be varied – most were focused on the processes of thinking such as expressing, elaborating and explaining (Ceri). During discussion it became evident that some of the group saw thinking as something that went beyond the kinds of knowledge that tests measure (Olivia). The group identified challenges relating to recording thinking, promoting social skills and supporting certain learners as important, and Lynda warned that thinking could be just another new idea or gimmick to try.

5.1.2 Teachers' notions of 'good teaching of thinking'

We then began to explore what we felt good teaching of thinking would look like. I used a video clip as a starting point for the discussion. The initial responses that the teachers made tended to be about observations of the practical issues – for example Lucy thought that the resourcing in the clip was poor. Olivia commented that there '*seemed to have a common vision of what was expected and how to get there*.' Gradually, analysis of the transcripts shows the teachers starting to focus more on teacher – learner interactions as I questioned them more about this. This was interesting, as although the term 'sustained shared thinking' was not mentioned at this time, it became apparent that the group felt that there were key pedagogies associated with 'good' teaching of thinking. Many of these resonate with sustained shared thinking, and intentional pedagogy (*eg* Epstein, 2007).

For example, as detailed in Chapter 2, Katz (2008) suggests that continuous, contingent conversation is essential in effective practice with young children. She suggests that the best example of this is through conversations about things that are of genuine interest to the participants. In the discussion of the video clip, conversation was highlighted by some of the teachers when considering the notion of thinking was returned to by Lynda, who commented that '*the children had good social skills. Lots of talk and stayed for a long time working together*'. Mel added to this by noting that '*the children were asking questions and were on task and engaged for a long time'*.

Another interesting theme that emerged was the discussion around the role of the teacher during an activity. The following extract, 5.2 illustrates this - Sam, Ceri and Lucy were thinking about what the teacher in the clip did during the session to promote thinking. The 'Chalk talk' activity that was undertaken is a Visible Thinking Routine (Ritchhart *et al*, 2011).

Sam: She (the teacher) takes a step back.

Ceri: Yes, let them go their own way.

Sam: No preconceived ideas of what was going to happen – didn't pre-empt the ending.

R: Are these good strategies?

Sam/ Ceri: - yes

Lucy: Do you think she gave some constraints –said make it 'nice and big'? And limited resources –directing what can be an outcome?

Ceri: Well – some may have panicked without guidance.

Lucy: true - scaffolding

Sam: Do you think she directed thinking - not prompting thinking?

Ceri: Maybe - it's easy to be critical of video!

Sam: She didn't ask many 'what could you…' 'what do you think' questions.

Mel: (ticks sheet to agree with this)

Lucy: but children are young and she gave + praise

Transcript 5.2 Discussing the video during a 'Chalk talk' activity

In this extract the teachers were beginning to look more closely at what the adult did in an activity designed to promote thinking. They were exploring what they consider to be important in terms of the level of support provided by the teacher. Whilst Sam and Ceri suggested that the teacher appears to take a step back, and allowed the children to be quite independent, Lucy questioned whether in fact the teacher was still in a sense directing the learning – through both her prompts and through the choice of resources given.

Sam questioned whether the teacher was directing the children as opposed to probing them and prompting thinking. This was interesting as the teachers were considering certain pedagogical strategies in terms of the role of the teacher as a guide and facilitator as valuable.

As discussed in Chapter 2, effective early years practice suggests that the 'intentional teacher' is someone who has 'a repertoire of instructional strategies and know when to use a given strategy to accommodate the different ways that individual children learn' (Epstein, 2007:1). The notion of intentionality recognises that both child-led and adult guided experiences are important, and that central to intentionality is directed, designed interactions between children and teachers in which teachers purposefully challenge, scaffold and extend children's skills' (Pianta, 2003:5). In this transcript the teachers are beginning to consider how the teacher promoted thinking through interaction. Sam and Mel both considered that asking more open-ended questions was important – although Lucy questioned how appropriate this would be with young learners. Lucy also refers to the scaffolds the teacher provides as useful and so together as a group they are beginning to discuss the nature of the interaction more deeply.

After the discussion Olivia commented that ' *the video really made me reflect deeply on what I value*.' Sam agreed because *'I don't think we usually have space to think like this – and to talk with others – that's been really helpful to build up a common idea*.'

I used the comments made by the group during our discussion to generate a structure for analysing the VSRD episodes with teachers. We discussed how we would know that thinking was being taught well. Because thinking is an internal process, the teachers discussed behaviours that they attached to thinking. For example, they decided that a child who was elaborating on an idea would be demonstrating thinking. As described in Chapter 3, I coded and analysed transcripts of our discussions. I grouped the comments that arose from the teachers' discussion into groups of similar comments, and classified these. This process was influenced by my knowledge of the pre-existing literature. The comments were classified into nine groups of behaviours that the teachers felt demonstrated good thinking.

These behaviours, and reflections regarding these behaviours became my focus when I analysed pre- and during VSRD reflections following the first observational visit. These are shown in Table 5.3 which follows:

Initial descriptors of the behaviours which support good thinking:
Expressing ideas clearly
Elaborating/ explaining ideas
Collaborating with each other
Using a variety of strategies to solve problems
Reflecting upon their thinking
Making appropriate decisions
Making links and connections
Sharing a vocabulary of thinking
Working with the teacher to solve problems

Table 5.4 The teachers' descriptors regarding behaviours which support 'good thinking' in the classroom (the 'teacher descriptors table')

These behaviours were identified as indicators of good practice in the teaching of thinking – and the group felt that these would be both demonstrated by children and modelled by teachers. Sam, Mel, Ceri and Lucy also referred to the term 'Sustained Shared Thinking' as an element of good thinking – although only Sam volunteered any kind of explanation as to what the term actually meant – '*it's about working with the children – maybe as a focused task or in the enhanced provision – to problem solve together. You talk together.*' We discussed whether we needed a separate criterion called Sustained Shared Thinking, but the group felt that actually, if some of the nine behaviours were present, this may happen - as it was not so much a pedagogical principle but rather an event that might happen in a session.

Overall Summary – Teacher Network Day 1

To summarise, at the end of Day 1, the discussion about good teaching of thinking allowed key themes to be identified by the teachers as behaviours that would happen where there was good teaching of thinking. These were arranged into nine descriptors, which drew directly from the teachers' own comments. These formed the basis of my analysis of the reflections – both during and before the VSRD that followed the lessons during observational visits.

5.1.3 Observational Visit 1

It was felt by all the teachers that activities and interactions that promoted and developed thinking were important to bring into classroom practice. However, the approach taken to trying to develop a culture of classroom practice that promoted effective thinking was not the same in every class, and the responses that children and teachers gave differed from setting to setting. In the next part of this section I will look in more depth at the journey each individual teacher took. In order to maintain clarity when considering data that emerged from transcripts, as discussed in Chapter 3, the following colour codes will be used to identify the transcript source:

Pre VSRD reflection with teacher	VSRD between teacher and myself

The focus of this part of the research project was to consider how to teach thinking effectively. I was interested in how VSRD could potentially support the teachers in reflecting upon this. All teachers were clear about the focus, and all had been involved in identifying the nine criteria that they felt would be useful when teaching thinking. I compared their reflection immediately after the lesson to their reflections during VSRD. Each teacher's first lesson observation will now be analysed.

Olivia's story

Olivia felt that this project created an opportunity to reflect deeply upon her own development as a teacher. For her, the benefit of the project was that she said that it provided time and space to look closely at her practice, to talk with other teachers about it and in particular to allow her to focus on her ability to promote effective talk in her classroom.

Olivia and the VSRD episodes Videoing of sessions was not a cause of anxiety for Olivia because she '*has always got people in and out of the classroom*' and so said that she felt used to being observed.

She commented that she was looking forward to the chance to see herself teach as it was '*a new experience and I am really interested in what I will see.*' Pre-VSRD, when reflecting on the lesson she referred to one of the behaviours, and during VSRD she referred to three behaviours. After the lesson, and before seeing the video, Olivia gave her initial feedback – reflecting on the actions that had taken place from her immediate recollections of the session. Her initial responses were positive – she commented that she had been '*pleasantly surprised'* by the children's engagement. Olivia felt that her questioning was good – she said that she had '*asked a lot of questions – and I didn't jump in too quickly with answers'*. The following table. 5.4 indicates how many of the behaviours (from Table 5.3) the group associated with good thinking Olivia commented on when she feedback immediately after the lesson and during the VSRD. Blank columns indicate that there was no reflection on this particular behaviour.

Behaviour	**Reflection Pre VSRD**	**Reflection during VSRD**
Expressing ideas clearly		
elaborate on their ideas		' When they discuss - they don't agree and I could have said that to them. I could have said I liked their explanation or something couldn't I, and asked them to give more?'
collaborate with each	'As soon as I said 'think about	'I need to consider how my body

other	it' they turned to one another. They are starting to get the idea of working together'.	language actually may stop discussion'
Use a variety of strategies		
Reflect upon their thinking		
Make appropriate decisions		
share a vision and vocabulary of thinking		'I used the word 'think' a lot. I am really aware of it now. I am going to try to focus on better key words or phrases like 'make a connection.' 'When I hear myself say 'think' I will try and add the actual word as well – like 'connect' or 'compare' or 'justify' or something like that.'
Making links and connections		'They were able to make a link there – they saw the link between people who wanted to keep their possessions and that this might have made them die. That's good thinking – not just a rote answer being given.'
Other	My questioning had been good – 'I ask plenty of questions and I don't jump in with the answers straight away	'Look at my roots – I really need to dye my hair' I gesticulate so much – I can't stop flinging my hands around''In practice I asked a lot of questions with the result of giving very little time given for children to respond.

Table 5.5 Olivia's reflections on the initial observational session pre and during VSRD

Olivia's initial reflections immediately after the lesson were about general pedagogy, and pupil engagement. She felt that the activity had been successful and was pleased with outcomes overall. One of the behaviours identified – collaboration – was reflected upon. She did not make specific reference to thinking. When she used the VSRD process, she began by thinking about body language. Olivia reflected on how her behaviour shaped the responses that children provided. This was something that she had not considered before. She noted that she had shaped the responses that were given by the children – and became aware that children in her class were tuned in to her far more than she had realised.

She talked about the fact that her body language – whether deliberate or unconscious, could interrupt the flow of a discussion between children. This was identified as an aspect of group work she wanted to improve, and is linked to collaborating - one of the behaviours that was initially identified as important for teaching thinking well. Through the VSRD process, her reflection began to focus on elements that linked more closely to the behaviours identified by the group as those that would support thinking. The following transcript, 5.4 shows how Olivia realised that the VSRD has been a useful tool in helping her think about how to foster discussion.

R: So watching this has surprised you. Do you think that without the chance to watch the video you would have realised this?

Olivia: I'm pretty sure I wouldn't have even thought about it. I would just have thought that they worked well and that they all joined in.

R: So - do you think that this new information might impact on your teaching?

Olivia: Oh gosh, yes. I have loads to think about now. I need to think about my whole style – in the bit we watched I could also see that when they were talking together – if I look at them they stop – and if I turn away they do discuss. So if I want them talking and discussing properly I need to make sure that I don't stop them by accident. It's the same if they are in a group or a pair - if I look away they talk to each other – as soon as I look at them they stop – freeze.

Transcript 5.4 An extract from Olivia's first VSRD discussion

Through the VSRD discussion Olivia also realised that she often targeted certain children first with questions. She felt that this may have meant that some individuals did not feel that their input was valued as much as others. One particular part of the episode that she considered demonstrated this particularly clearly and is transcribed below, in Transcript 5.5. When Olivia came to talk about this part of her selected clip with me she said she felt surprised at the number of questions she had asked, but was also surprised not to have allowed time for the children to respond to each one.

Olivia: 'I've got some answers, you are going to make the questions. We can make as many as we like. Are they all the same? Are they still the same shape? Shall we read them all together? Or one at a time? Can anyone come up with a question? Have a think. It's time to think. Have a go at helping each other. Have a minute to talk with each other.'

The group chat for 45 seconds

T1 'What are your ideas? What do you think?'

Child 1 'Too close?'

T1 'Why do you think they were so close?'

Child 2 'Why were they close together?'

T1 'What a good question.'

Transcript 5.5 Olivia questioning her children during the activity

Reflecting back on the clip helped Olivia consider aspects of her teaching that she was not aware of, or that she felt she had been mistaken about. For example, she said that she had '*mistaken lots of questions for quality*' – and noted how little time children had to think about their responses. She was surprised by how many questions she asked. She also realised that much of her teaching input used very general guidance rather than specifics, such as saying that was 'a good question' but not actually developing the children's understanding of why it was good. This is explored in Transcript 5.6 below.

R: That's interesting. The idea of a classroom culture to notice and name thinking was something that we talked about wasn't it?

Olivia; Yes – I kind of had that in my mind a bit when I watched. I thought I was doing it! I could see connections and justifications happening – but I didn't really capture these.

See when they discuss they don't agree and I could have said that to them.

R: So naming and noticing the thinking?

Olivia: Yes - I could have said I liked their explanation or something couldn't I?

R: Why did you decide that you would not do that?

Olivia: I didn't. I just didn't think. So I just asked for their answers. I suppose I was surprised by how many questions I asked, and I did say well done to children if they made a connection, but I don't think I said why it was well done. So I think I see when they do it, but maybe I don't make enough of it.

Transcript 5.6 Initial VSRD episode with Olivia, part 2

So, this VSRD episode assisted Olivia in the process of beginning to question her own practice more deeply than the initial reflection on the session without the VSRD allowed. She has reflected on an aspect of her pedagogy – questioning – that she had felt was good, and considered how she could make improvements to this. Olivia decided that this was an area she wanted to focus on improving - particularly in varying the type of questions that she asked. The transcript demonstrates how this awareness of her own practice was clearly brought about through the VSRD process, compared to her initial reflection on action before she watched the video.

Ceri's story

Ceri felt that this project would allow her to develop professionally, which she felt was important as she described her teaching situation as challenging but rewarding. She hoped to be able to find practical ways to improve learner outcomes through her involvement in the project. From the start, Ceri was willing to contribute to sessions, and although she confessed that the thought of being videoed teaching was '*somewhat daunting'*, she felt that this was a '*challenge that I want to do*.'

Ceri and the VSRD episodes After the lesson, and before seeing the video, Ceri gave her initial feedback – reflecting on the actions that had taken place from her immediate recollections of the session. Her initial responses were that she had been '*surprised'* by aspects of the session, such as how the children were able to use a variety of strategies to solve the problems.

She tended to focus her comments on the children's performances *'child 3 did really well'*, '*I was disappointed by child 2 when he couldn't give more of an answer – I'm sure he knew it*'. Using the Teacher Descriptor Table (5.3) relating to behaviours promoting thinking, her comments are analysed in Table 5.5 below.

Behaviour	**Reflection Pre VSRD**	**Reflection during VSRD**
express ideas clearly		'I thought I was stumbling there – I was thinking too much about how to phrase the question. I didn't show them how to say clearly.' 'It wasn't clear. I need to improve that'.
Elaborate/ explain ideas		
Collaborate with each other		
use a variety of strategies to solve problems	'The children used different ways to organise their work – *eg* child 1 moved his finger along the number line, but child 2 went above the line.'	'Here I saw that even though child 2 is better at maths – it is child 3 who is better at problem-solving. He has more ways to think – he's not relying on rote memory. The video lets me see this clearly.' 'There I could see what child 5 was doing – he was able to choose that number line to help him independently' I could see that they were organising their strategies differently – they all used the

		number line differently to get their answer.
Reflect upon their thinking		
Make appropriate decisions		
Make link and connections		
Share a vocabulary of thinking		
Work with the teacher to solve a problem		
Other		'It's cringeworthy to see yourself'. 'I sound so Welsh'. 'I'm mumbling – I'm not clear.' 'I can see children making progress.' 'It's useful to see what child 3 was doing when I was focusing on the others.'

Table 5.6 Ceri's reflections on the initial observational session pre and during VSRD

Pre VSRD she referred to one concept, and during VSRD she referred to two concepts. Ceri initially reflected on one concept – 'using a variety of strategies'. Once we used the VSRD process, Ceri was able to look at this concept in more detail, reflecting on individuals. Comments tended to focus on children's performance or her own teaching in general, rather than reflecting specifically on thinking. For example, Ceri spent a lot of time considering her own use of voice – from her accent to the clarity of her speech.

These are not pedagogical strategies specific to developing thinking, rather they relate to general strategies. When we talked in more detail about the selected episode, it was her use of questioning that emerged as something she really felt would be her area to develop. She chose a clip that she felt showed why this was the case to discuss. This is demonstrated in the following transcript:

Ceri: This bit wasn't so good.

R: What makes you say that?

Ceri: Well – we have done so much on AfL in the school I am a bit disappointed in myself. We are supposed to monitor the questions we ask.

R: Why are you disappointed? The children seemed to be listening and responding – what else did you hope for that when you reflect on the episode makes you feel disappointed?

Ceri: Yes – they are listening. Ummm. Well, I thought I was stumbling there – I was thinking too much about how to phrase the question. I didn't show them how to say clearly.

R: Do you think how you phrased the question made a difference to the children's responses?

Ceri: Umm. Well, they did answer. But I think I could have asked things in a better way.

R: Better?

Ceri: Maybe to let them say a bit more, or perhaps – see there where I said 'what have all the snowmen got?' – they all said faces, hands and stuff but I meant about the numbers on them to help put in order – so they didn't know what I meant. I think I need to plan really clear questions that make what I mean a bit more..um .. obvious I suppose. And let them explore answers a bit more. In maths there is a right answer but they could have talked more about how they knew couldn't they?

Transcript 5.7 Extract from Ceri's initial VSRD episode

So this VSRD episode assisted Ceri in the process of beginning to question her own practice relating to teaching thinking in terms of refining the questions that she asks. She decided that focusing on her questioning would be beneficial for learners, especially if she made her questions clearer and more open ended in nature.

The transcript demonstrates how this awareness of her own practice was brought about through the VSRD process, compared to her initial reflection on action before she watched the video.

Lynda's story

Lynda came to the project after being made aware of it by her headteacher. At the start, she indicated that she did not have many ideas on ways to develop thinking skills with younger learners, and so said she was '*looking forward to finding some ideas*'. From the start, Lynda was willing to contribute to sessions, but said that the thought of being videoed did make her feel '*a little nervous because this isn't my area*.'

Lynda and the VSRD episode

Although Lynda was the most experienced teacher in terms of length of service, she stated at the start of the observational visit that she had '*worried a bit about this last night*.' She said that if there had not been the chance to watch the video back privately herself she probably would not have wanted to take part. Her initial discussion about the session was positive – she was pleased with her children's responses and behaviour in the session, and felt that the children had achieved the intended outcomes. She was pleased that they seemed to have enjoyed the session, and that '*they used a good level of language – I was really pleased with that*.' Table 5.7 below indicates her reflections pre and during VSRD.

Behaviour	**Reflection Pre VSRD**	**Reflection during VSRD**
Express ideas clearly		
elaborate on their ideas		This amazed me – they considered the instruments carefully - I hadn't thought of doing it in loads of the ways they did - and could tell me about it – they explained in depth
collaborate with each		I could see these two children – they were very involved in

other		talking with one another – and I can see that the talking is a good thing.
use a range of strategies to solve problems		
Reflect upon their thinking		'I was interested that he changed his mind in that bit – he really thought hard about what he was choosing.'
Make appropriate decisions		
Make links and connections		
Share a vocabulary of thinking		'I do say 'thinking and think' a lot – I could be more specific I think – use the actual words…you know.. like connect or explain'
Work with the teacher to solve problems		
Other	'I need to laminate my resources I think'. 'Did it go on a bit too long? I'll use a timer next time.' 'I was surprised by X – he wasn't as good as I thought he would be.'	'I am as bad as the children – look at me fiddling' That's interesting – in that bit I think I might have talked fast – because she says she needs more thinking time – was I rushing? She could have been helped to see what strategy could have helped her work it out – but I kind of rushed on.'

Table 5.7 Lynda's reflection on the initial observational session pre and during VSRD

Lynda initially did not reflect on any of the concepts that the teachers had identified as important in the effective teaching of thinking (table 5.3).

Instead she talked about outcomes of pupils and also about her choice of resources. These are important elements of classroom practice, but did not relate directly to the teaching and development of thinking. Once we used the VSRD process, Lynda was able to look at the session in more detail, reflecting on individuals and their progress, but also on other concepts relating to the groups' view of 'good thinking' as well. In the VSRD episode Lynda referred to four of the behaviours from the Teacher Descriptor Table (table 5.3). For Lynda, the focus that she felt that she needed to work on was related to how she viewed child-child interaction, as illustrated in the following transcript:

Lynda: This bit wasn't so good. When they were chatting here – this is important.

R: Why? What do you think is important about this clip?

Lynda: I think I was a bit dismissive. I didn't really listen.

R: That's interesting. What makes you say that?

Lynda: I sort of..umm.. well I just know these children are from good backgrounds so I suppose I expect them to answer. They are a bit attention seeking.
R: I'm not quite sure why this would make you be dismissive?

Lynda: No, well, I'm saying that they … um.. well… I expect them to have an answer. I don't think I thought they might need time to think about it. So when they chat I think they are off task.

R: I see. And has the video has made you think differently?

Lynda: Yeah – they needed to check their ideas – I could see they were involved – I was surprised X was so good actually. They were talking about their ideas. That's a surprise. It wasn't them being chatty off task.

Transcript 5.8 Extract from Lynda's first VSRD episode

So, for Lynda the VSRD episode highlighted that her assumptions about classroom talk in the context of this activity were not necessarily correct.

Without the opportunity to see this she would have unaware and had felt the lesson was successful.

The video allowed her to '*see what I didn't know happened*' with regard to her earlier reflections. Children she felt were off task were in fact constructing some understanding of the instruments – and the video allowed her to reflect on this. As a result, Lynda decided that she wanted to focus on developing her practice to allow collaboration to happen more frequently – and more visibly - *'Next time I see that I will make sure I spot it and tell everyone that those children were really thinking hard. Actually I won't say thinking hard – I will try and be specific.*

Lynda made an interesting comment about VSRD, when she said that could have a tendency to make you overcritical. Her comment that *'it would be easy to get caught up thinking I didn't do anything right. I need to go back to what I said at first too – they did enjoy, and they were engaged – I want to keep that in mind too!'* was a useful reminder to me as well – I reflected on the fact that as the other person in the VSRD dialogue it was important to keep the focus balanced – to avoid it becoming one-sided or hypercritical.

Lucy's story

Lucy had been teaching for 4 years prior to taking part in this project. She noted that she had an interest in developing excellent aspects of practice, and was keen to find out about strategies that would work effectively in the classroom.

Lucy and the VSRD episode Lucy was not worried by the prospect of being videoed – she said that '*it isn't long since I was in uni being watched a lot, so I am used to it.*' She felt that the lesson went well – '*they talked a lot, and had good ideas although I think they found it a hard activity*. *I'm not sure the objectives were spot on.'*

Table 5.8 shows her reflections pre and during VSRD.

Behaviour	Reflection Pre VSRD	Reflection during VSRD
Making appropriate decisions		'Actually I can now see that they were presuming a lot about the pictures. Perhaps I needed to encourage them to look a lot more closely at them.'
Expressing ideas clearly		See here, even though he isn't right (child 1) is able to say why he has decided that. He has a clear explanation.
Elaborate/ explain ideas		
collaborate with each other	They were quite happy to talk to one another and have some disagreements!	Here I can see that even in a small group there is a problem getting them to talk. They are waiting for me – and look – all have their hands up – I want to work on that – I want to find other strategies.
Makes reference to their own strategies Reflect upon their thinking		Actually this shows me how hard they find the metacognitive part of the task. They can't tell me much about how they have worked it out, or made a decision at all. I need to model this much more.
Make appropriate decisions		
Make links and connections		
Share a vocabulary of		

thinking		
Work with the teacher to solve problems		
Other	I don't think the camera was a problem at all – they didn't pay any attention.I think I used good body language- they could see they were to take over the talk.	I do talk a bit – fair do's – especially when I keep asking questions of them. So maybe they don't get as much chance to talk as I thought.

Table 5.8 Lucy's reflections on the initial observational session pre and during VSRD

Before the VSRD reflection, Lucy mainly talked about the outcomes for individual children. She commented on one specific behaviour from the descriptor table (Table 5.3) – considering whether the children had collaborated well during the task. During the VSRD she considered four behaviours in more depth. Lucy was interested to see that the group found the metacognitive aspects of the task very challenging, and was surprised that they didn't communicate with one another '*as well as I thought they would*.' She decided that one element of her teaching that she would develop would relate to her modelling of metacognitive behaviours and language. The other aspect that Lucy felt needed working on was her questioning especially when trying to encourage group discussion. The following transcript, 5.9, was chosen by Lucy to illustrate a part of the session that she felt that she could improve – mainly because she felt that it showed her just how much she talked and questioned, and she felt that maybe this was '*stopping the children being able to say very much at all*'.

Lucy: What's that vegetable?

Child: ummm

Lucy: What vegetable is she working with?

Child: ummm

Lucy: What's the vegetable? Look at the picture.

All other children have hands up.

Lucy: What's she going to cook with?

Child: ummm

Lucy: What is the vegetable in these pictures?

Child: ummm. Ummm carrots.

Lucy: Good. Carrots. So it might be carrots in the bag.

Transcript 5.9 Lucy questioning a child during the initial observation session

Lucy felt this this was an important part of the lesson.

She had thought that this child had responded well during the session, but VSRD helped her to notice that actually at times she focused in on certain pieces of information that she felt she needed, and questioned the children until she got that.

She said that she was surprised just how much she asked the child in this clip before she got the answer that she wanted. Lucy felt that this did not necessarily promote the higher order thinking processes she was hoping for – but it did get the 'right answer'. This is shown in the following transcript:

R: What did you think was important about this clip – what made you choose it?

Lucy: I can really see what I am doing here. I am so caught up in getting that answer from the child – and I know that there is a right answer – that I just keep going until I get there.

R: Do you think that has an impact on what happened?

Lucy: I suppose that's ok sometimes to have an answer in mind – but really in a session I need to make sure I give them time to think.

R: What difference do you think that would have made today?

Lucy: Well…umm..There wasn't much thinking here! I need to ask better questions that they really have to think about. And maybe not ask so much so fast. They can't really think more about something if they are answering lots of questions like in this bit.

R: When you say think more, what do you mean?

Lucy: Umm. Well. I mean that they are just answering me, but this was supposed to be an activity where they learnt from each other. Maybe if I had kept quiet they could have done more thinking.'

Transcript 5.9 Extract from Lucy's first VSRD episode

As such, the development of a range of questioning styles, and strategies for promoting effective group work through discussion were the elements of practice that Lucy decided that she wanted to focus on. She said that working on developing these would be her priority as the project went continued.

Sam's story

Sam was interested in developing thinking skills across her school, and had attended several training events prior to becoming involved in this project. In initial discussions Sam talked about children developing an awareness of their thinking and metacognition as important elements to focus on in the classroom.

Sam and the VSRD Sam said that she felt positive about the VSRD as an opportunity 'to tune in to what I am really doing when I teach.' She felt that this process might help her professional development, as well as offering insight into how to develop the teaching of thinking across the school – '*this is not an easy school to teach in, and it would be great to be able to support the staff develop teaching strategies*.'

After the lesson, Sam reflected and commented that she felt the lesson had been '*quite good – but there is maybe room for some improvements*'. These improvements related to the stimulus material used in the activity, which Sam felt had maybe not grabbed the attention of all the children, and which had meant she had had to do a lot of the talking. However, she did say that she felt the session had '*been generally successful in achieving its' intentions because the children did all make connections*.'

Sam's reflection before and during VSRD are analysed in the following table:

Behaviour	Reflection Pre VSRD	Reflection during VSRD
Work with the teacher to solve a problem	'I have to say that I find it hard to know how much direction to give in the activity. I wonder if I say too much?'	
Express ideas clearly		
Making links and connections		'Look – you can see how the better connections come from those who choose quite quickly. That's really interesting – I thought they might have needed more time, but actually it doesn't seem they did.'
Collaborate with each other		
Use a variety of strategies to solve problems		
Reflect upon their thinking		
Elaborate on their ideas		'Here it's clear that with a bit of prompting they can give reasons beyond just saying 'I like it' – they are thinking about deeper reasons and are willing to share these.'
Make appropriate decisions		
Share a vocabulary of thinking		'They knew what was meant by a connection – although I can see that they actually find it easier to spot differences – that's interesting. But they can use the language well and

		they say 'connection' themselves – I'm pleased about that because they are not high achieving language users.'
Other	'Perhaps my choice of characters favoured the boys – I will have to think about that for next time.' 'I think that it might have worked better with real objects, not pictures- they are a bit limiting.'	'My voice – I sound like an extra from Brookside!'

Table 5.9 Sam's reflections on the initial observation lesson pre and during VSRD

The VSRD process encouraged Sam to reflect upon three of the identified behaviours that the teachers felt were important for developing effective thinking. Prior to this, her reflections focused on resources, whereas in the VSRD the process of making connections featured highly in her reflection. Sam decided that the key areas that she wished to develop as the project progressed were to do with promoting the children's metacognitive skills because '*I can't see the children really reflecting on themselves as a learner. They can see the connections, and can use the language of thinking but I am not seeing them talking about how it feels to think and I think that is important. How to get that happening is my challenge*.' Sam felt that encouraging the children to talk about their strategies, and how they used and adapted these would be something that would help support metacognitive development. Sam was the only one of the teachers who raised this as an area to focus on, and was the only teacher to focus on the children as learners in such an explicit manner during the initial VSRD.

Mel's story

Mel felt that the project may offer a way to support her children in developing thinking and language skills – which she felt was important given many of the children's home backgrounds. She was keen to try out VTRs in her

classroom as she felt that these would be useful '*practical activities that the children would enjoy*' which also involved language and talk. She felt that '*with my children this is crucial to work on*.'

Mel and the VSRD episode

Mel said that the VSRD did make her feel '*a bit anxious*' initially because she felt that '*thinking isn't my area really, so I am not sure that you will see what you are expecting to see'*. Mel was '*kind of curious'* as to how her lesson would appear. Her initial reflections before the VSRD were that the lesson had gone well – with good pupil participation and involvement.

She was interested in how the children had thought about similarities and differences, but felt that maybe the fact that the stimuli had been toys meant that the children were constantly 'fiddling' with the resources, so she had to '*work quite hard to keep them focused – but I think overall they were*.' The following Table, 5.10, compares reflections before and during VSRD using the Teacher Descriptor Table (5.3):

Behaviour	**Pre VSRD**	**During VSRD**
Expressing ideas clearly		'I can see that my explanation of the speech bubble bit is not clear – I don't model clarity at all!'
Elaborating/ explaining ideas		'I can see that (Child) finds it hard to explain – or to formulate a question. I didn't really support him there – I need to think about this'
Collaborating with each other		'I could have used a think-pair-share' there – that would have worked well I think'.
Use a variety of strategies to solve problems		

Reflecting upon their thinking		'That's an interesting bit – where they start to talk and change their ideas a bit. They started saying yes – always wheels but then they do think a bit more and change their idea a bit.'
Make appropriate decisions		
Making links and connections	'I did encourage them to make links through the activity. There were some good examples- like when (child) thought about the wheels connecting the toys. They could all have a go at this.'	'I was surprised that (child) didn't make that connection actually. We have just looked at forces, so I thought he would have done but he wasn't able to. Perhaps I was trying to do too much?'
Sharing a vocabulary of thinking		Am I putting words in their mouth – see – here I am trying to get them to talk about the differences and use the right words – but sometimes I am leading them on too much.
Other	'I was really pleased with their ideas.' 'I really liked working with them in this little group – it worked well.'	'It's the sound of my voice that is awful – listen to how I say 'thinking'. 'Gosh – I say 'right' a lot'.

Table 5.10 Mel's reflections on the initial observation lesson pre and during VSRD

Before using the VSRD, Mel reflected on one of the behaviours that we had decided were important for teaching good thinking. The majority of her reflection was about individual children and their progress during the task, relating this to group work and collaboration. Undergoing the VSRD process

enabled Mel to reflect on six of these behaviours in more detail. As a result of the VSRD, Mel decided that she was going to focus on trying to develop the children's ability to work collaboratively. She felt that this might help some of them to gain confidence *eg* to sometimes be willing to change their thinking in the light of listening to the group. The VSRD had shown her that *'some of the children just go along with the majority. They don't really explain their ideas, maybe they aren't confident. It's like (child 2) in the clip – he knew about forces but he really didn't bring that into the talk – maybe because (child 4) was really in charge of the conversation at that point. So I think looking at how the group works together is important.*'

Summary of Action Research Cycle 1

All six teachers engaged with the VSRD process. In all six cases the teachers said in their initial post lesson reflection that the sessions had gone well. All talked about outcomes for individual children. In all six cases the teachers were aware of the behaviours that had been identified by the group as promoting good thinking in the classroom (Table 5.3), yet reference to these pre-VSRD was limited – most teachers referred to only one (and Lynda mentioned none of them). In the pre-VSRD reflection very few made any reference to elements of their practice that they wanted to improve – although they did talk about learners and how they could improve.

During VSRD, the initial discussion tended to focus on physical traits such as hair or accent, and general comments about the children. Through the dialogue with myself, the reflection deepened to specific aspects of the session. Whilst these still often referred to individual children, in every case the teachers also made increased reference to the behaviours that they had identified in TND1 as important to support good thinking– in other words they began to focus increasingly on their pedagogy. Figure 5.1 below shows how the teacher reflections during and before VSRD differed in terms of reference to the behaviours identified in the Teacher Descriptors table (Table 5.3) visually:

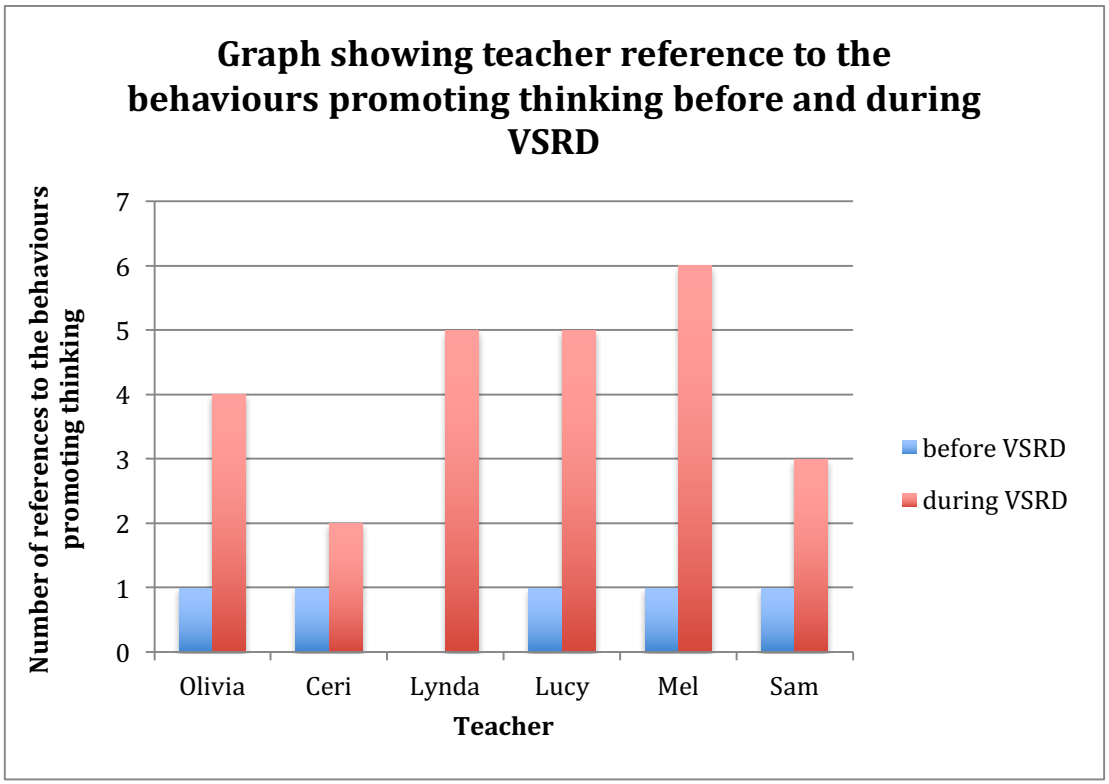


Figure 5.1 Showing teacher reference to the behaviours promoting thinking (as identified by teachers) before and during VSRD episodes

During the VSRD, the teachers identified aspects of practice to develop in relation to teaching thinking. These aspects were identified as a result of, based upon the teachers watching themselves teach, and through dialogue with myself. There were some commonalities amongst the group, and all six teachers were surprised by some of the things that they observed happening in the video. Three teachers (Olivia, Ceri and Lucy) felt that developing their use of questioning would be beneficial in promoting good thinking. Five commented on the need to establish effective group work so that children were able to collaborate and interact with one another (Olivia, Lynda, Mel and Lucy). Sam wanted to focus on explicitly developing metacognitive strategies amongst their children.

5.2 Teacher Network Day 2 (TND2)

TND2 was held in the Spring Term. There were four key aspects of discussion that emerged during the day. These were:

- Reflections on the VTRs
- Refining the descriptors relating to behaviours that support thinking
- Exploring what makes a 'good' question
- Considering interaction and collaboration

5.2.1 Reflections on VTRs

We started with an update regarding how the teachers were using VTRs. There were different patterns of use. Lynda and Sam had tried out the most VTRs, although it was Olivia, Ceri and Sam who claimed to have embedded the use of VTRs most frequently into their classroom practice. Mel had only tried one VTR but she felt that this was working well and that the children responded positively to it. The group were unanimous in the view that the VTRs they had tried gave them a clearer focus on the underlying thinking skills that they were aiming to develop. They also agreed as a group that the VTRs helped them to consider what 'good thinking' would look like, and effective ways this could be promoted with young children. This focus meant that they were able to clearly express the thinking strategies to the children, and were clearer themselves about the intentions of the activities. Olivia also said that she felt the activities promoted a shared language relating to thinking. The other teachers agreed, and Sam commented that the use of VTRs actually also gave the group a way in which to discuss their own during the Teacher Day – '*if I say I was looking at making connections, everyone knows what I mean – if I just talked about getting good thinking it isn't so clear what I am doing*'. This became evident through the course of the day - for example, the teachers were able to evaluate the success of routines based on the specific thinking skills that they were trying to develop, rather than the broad and general terms that they had used on Day 1.

They were also able to discuss how they needed to evaluate and refine these VTRs in order to maintain focus on thinking. The following transcript demonstrates how the teachers started focusing on their attempts to refine their use of VTRs in order to improve thinking.

Sam: I have used the connections activity a lot. You have to think quite carefully about what you are going to use to get really meaningful responses. When you came in we used the different cartoon character superheroes. I had photographs of them, a lot of the time the children just focused on the visual cues.

So they made connections about the colour of clothes and only a few of them looked at the qualities of the character – and that was really what I was hoping they would think about. Perhaps we should have watched a couple of videos first or something else so that they knew what the aim was. So that was interesting.

R : So are we looking at how we help the children focus on the thinking that we are hoping to develop. Maybe we need to think about what strategies could we use to make it clear?

Sam: Yes – even if the resource is good and they like it, we need to think about it carefully.

R: How could we do this?

Olivia: Well – that would be nice to do a before and after. Do connections before, then talk to them – teach them - and then do it again. You could see how their thinking changed.

Sam: Yes – you could find out what they see at first – you want to make sure we value all comments but we are trying to get them to develop the thinking. I found that the best time I did this was using natural objects. Maybe it's the starting point that encourages good thinking – they made better connections when I used natural resources than the superhero pictures.

R: Why were the natural resources better?

Sam: Well –they're more ambiguous – so I had one of them that was a charred piece of wood and a twig - one of the connections was they were both from a tree, but another was that they were both dead. With cartoon characters maybe they couldn't be so open in their exploration – they just saw colour as an important characteristic. With the natural object the answer wasn't clear.

R: So not having a right answer, or an obvious connection might challenge children to develop their thinking?

Sam: I think so, yes.

Mel: Yes – I did an activity with cards and the connections were too obvious so they didn't really look closely and need to think.

Transcript 5.10 Teachers discuss the choice of resource in VTRs

So, the group were beginning to think about how their choice of stimulus impacted upon the thinking that went on in the classroom. As discussed in Chapter 2, the selection of appropriate resources is an important element of effective teaching (*eg* Epstein, 2007). There was a growing awareness amongst the group that there needed to be careful selection of resources that would allow the children '*something to get their teeth into*' (Sam) and to need to think about. This is in line with the literature discussed in Chapter 2, which indicates that challenge is an important element of promoting thinking in the classroom.

5.2.2 Refining the descriptors of behaviours that support thinking

The group were able to discuss their experiences with VSRD. It was decided that the original list of behaviours identified (see table 5.3) as being those that support good thinking needed to be refined and added to. When I asked the group what had prompted them to think that the original list needed refining, the teachers all said that this was as a result of reflecting on the observed session. Olivia said that '*seeing myself teach a session that I thought was all about thinking has made me realise that I need to develop this further to get the most out of my class*.' From their discussion the teachers decided that they wanted to clarify whether it was the child or themselves who would be showing certain behaviours, because they felt that the original list '*wasn't really clear enough'* (Mel). It is important to note that it was the teachers themselves who led this part of the session. They took ownership of this element and led the development. The refined table is below:

Initial descriptors of the behaviours which support good thinking (table 5.3):	Refined descriptors of behaviours – child	Refined descriptors of behaviours - teacher
Expressing ideas clearly	Child can express their thinking clearly	Teacher can explain what thinking is needed clearly
Elaborating/ explaining ideas	Child can add detail to their ideas	Teacher can prompt children to elaborate
Collaborating with each other	Children listen to one another and build on ideas	Teacher encourages children to listen to one another
Using a variety of strategies to solve problems	Uses a variety of strategies to solve problems	Teacher encourages children to use appropriate strategies
Reflecting upon their thinking	Children can talk about their learning	Teacher asks the child to comment on their own learning
Making appropriate decisions	Children make appropriate decisions	Teacher supports children to make appropriate decisions
Making links and connections	Child makes links and connections or spots differences	Teacher encourages children to compare and connect
Sharing a vocabulary of thinking	Child can use thinking vocabulary	Teacher models thinking vocabulary
Working with the teacher to solve problems	Child works with the teacher to solve problems	Teacher offers the time for children to work at solving the problem with them
	Questioning Child answers and asks a variety of questions	Questioning Teacher asks a range of questions, provides wait time and encourages

	children to ask questions.

Table 5.11 Refined teacher descriptors of the behaviours that support thinking

This table of descriptors became the tool with which I analysed the final VSRD with the teachers and is reported on in Section 3.

5.2.3 Reflecting on questioning

The teachers also felt that 'questioning' was missing from the original list – which was '*crazy really because we can't get them thinking if we don't ask them things*' (Olivia). This awareness came as a result of individual VSRD episodes, and was Olivia said '*I really want to work on questioning. I thought I was doing this well, but I know I can improve lots of questions I ask. Having some starting points will be a good memory boost – it's like scaffolding for us*.' The group agreed that they would keep some key questions in mind when they planned and taught sessions.

They were searching for strategies that could improve their practice, and worked together to devise some questions that they felt would be useful to have in mind when they taught future lessons.

Reflecting on interaction and collaboration

Developing effective group work and collaboration was also a focus for several of the teachers. To facilitate this, I identified a professional development video for teachers which focused upon Sustained Shared Thinking (Dowling, 2005). At this point, I was therefore guiding the direction of discussion through my selection of a particular stimulus. After watching the video, the teachers discussed what they felt had emerged as important. I asked the teachers to comment on what had immediately struck them as an important aspect from the video.I noted these comments in Table 5.12 which follows:

Teacher	Aspects noted
Olivia	The teacher picked up on key words and answers and kind of repeated them… like an echo. But not for everything – for key things. She allowed them time to think.
Ceri	She asked questions to get their ideas like 'what do you think?' So they had to be quite explicit in the answers. And she was good at getting them all involved – I guess she knew them well.
Lynda	She kind of asked for clarification – like 'let me check this out – you think…' She kind of tried to make the hidden less hidden – more explicit.
Lucy	She let them move about a bit, some looked like they were fidgeting but I think they were thinking.
Sam	There weren't really yes or no answers to the questions – it was a bit more thought provoking. She allowed them the chance to give what was in their minds. I think they wanted to talk about the task – no-one looked bored by it – I think that is important – finding something they are keen on.
Mel	She asked them to say why and then saw if anyone had different ideas so the talk kind of mushroomed out a bit.

Table 5.12 Aspects of sustained shared thinking that the teachers initially focused on

Within this discussion, the group began to unpick concepts that they see as important in depth. For example, the role of the teacher in encouraging and supporting the conversation is highlighted by all of the teachers. Lynda, Mel and Ceri all talked about how the teacher was able to probe and question the children to encourage responses. Sam pointed out that the task was relevant and of interest to the children – and as discussed in Chapter 2 this is important – 'Children talk when they have something to say' (Epstein, 2007:15). This discussion was of course shaped by the nature of resource that I selected (*ie* the video), but was elaborated and extended by the teachers who, through discussion were refining their understanding of sustained shared thinking.

The video also caused the group to ask questions about how to develop this dialogue in their own classrooms, as demonstrated in the following transcript:

Lynda: It was good – but I think at times she could have allowed more time for contributions.

Mel: I think she did follow up some of the children's ideas but how did she choose the ones she would do this with?

Sam: Well, she seemed to really listen to the children – and they seemed to listen to one another too. They were able to comment on their ideas – I thought that was good.

Mel: How could we help our children do that?

Olivia: It must be partly through planning what you want to happen – so modelling – like by talking and questioning. She had key words and sentences she used. It was like she had things in her mind that she wanted to elaborate on – and she spotted if these happened.

Mel: So – how does she introduce and develop that?

Sam: Our questions might be a good starting point? Knowing where we intend to get to, and spotting the children who can help the group get there maybe?

Transcript 5.11 Teachers discuss developing sustained shared thinking in their own classrooms

The teachers are identifying that the role of the teacher – through questioning, modelling and intentional practice, is crucial. Sam suggests that the teacher uses the children's responses, and that listening is a crucial element of developing this interaction. Mel asks a number of questions regarding how this could happen in her own context. This echoes the discussion detailed in Chapter 2 relating to intentional pedagogy – whilst Brooker (2010) suggests that being informed by the cues given by children is essential, this is not easy. Papatheodoru (2009) suggests that such relational pedagogy takes confidence on the part of both the teacher and child. Transcript 5.11 indicates that the teachers in this group could see the value of listening to the children's responses and building on these, but needed to think about how this could be done in practice.

Through discussion the teachers decided that one area that the children needed support in that could improve interaction was related to working collaboratively. They felt that sometimes sustained dialogue between the children was hampered by their poor listening skills, or inability to successfully take turns in particular. However, as stated by Mel '*How can we get them to improve? Sometimes they just can't listen*'. I guided the discussion in a particular direction, as, having reflected on the lesson observations, and given that I had not seen very much extended dialogue I had thought about how we might discuss developing this aspect of teaching. The WG thinking and assessment materials (WG, 2008) provided a starting point for discussion, and we explored the guidelines that were provided in these materials. The teachers felt that being more explicitly aware of these would be useful in developing successful group work. The group felt that they would talk about some of the guidelines such as ground rules with their classes.

Summary Teacher Network Day 2

At the end of Teacher Network Day 2, each teacher was asked to decide upon the aspects of their own practice that they were most keen to improve. These related to elements of practice that the teachers considered important in developing thinking within their classes. Most related to teacher behaviours – in particular questioning, although two related to developing effective collaboration and one referred explicitly to children's metacognitive development.

These targets are summarised in the table below:

Teacher	Area of practice that the teacher wishes to improve
Olivia	Questioning
Ceri	Questioning
Lynda	Collaborative group work

Lucy	Questioning
Sam	Encourage metacognition (through discussing strategies with children)
Mel	Collaborative group work

Table 5.13 Each teacher's personal target at the end of Teacher Day 2

5.3 Final Action Research Cycle

5.3.1 Final observational visit and Teacher Network Day 3

After the second Teacher Day, I returned to schools to carry out a final observational visit. Once again this involved a session observation, and VSRD with the teachers (reported in this chapter) and children (reported in Chapter 6). All teachers undertook the second observed activity, and the VSRD episode. The teachers all reflected upon their lessons before and during the VSRD process.

Olivia's story

In the final observation visit that I made to the school, Olivia was keen to carry out the VSRD process again. She taught a session based upon a book, in which she intended to develop the children's appreciation of the different perspectives of the characters in the story.

Olivia and the VSRD Before the VSRD Olivia reflected on three child behaviours and two teacher behaviours. During the VSRD she reflected on four child and seven teacher behaviours, including her questioning. After the session, in the immediate reflective feedback, Olivia said the session had been appropriately focused, and that the children had been able to give opinion and discuss ideas together effectively. She thought that she had taught 'quite well' and used some 'clear language' and was keen to watch the session back.

She felt that her questioning had been better because it had been more focused – this had been her personal target to develop and she felt she had '*made some progress'*.

During the VSRD, Olivia reflected on elements of relational pedagogy – she said that she '*was noticing individual responses more – that's why I asked Jacob to say – he hadn't had the chance until then, and I remembered that I didn't always ask everyone*'. She also thought that she clarified why child 1 provided a good response and she was pleased about this. At that moment she felt that she was '*modelling clear expectations and going a bit deeper into the discussion, especially in the bit about sharks and dinosaurs'*.

After the first teacher day, Olivia wanted to focus upon improving her questioning. In the VSRD she selected an episode to talk about where she focused on that, and she chose it because she felt that her questioning showed improvement. She had used the question prompts frequently in her classroom and felt that these were becoming '*something that is in my mind a lot*.'

An excerpt of this conversation is below:

Olivia: Do we all agree?

Child 3: Not yet.

Olivia: I like the way that you are persuading (child 3) to try and change her mind. What else could you say that might help someone make a choice?

Child 1: umm. This is the nicest dinosaur – he would be a pet.

Child 3: I disagree with (Child 1) – because of the teeth. They are very sharp and that's not good for a pet.

Olivia: I can see what you are thinking.

Child 1: Pets have teeth. My dog's got sharp teeth.

Child 2: I disagree a bit with (Child 1) and a bit with (Child 3). You could just glue parts of both of them together.

Olivia: That's really interesting. Why would that be good?

Child 2: Well, the best b' from both could come.

Olivia: Yes – you have come up with a new idea.

Transcript 5.12 Olivia and children in discussion, final teaching episode

Olivia felt this clip showed good questioning because she was not '*fixed on one answer, or one child'*. She felt that she listened to the children carefully, and '*prompted the children to explain more'*, and that she had managed to model the vocabulary of thinking more explicitly. She had used some of the questions from our checklist to help her plan the session – but noted that '*it's enough maybe to just think about a range of questions – I don't always use them though – you never know what is going to go on, so you have to adapt with the lesson.*' This was interesting – Olivia is indicating that having the questions as an aide-memoire is useful, but not restricting as she would still adapt the lesson depending on the children's responses.

She also felt that the video showed effective collaboration, because the children were building upon one another's ideas, and gave reasons for their decisions. She felt that '*collaboration has really improved now we have set rules and guidelines, and we have done that because of the work we talked about as a group on the teacher day. I probably wouldn't have thought about it otherwise – or I wouldn't have thought how to do it better*'. Olivia felt that the selected clip was an example of a good piece of thinking – with children persuading one another to choose one of the dinosaurs as a pet. She said that '*to keep them thinking about this, next time we could use a double bubble map to document the thinking – it might help them see the comparisons. That would help C5 maybe because she didn't contribute as much to the persuasion – maybe she needed to think more about the characteristics first.*'

Olivia expressed disappointment that she still hadn't '*managed to use more specific language all of the time*' in the lesson. When I asked why she felt this, she explained that it was because she did not feel she was using enough thinking language.

For example she said that she had seen a moment in the lesson where '*I just said 'what questions do you have... I didn't say anything more specific.*' However, when we looked back at the clip she selected she could see that she '*oh I did say they were persuading each other. And later I did talk about making good connections. I guess I just need to keep aware*.' The VSRD helped Olivia to realise what she was doing successfully, as well as what she could improve. Overall, Olivia said that she felt positive with the developments in her teaching.

She said that she could see improvements in individual children, and that she was more aware of how each child contributed to the discussion. She felt that she modelled some language such as 'explain' and 'connect' and that she felt confident to be able to amend the session slightly as different responses were given. This was particularly evident when she decided to use a thinking map following on from the discussion that the children were having. Olivia commented that she now felt that she had '*a variety of different ways to help support thinking. I can decide which ones to use depending on the session, and you could see that in the VSRD bit'*. Her reflection during VSRD was more in depth and focused on thinking and her personal targets that pre-VSRD.

Ceri's Story

Ceri taught a session based on mathematical development. The children had to give explanations of subtraction strategies that they used to solve 'pirate puzzles'. Before the VSRD, Ceri reflected on two child behaviours and three teacher behaviours.

Ceri and the VSRD During the VSRD she reflected on four child behaviours and six teacher behaviours including her questioning. The focus of her personal development after the initial VSRD was questioning – her first session had included high incidences of IRF exchanges and she wanted to consider how to extend the children's contributions, and promote a more dialogic approach. She initially felt that the lesson had gone '*quite well*.' She felt the children had succeeded in making connections and using appropriate vocabulary. She also felt that she had managed to focus them clearly, using appropriate vocabulary although she didn't feel her explanations were always

'*at the right level*'. During her initial reflection, without the video Ceri did not comment on her questioning or the dialogue that took place.

Having watched the video back, Ceri said that she felt '*really pleased*' about the session, and how this had gone. She felt that the children's contribution to the session was better than in the original observed lesson, and she added that this was partly because she '*felt more confident about running a discussion*', but also because of the children's responses. As with Olivia, the VSRD allowed Ceri to reflect on the relational aspects of her practice.

She felt that her questioning and also her listening to responses had improved since the first observation, and as a result the children were able to have more of a discussion. The following transcript shows part of the VSRD discussion:

R: What made you decide to talk about this clip?

Ceri: I was really pleased. This showed that the work was challenging, but that they started to explain their thinking more. I would have liked them to do a bit more of this, but actually the video has helped me see better.

R: See better – can you explain?

Ceri: Yes- see child 1 there – he can't explain his thinking but he is showing me with the cards. I probably would not have noticed that - but seeing it back helps me realise he does understand but he needs help to verbalise.

R: You wanted to work on questioning after my last visit.

Ceri: Well.. umm.. yes. I worry that I still don't give enough thinking time. I do still need to stop rushing in – but I can see that my questions are better – they model the language a bit more and they are more open ended. I really try to encourage them to say their own ideas more now.

R: Has the VSRD today helped you see any changes in your questioning?

Ceri: Well it allows close observation. I can see that with child 2 there, when he asked about the brain I got a bit flustered – I couldn't think how to move on. I could re-watch that now and think around it – I might be more prepared to deal with the unexpected then.

Transcript 5.13 VSRD episode - Ceri discussing the her second observed lesson

The VSRD transcript shows that by using the video, Ceri was able to look closely at her questioning. She could see what she thought that she was doing well – such as modelling appropriate language, but the process also helped her see areas she could continue to develop - such as the wait time. She felt that the VSRD '*helps me see more closely – and it is good because it's not just me thinking about what I have done less well. I can see the sort of areas where I have done things better than I thought.*' This reflection is more detailed during the VSRD than that when Ceri made initial reflections on the lesson pre VSRD, and relates to more of the behaviours that the teachers had noted as important.

Ceri herself noted that was the case – stating that the VSRD allowed for closer observation of the session.

Lynda's story

Lynda taught a chat mat activity for the final observation. This was based on the story of Noah's Ark, and involved the children making connections between different animals. It lasted for 25 minutes. Before the VSRD, Lynda reflected on three child and three teacher behaviours. During the VSRD, Lynda reflected on six child and seven teacher behaviours. In her initial reflection without the video she said that the lesson was '*successful*'. She commented that the children '*have really improved. They were explaining things well, and could make connections. For instance – (child 1) made a connection between the cheetah and the whale that was way beyond where they live – it was very thoughtful*.' Lynda had selected the development of collaboration as her personal target, but did not reflect specifically on this in her initial discussion of the lesson.

Lynda and the VSRD During the VSRD, Lynda noted a number of aspects of her practice and of the children's responses as being things that she was pleased to see. Lynda felt that she was more relaxed about the process of being videoed and the use of VTRs in general, and so she thought that had paid off – she felt that *'now the children know about these routines so I am not on edge trying to think about how to manage them – they know what is expected so we can actually do the thinking*.' The following transcript demonstrates how Lynda was able to reflect upon the session using VSRD.

Lynda: In this bit I can see the improvement so I have chosen it to talk about.

R: Improvement – that sounds positive – can you explain in what aspects you think there is an improvement?

Lynda: Well- I can see that I am modelling the language here. But it's more. See – this child really came out of herself.

R: How did you encourage that?

Lynda: Well – I can see that I said 'we can all have different ideas'. But the children seemed better at reasoning…umm… I can see they are more willing to discuss things with each other.

R: You said after my last visit that you wanted them to get better at collaborating – so this seems to be supporting that this is happening?

Lynda: I think so. I can see them listening. I look like I am more relaxed, but it's them – they are talking more I think – maybe they also feel more relaxed….or they know what is expected maybe?

R: Have you done anything to help them know what is expected?

Lynda: umm… well… yes. We are more specific when we talk about what to do in the lesson – you know – here I am saying 'make a connection' or 'explain what you mean' – so perhaps that is helping them. The VTR does what it says on the tin – and maybe that is why they are showing the thinking more too. And we used the ideas from our day to set some rules up – we always remind ourselves of the rules before we start and I can see that is working well here.

Transcript 5.16 VSRD episode – Lynda discussing the her second observed lesson

In the transcript, Lynda identifies some points that she did not refer to in her initial reflection. She comments that the VTR itself may be supporting the thinking – because it is specifically designed to develop connections and Lynda can see examples of connections being made. She also suggests that the rules for collaboration (developed by the teachers in TND2) are being used and are 'working well' in this clip. It would have been interesting for me to probe her further on what she meant by 'well', but I did not take this opportunity. Also, through the VSRD process Lynda was able to select aspects of her practice such as modelling language that she felt were having a positive impact on reasoning and collaboration. The comments were more

focused and in-depth when the video was reflected upon, and tended to discuss specifics. Without the video reflection the comments tended to be more general *eg* referring to 'the children' as a whole rather than on individuals.

Lucy's Story

Lucy taught a session where the children were involved in solving problems relating to money. She intended that the children would have opportunity to discuss and develop mental calculation strategies in the session, and did not use a VTR. Before the VSRD Lucy reflected on two child behaviours and three teacher behaviours.

During VSRD she reflected on five child and seven teacher behaviours, including questioning, which had been her personal target. She reflected immediately after the session, and commented that she felt that the session was good. She gave examples of how it was good that related to the objectives of the session – for example, she thought that there was evidence of '*children recalling and applying a variety of number facts. But I was surprised that one of the boys had trouble identifying coins'*. She felt that she had '*encouraged children to use a variety of strategies'*, and she was pleased with their responses. Lucy's personal development target was questioning, but in the initial reflections on the session she did not refer to this.

Lucy and the VSRD Lucy said that she felt more comfortable undertaking the VSRD the second time around because *'I know what it's going to be like this time.'* In the VSRD session, Lucy initially reflected upon individual children and how they had performed – she found that the video allowed her to '*really see the children and how they have got on*.' She felt that the lesson was successful, and was able to reflect on specific elements of it using the VSRD process. This is highlighted in Transcript 5.17 below:

Lucy: I think that I modelled the system well here.

R: Why is that important for you to talk about?

Lucy: Well … I am trying not to be dominant and just ask lots of questions. I saw that last time – just me question, question, question - and I have really thought about changing how I ask them things.

R: So – can you see a change in this video clip?

Lucy: Yes. I am quite pleased.

R: In what way?

Lucy: Well – I am not looking for one answer for starters (laughs). See – here they worked together after I had shown them a starting point. They spotted the pattern – and see (child1) here – she is tapping her head – that's something we do to put numbers in when we are adding.

R: Does the VSRD help you?

Lucy: Well – it gives me time to look. See – I didn't realise those three didn't use the coins to help them at all. I can also see where maybe I needed to still step back a bit. But I have done more of that recently – letting them take more control.

R: Do you think that is a better approach?

Lucy: Well. You still have to ask questions, but …ummm… well – today it means that they worked things out for themselves and I modelled the strategy and vocabulary. But see – they can all explain what they have done, so yes, for this work I think I have improved how it's done.

Transcript 5.17 VSRD episode - Lucy discussing the her second observed lesson

Undertaking the VSRD allowed Lucy to confirm her initial feelings that she was questioning children '*better in a way which allowed them to explain'* and also encouraged them to reason about their responses, rather than in the initial lesson where her style had tended towards IRF – where she was looking for specific answers. The VSRD reflections focused specifically on key elements of her teaching which related to her personal target. She also found the fact that the VSRD allowed her time to look in depth at the children and their responses very valuable. She was able to see events that happened that she had not noticed before.

Sam's story

For the final observation, Sam used a See-Think-Wonder activity based on kites. This activity was the final one in a carousel of thinking skills tasks and

Sam wanted to focus in particular on the children's own reflections of the learning process. Before the VSRD, Sam reflected on two child and three adult behaviours. This included metacognition – her focus. She was one of the only teachers who reflected on her target both pre and during VSRD. During the VSRD, Sam reflected on four child and six teacher behaviours, and again reflected on metacognition.

In initial reflection, Sam felt that the lesson had '*gone pretty well – they did what I hoped and they were keen to talk about their ideas. I think we could see some metacognition in the things that they said.'* This had been Sam's personal target for development. She said that she felt that her questioning had been better because she had thought more carefully about it in advance of the lesson, using the starting points that the group had discussed during TND2.

Sam and the VSRD episode During the VSRD, Sam was keen to focus on the metacognitive skills that were apparent, and which had been the focus for her personal development. Sam felt that the VSRD was invaluable in reviewing the lesson when looking at this aspect, as the following transcript shows:

R: So, can you explain why you have chosen this clip?

Sam: Yes, it's because in this part of the session I think the children are showing how well they can talk about their own learning.

R: What do you think was particularly apparent?

Sam: Well, look they can talk about what good group work would look like – and they can give examples – see here (child 1) says it's about 'piggybacking' on ideas. That's something we have talked about – and he shows that he's really tried to do that. They are showing understanding of their own learning I think.

R: Is the VSRD process useful here, or would you feel the same about the teaching and learning if you hadn't done this?

Sam: Definitely. I thought they were explaining their learning well – VSRD helps me capture examples. It's a luxury – it gives you time to look and listen closely. I can see what they are saying – but how they are saying it … And I can see where I have done something to help or stop (laughs) the thinking.

R: A luxury – that's interesting - do you think it is something that could be done more often – a luxury sounds like something you only do sometimes?

Sam: Hmmm, well… it would be great to do this often - I mean you can slow everything down – like slow motion - but that's a luxury in class. It would mean we would need to dedicate time if we were to do it often. And who would you talk with … having someone here is a luxury.

R: It's nice to be called a luxury! Does having someone to talk to make a difference?

Sam: Well, I suppose it helps you focus and then you can explain…perhaps like children – if we explain we understand better. It's just good to have the chance to talk about things that happen in our own class. It would be hard to do this every week, but I think there are loads of benefits. It lets me see how I have taught but also what they have responded like.

Transcript 5.18 VSRD episode - Sam discussing the second observed lesson

Sam describes the opportunity to undertake VSRD as a luxury that provides opportunity to see teaching and learning in 'slow-motion'. Sam suggests that being able to see her teaching – but also children's responses is a benefit. She also identifies that within the process, the chance to talk with another adult is a useful experience. This is important. As discussed in Chapter 2, using video is not new in teaching and reflection – *eg* Stenhouse (1975) videoed lessons and took a 'discovery approach' to pedagogy. VSRD is distinct because of the use of dialogue as a within the process (Kennewell *et al*, 2009), and it is during moments of co-reflection that we extend understanding of our own practice. Sam acknowledges that having someone to reflect with is important.

However, Sam also indicated that there would be challenges trying to undertake VSRD on a weekly basis – finding the time and another person to work with are noted in particular.

In terms of her teaching, Sam noted that in her second VSRD experience she could see that her interactional style had changed, as illustrated in the transcript below:

Sam: Well, the video did show that I speak less.

R: Do you think that is a good thing or not?

Sam: Yeah – it is good because when you first came I did lots of talking and they didn't. So I kind of said what I wanted them to say. Now they have more chance to give ideas.

R: So do you think you have cracked the questioning aspect?

Sam: Oh – I can still do more. Like… I …umm…I still find it hard to get them to talk to one another. I need to think about that. How I get them taking the lead more.

R: I see. That is really interesting. I wonder – is it always the case that the teacher needs to speak less and the children more?

Sam: (laughs) Well – we have to make sure they are talking about something of value – or sharing ideas that can contribute to what the question is.

R: Value – that is an interesting word.

Sam: (laughs) I knew you would say that. I am meaning that I can't just let them chat about anything – it has to be focused on the learning – that's the challenge – getting them piggybacking from one another in a way that builds what we are trying to achieve together. Not that all their talking isn't valuable – but that we need to focus it on the job in hand – toward the goal of the lesson.

Transcript 5.19 Sam's reflections on her interaction with children in the second visit

Sam shows an awareness of improvements to her practice – and that she feels that if she speaks less, the children have more opportunity to contribute. She also shows an awareness of areas that she could develop further by encouraging the children to engage in 'piggybacking' ideas – which I interpret as referring to a form of exploratory talk as the children would build and reason about ideas together. Sam also relates to the idea of intentional teaching – although she acknowledges the importance of the children having ownership of the discussion she is also commenting on how there is a purpose to this that she trying to guide the learning towards.

Mel's story

For the final session Mel taught a Chat Mat based activity aimed at making connections between living creatures. Before the VSRD, Mel reflected on three child and one teacher behaviour. During VSRD she reflected on four child and four teacher behaviours. In her initial reflections on the lesson, Mel said that she felt that the activity had '*gone well. It was interesting, and the children did well.*

They could talk about their ideas and made some good links I think.' She was surprised that the children '*didn't make links to wolves in fairy tale books, but they could make other connections, so that was good*.' Mel felt that her teaching had been '*a bit better than last time – I wasn't so nervous*.'

Mel's VSRD Mel's personal target had been to develop collaborative group work, she did not reflect upon this initially but she did during VSRD, when she talked about encouraging children to listen carefully to one another during '*sharing parts of the lesson*' when the children were reminded of how to listen and respond to one another's ideas. However, in this particular VSRD episode, we had the only issue with the technology that arose over the course of the project.

Because of the nature of Mel's Foundation Phase classroom provision, the sound quality for the video was very poor. It was possible to use the video in the VSRD discussion, but as Mel pointed out at times she had to use some guess work - '*I think that is what they said then, it is tricky to hear*.'

However, there was enough clear video to allow discussion. Mel talked about individual pupils and their responses during the VSRD – she said that it was useful to look back to make sense of their responses. '*Looking back I understand what was being said about tortoise shells. I'd not understood it at the time so I suppose I might have responded differently if I had*.' This in itself is an interesting point, if practitioners are to listen authentically (Katz, 2003) to children, understanding what is being said is crucial. Whilst VSRD did not make a difference during the lesson itself, for Mel it offered a second chance to show an interest as she commented that '*I could follow that up now – now I know he was talking about the patterns on the shells*.'

Mel's personal target had been to develop collaborative group work. During TND2, as detailed earlier she had asked many questions about how to develop this. The extract that she selected to talk about in detail related to a 'talk-pair' part of the lesson. She had created opportunities for the children to discuss key aspects of the session with a partner, and the following transcript shows our discussion around this:

Mel: I have chosen this because the talk-pair works well. Perhaps before I wasn't expecting enough. But they do it well – except here you see that I wasn't explicit enough.

R: What makes you say that?

Mel: I hoped that they would talk about size and strength. But I said 'anything you know' so it was a bit loose. But I suppose, looking back – well – they were able to do the ranking so it hadn't hindered them. But perhaps I could have guided them more.

R: But you let it open-ended. So you found out their prior knowledge in more depth.

Mel: Yes, I suppose so. And they were all able to do the task, so maybe I need to let them go with their own ideas a bit more.

R: Do you feel that this would be a change to your practice?

Mel: Umm, well, I suppose so. I er, I usually have an idea like talking about size. Maybe I need to go with their ideas a bit more often.

R: Why do you think that would be something to try?

Mel: well, I suppose they might be more engaged – more keen to talk if it's come from them.

Transcript 5.20 VRSD episode – Mel discussing the second observed lesson

The VSRD allows Mel to see how the children have addressed the task. She initially felt that the quality of her own input may have prevented them discussing specific qualities of the animals. However, through discussion she began to suggest that actually seeing the video had allowed her to realise that the children could do the activities even when they were given less direction. She suggests that she will consider 'going with their ideas' more – which would be a pedagogical choice supported in the research about relational pedagogy mentioned in Chapter 2 (and earlier in this chapter).

Summary of the final observational visit

To summarise, the teachers did refer to most of the behaviours that they had identified as supportive of good thinking both before and during VSRD (Table 5.11 Refined teacher descriptors of the behaviours that support thinking). In general, they referred to more of these during the VSRD than they did before they watched and discussed the video of the activity. The following table summarises which teachers referred to which of these behaviours and when.

Behaviour	Pre VSRD	VSRD
Teacher can explain what thinking is needed clearly	Olivia Ceri Lynda Lucy Sam	Olivia Ceri Lynda Lucy Sam Mel
Teacher can prompt children to elaborate		Lynda Lucy Sam Mel
Teacher encourages children to listen to one another		Olivia Ceri Lynda Lucy Sam
Teacher encourages children to use appropriate strategies	Lucy	Olivia Lucy Mel
Teacher asks the child to comment on their own learning	Sam	Olivia Ceri Lynda Lucy Sam Mel
Teacher encourages children to compare and connect	Olivia Ceri Lynda Mel	Olivia Ceri Lynda Mel
Teacher models thinking vocabulary	Olivia Ceri Lynda	Olivia Ceri Lynda

	Lucy Sam	Lucy Sam
Teacher offers the time for children to work at solving the problem with them		
Teacher asks a range of questions, provides wait time and encourages children to ask questions.		Olivia Ceri Lynda Lucy Sam

Table 5.14 Comparing reflections pre and during VSRD relating to the refined teacher descriptors of the behaviours that support thinking (found in Table 5.11)

During VSRD all of the teachers reflected on their explanations, and five teachers reflected on behaviours such as modelling vocabulary and asking children to comment on strategies, whereas some behaviours, such as asking for comments on their own learning were only reflected on by one teacher pre-VSRD. Some behaviours (modelling and comparing/ contrasting/ connect) saw equal numbers of reflection pre and during VSRD. This may have been influenced by the tasks taught – for example those teachers using a Chat Mat activity would have been focusing on specific skills of connecting. However, in most cases it was during the VSRD that behaviours were referred to most. The behaviours which saw the biggest differences between the pre and during VSRD were:

- Teacher can prompt children to elaborate
- Teacher encourages children to listen to one another
- Teacher asks a range of questions, provides wait time and encourages children to ask questions

This may have been because the video allows the teachers the chance to look in depth at the interactions that take place during an activity. In a normal classroom setting, it may be that some of these are missed because for

example teachers may be focusing on one child when another makes a valuable contribution.

As Sam suggested, the video allows the 'time to look and listen carefully.' However, the teachers did feel that this was a luxury, rather than a process that could become an everyday occurrence. The only behaviour not to be reflected on during VSRD was the one relating to working together to share problem. This may have reflected the activities being taught during those sessions.

I wanted to know whether there were differences in the patterns of reflection pre and during VSRD when visit 1 was compared to visit 2. Because the teachers had already undergone an episode of VSRD, I wondered whether in the second observation they would reflect on more behaviours pre-VSRD because they were more 'cued-in' to the behaviours.

Although the teachers between observation 1 and 2 had refined the criteria, there are broad similarities in the type of behaviours the teachers were reflecting on when looking at their own behaviour which allow a general comparison to be made. The following table compares how often they were referred to pre and during VSRD on visit 1 and visit 2. A 'n/a' means that the behaviour was not contained in Table 5.3 or Table 5.11 – for example questioning was not one of the teacher descriptors in Action Research Cycle 1, but was in cycle 2 and so has n/a in the Observation 1 columns

Behaviour – teacher promotes, models or supports:	**Observation 1**		**Observation 2**	
	Pre VSRD	**During VSRD**	**Pre VSRD**	**During VSRD**
Explanation	0	3	5	6
Elaboration	0	4	0	4
Collaboration	2	4	0	5
Use of strategies	0	3	0	3
Reflection on child's own learning	0	3	1	6

Connect, compare, contrast	1	3	4	4
Models vocabulary	0	4	5	5
Works on problems with child	1	0	0	0
Questioning	n/a	n/a	0	5
Making appropriate decisions	0	1	n/a	n/a

Table 5.15 Comparing how often behaviours were referred to pre-VSRD and during VSRD on visit 1 and visit 2

In terms of the teachers reflecting on their own behaviours, before undertaking the VSRD, all teachers reflected on their explanations, and most on their modelling of thinking vocabulary (5 of them), and their encouragement of connecting, comparing and contrasting (4 of them). These were referred to far more frequently in visit 2 than in the pre-VSRD during observation 1 – in which none of the teachers had reflected on their explanations or their modelling of vocabulary and only 1 had reflected on their encouragement of connecting, comparing and contrasting. However, this was not the same for all the behaviours, for example elaboration, use of strategies and reflection on child's own learning both had very few comments made pre-VSRD on visit 1 and 2. This is unlikely to be because of the activities taught, since in the VSRD the behaviours were reflected upon.

I also compared the reflections teachers made on the children's behaviours on visit 2, pre- and during VSRD using the refined teacher descriptors of the behaviours that support thinking (Table 5.11). The findings are shown in Table 5.16 which follows:

Behaviour	**Pre VSRD**	**During VSRD**
Child can express their thinking clearly	Olivia Lynda Mel	Ceri Lynda Sam Mel

Child can add detail to their ideas		Olivia Lynda Lucy Sam Mel
Children can listen to one another and build on ideas	Olivia Ceri	Olivia Lynda Lucy Sam
Child uses a variety of strategies to solve problems	Lucy	Lucy
Child can talk about their learning	Sam	Lynda Lucy Sam Mel
Child can make appropriate decisions		
Child can make links and connections or spot differences	Olivia Ceri Lynda Mel	Olivia Ceri Lynda Mel
Child can use thinking vocabulary	Ceri Lynda Lucy Sam	Olivia

	Mel	
Child works with the teacher to solve a problem		
Child asks and answers a variety of questions		Ceri Lynda Lucy Sam

Table 5.16 Teachers' reflections on children's behaviour, pre and during VSRD

The table again indicates that during VSRD the teachers reflected on more of the behaviours than they did without the use of the video and discussion. Two of the behaviours – asking and answering questions and adding detail to answers had no reflection on initially, but four teachers reflected on these during VSRD. Two behaviours had no reflections either pre or during VSRD, whilst several behaviours were reflected on both pre and during. Not all teachers who reflected on a behaviour pre-VSRD returned to it during the VSRD. I did not enquire as to whether this was because they felt that they had thought about it in enough detail already, or because other events seemed to be more relevant once they had watched the video. This was particularly evident for behaviours relating to the use of thinking vocabulary.

Analysis of VSRD from Day 1 and 2 revealed that using the VSRD process enabled the teachers to reflect on certain behaviours that they felt were important in the teaching of good thinking. For the analysis of the final VSRD episode with each teacher, I wanted to see if the level of reflection was different pre and during VSRD.

As discussed in Chapter 2 and 3, Muir (2007) provides a useful model for analysing level of reflection based on 3 levels: technical, deliberate and critical. Data collected from the VSRD process was analysed in terms of the levels of reflection using Muir and Beswick's (2007) levels. It was apparent that the teachers generally had moved beyond technical description of the activity when they used VSRD.

All were able to identify some critical incidents in sessions and deliberately reflect on these because this is exactly what VSRD asks them to do – identify a key episode in the session and reflect on that. For instance, Olivia explained and justified her teaching actions *eg* modelling. VSRD also seemed to facilitate more examples of critical reflection – possibly because the teachers have the luxury of revisiting the session and taking their time to reflect on it. The following table illustrates this:

Level	Description	Muir's example	Pre VSRD example	During VSRD example
Level 1: Technical Description	*The participant describes general accounts of classroom practice, often with a focus on technical aspects, with no consideration of the value of the experiences*	*The lesson went well I did not ask enough questions* *The students could all do the task*	*I taught quite well. I used clear language* Olivia - self *They were explaining things well, and could make connections* Lynda – student	*My voice – I sound like an extra from Brookside!* Sam- self *'There is a problem getting them to talk'* Lucy– student
Level 2: Deliberate Reflection	*The participant identifies 'critical incidents' and offers a rationale or explanation for the action or behaviour*	*Johnny was really off task today — I think the question was too hard for him; the way he was working out the area showed me he was confusing it with perimeter* *I really wanted them to use the concrete materials as I felt they didn't have a good conceptual understanding of why the addition algorithm works*	*'I don't think my explanations were always at the right level'* – Ceri – self *'They were explaining well – making a connection between cheetah and whale'* – Lynda - student	*See child 1 there – he can't explain his thinking but he is showing me with the cards. I probably would not have noticed that - but seeing it back helps me realise he does understand but he needs help to verbalise* Ceri - student *'I am modeling the language* here' Lynda – practice *'I need to ask better questions'* Lucy – self
Level 3: Critical Reflection	*The participant moves beyond identifying 'critical incidents' and providing*	*I shouldn't have put Jack on the spot by asking him to explain what a square number was. He*	No example found	*'Before I would have said 'stop chatting'…now I can see that for some of them they talk as they are*

	explanations to considering others' perspectives and offering alternatives	*was obviously uncomfortable. Perhaps I could incorporate a 'think-pair-share' strategy whereby the students could talk with each other before sharing more publicly* *I've always taught division that way, but I could see their eyes glazing over and I just think there must be a better way - I need to get them more engaged in the process - perhaps using concrete materials might help.*		*…trying to understand the ideas'* Sam – student *'Am I putting words in their mouth – see – here I am trying to get them to talk …I am leading them too much'* Mel – practice *'Next time we could use ….this would help child 5 contribute to the persuasion'* Olivia – student

Table 5.17 Examples of pre and during VSRD levels of reflection

Adapted from Muir and Beswick (2007:79).

Furthermore, in all cases, during VSRD the teachers were more likely to reflect explicitly on themselves, their practice and the children. In pre-VSRD reflections they were more likely to focus on the children and themselves, not the specific behaviours or pedagogies associated with the teaching of thinking.

Summary of the final school visit

All teachers undertook a second observed activity, and a VSRD episode. The teachers all reflected upon their lessons before and during the VSRD process. All teachers reported positive feelings about the sessions, and said they felt that their teaching had improved since my first visit. In every case the reflections were more in-depth during VSRD compared to initial reflections without the video. Using the revised 'descriptors of good thinking' table (Table 5.11) as a framework for analysis, it was apparent that in all cases the teachers reflected on more of these when using VSRD than when they were reflecting immediately after the lesson.

Whilst only one teacher reflected on her personal target for development (Sam) initially, when the teachers were involved in the VSRD process all of the teachers referred to their targets when reviewing the session. Following the final school visit, we gathered as a group for the third and final teacher network day.

5.4 Teacher Network Day 3

For the final Teacher Network Day, the focus was on discussion around three key areas:

1. Experiences using VSRD
2. Experiences with VTRs
3. The impact on children's thinking (– which is discussed in Chapter 6)

The teachers brought examples of activities that they felt had worked well, and were given time to reflect upon their own experiences during the project.

5.4.1 Experiences using VSRD

We reflected on whether or not the teachers felt that the VSRD process had been beneficial. The group all agreed that it had been of use, both for their own teaching but also for closer observation of individual learners.

The following transcript provides an illustration:

Researcher (R) :Overall, do you think that VSRD helped you in your teaching of thinking?

Olivia 'Realising that the quiet child is actually thinking and not disengaged was a eureka moment.'

Sam 'Yes – sometimes good thinking can be a child looking into space and daydreaming.'

R 'Can you think of an actual example of that from the VSRD episodes?'

Sam 'Yes, I watched a boy, I realised he had thought about what he was going to do when he was stuck – he didn't rush. Then he was able to tell me what he'd done. Otherwise I might just have thought he wasn't bothering – watching it back helped me see his learning.'

R 'Has that been the same for anyone else?'

Olivia ' Sometimes they need to fiddle with something – it's not bad behaviour. It used to annoy me, but now I can see that the movement sometimes is..um..like a way of helping makes sense of tricky stuff'

Sam 'Yeah - like self-talk – I can see why that is helping some of them now - when I take time to watch the video. Before I would have said 'stop chatting', or I'd have thought they were being disruptive or off task. Now I can see that for some of them they talk as they are… kind of trying to understand the ideas'

Olivia "I think I am also a bit clearer I think now I have watched things. I could see sometimes before I would say things and they didn't get what I was saying – but sometimes if I used better terms ..um..clearer words like 'connection', they could do it better.

Transcript 5. 21 teachers' reflections on the use of VSRD

When asked to reflect on VSRD the teachers all stated that it had been a beneficial process to undertake. The focus of the extract above is mainly focused on how VSRD allowed the teachers a greater insight into pupil learning, and so I encouraged the group to think about their own personal targets for development after the first observation, and whether VSRD had helped them to address these. They all felt that it had given them the chance to think about their own practice in more detail. In all cases, VSRD had surprised the teachers in some way – sometimes in terms of the things that they thought they were very good at but then realised that they could improve. Sometimes VSRD revealed that they were actually teaching something better than they thought they were and sometimes the VSRD helped them to look specifically at learners. The group all felt that VSRD had helped them identify and reflect on personal development.

They all felt that their teaching had improved as a result of '*spending time looking and talking about what I do day in day out'* (Sam). They could also see how VSRD could be a useful process to undertake for a variety of professional development purposes. '*If we had a focus on the school development plan, we could use VSRD and then maybe use it in staff meetings to help share good practice'* – Olivia. *'If we had particular subjects we weren't so sure about it might help us find targets'* – Ceri. They made it clear that it was not just the viewing of the video – it was the conversation with myself that was key. Sam summed this up, when she said that '*I guess the chance to talk things through means you unpick them in more depth* –

and sometimes just discussing with you made me think about a child, or something I had done in a new way. Like opening my eyes anew.' As discussed in Chapter 3.

This resonates with the work of Muir and Berwick (2007) who suggest that professional conversation in this type of situation can promote deliberate reflection which probes teaching behaviours deeply.

5.4.2 Experiences with Visible Thinking Routines in the project

All six teachers viewed VTRs positively. Each had used several during the course of the project, and felt that, in terms of developing the thinking of their children they were highly effective materials. The reasons given were:

- Olivia: *They are fun – and really easy to put into lots of different lessons. I like the fact that they have a very clear focus – like 'connect' – it helps me and the children remember the thinking focus*.

- Ceri: *They are quick to pick up – children can engage with them. They are user friendly – and I am clear about what I am trying to teach*.

- Lynda: *They are very focused so we all know what we are trying to do. If they say they are about connections, you can be pretty sure that the children will be making connections if they do the activity*.

- Lucy: *I like the clearness – you can use one which develops particular thinking when you need to, so can easily help with plans and the children enjoy them*.

- Sam: *They are clear and focused. They make me clear about the language to use, and the actual thinking skill we are trying to learn and so they and help us reflect on the learning and thinking because everyone knows what is expected*.

- Mel: *They are easy to use. They make sense and they make sure we all know what is going to be covered. They are actually really simple to put into place*.

The teachers felt that the simple, clear and focused nature of the VTRs was beneficial. They felt that the VTRs were focused on specific thinking which supported their planning and teaching.

The resources enabled them to plan activities that had clear thinking skills related to them – and this helped then to focus the discussion during the tasks. The resources were interesting to the children – and all six teachers said that the children enjoyed engaging in VTR activities. The pattern of use of VTRs varied from class to class, but all teachers used them at least three times during the course of the project. This is shown in Table 5.19 below:

Routine	Olivia	Ceri	Lynda	Lucy	Sam	Mel
See-think-Wonder	✓	✓	✓	✓	✓	✓
3-2-1 Bridge	✓	✓	✓	✓	✓	
Chat Talk/ Chat Mat	✓	✓	✓	✓	✓	✓
Think-Puzzle-Explore	✓		✓		✓	
Circle of Viewpoints	✓				✓	
Other	✓			✓	✓	✓

Table 5.19 which indicates which routines were used by each teacher throughout the project *A green box represents a routine used regularly (at least fortnightly), and yellow indicates routines used a maximum of three times during the project. No colour indicates a routine not being used at all.*

See-Think-Wonder, Chalk Talk and 3-2-1 Bridge were the VTRs used most frequently. Most of the six teachers were using VTRs on a regular basis, with Sam and Olivia using the widest range most frequently.

Mel used VTRs least, but she did use Thinking Maps as well, often alongside the VTR in the same lesson. The teachers fed back that VTRs were easily embedded into the Foundation Phase curriculum in their classes, and all six

teachers said that they would continue to use them after the project had finished. Olivia, Sam and Lucy all had plans to deliver some training for their schools on VTRs after the project so that they could be used in other classes.

Summary of TND3

The teachers all felt positive about their experiences with both VSRD and the VTRs. They all felt that their teaching of thinking had improved as a result of being part of the project, and all felt that they had benefitted form an action research approach, as they could 'learn from each other but keep focusing on our classes because they all have their own challenges' (Olivia).

However, there were also challenges that the group identified in implementing VSRD processes. In particular, the sustainability of the process was discussed. Sam had already referred to the process as a luxury. The teachers all felt that it was time consuming, and so whilst very valuable, as Lynda said '*you couldn't do it every week'*, and it did need '*some careful preparation and planning*' (Olivia). The group felt that there could be specific times when it would be particularly beneficial these were:

'*If I was starting my teaching career, I think it could give me a brilliant insight so that I could remedy little habits that might not be very good habits'* – Ceri

'*If we had a focus on the school development plan, we could use VSRD and then maybe use it in staff meetings to help share good practice'* – Olivia

'If we had particular subjects we weren't so sure about it might help us find targets' – Ceri

'*Sometimes when we have to think about what we are to do next in terms of career, we can be in a bit of a rut. VSRD has certainly shaken me out of mine – I saw clearly what I could do next*.' - Sam

Conclusions to Chapter 5

The main focus of this chapter has been on reporting and analysing data relating to the question of 'How did the teachers involved in the project develop in their teaching of thinking through the course of the intervention?'

All six teachers felt that their understanding of what 'good teaching of thinking' looked like in the classroom had developed over the course of the project. They all felt that involvement in the project had had a positive impact on their awareness of how to teach thinking effectively.

They said that this was a result of a number of factors which they summarised as a group as follows:

- Having the time and space to explore what thinking really means in the Foundation Phase.
- Having the time and space to discuss thinking with other teachers.
- Having the opportunity to explore new ideas for activities to promote thinking.
- Having the chance to revisit ideas over a sustained period of time.
- Having the chance to reflect on, and discuss their teaching with another person.
- Having the opportunity to base this discussion on their video excerpt.

As summed up by Olivia during the final conversation about VSRD:

'*This approach (video) has been discussed many times but I have always been reluctant, but it enabled me to look at it many times and observe and evaluate different aspects each time. The dynamics of the group, the confidence and wellbeing of the pupils – body language that is so easily missed, realising the quiet child is actually thinking and is not disengaged was a eureka moment...and of course to develop my own use of language, time to allow the children to talk and answer their own questions.*

The use of video has enabled me to develop my questioning skills. It was essential that I knew what I was looking for – the objective of my viewing. Initially I felt self-conscious and did not fully understand what I was looking for, but by talking through I found targets to look at developing. As a profession I feel we look for the negatives in our teaching, but knowing the

objective of my viewing and talking it through helped me to focus on thinking and how I can move it on.'

In this comment, Olivia notes that it was the 'talking through' of the video clip that was particularly useful in helping her to focus on the children's thinking and her teaching of it. This indicates that the nature of this dialogue is of importance – Olivia felt the process of 'talking it through' was helped her development. All of the teachers said that the VSRD had been very beneficial, and was something that they felt was a valuable staff development tool. All felt that they had made genuine and long lasting changes to their practice as a result of involvement in the project. I did not attempt to evaluate their teaching at any point as that would not have been appropriate within my research framework. However, I could look at their initial focus of reflection and how this developed over time. The data indicated that over the course of the project, all of the teachers became able to reflect more frequently on key behaviours they felt were important in the development of thinking, and in more depth about their teaching of thinking. For example, one stated that *'I realised I used the word 'think' a lot. I am really aware of it now. I try to focus on better key words or phrases like 'make a connection'. When I hear myself say think I try to add the actual word as well – like 'connect' or 'compare' or 'justify'* (cited in Lewis, 2013:46).

VSRD and VTRs were both valued by the teachers, and both were credited with helping the teachers develop thinking in their classrooms. Through the use of VSRD, all of the teachers reflected more frequently on behaviours that they associated with developing thinking at a deeper level, beyond a technical focus. The VSRD process also helped the teachers focus on specific thinking skills such as making connections and also made them aware of areas of their practice they would like to develop. These conclusions will be drawn together with the other findings in Chapter 7.

Chapter 6
The children's journey

The previous chapter presented the findings in relation to the experiences of the teachers involved in the action research phase of my study. The purpose of this chapter is to present the findings relating specifically to the final two questions in my project, which focus on the children who were involved, namely:

- To what extent did children in the project demonstrate development in their awareness of thinking?
- What was the impact of the intervention on children's performance on a limited number of standardised tests?

The chapter is divided into three main parts and each of these parts reports back on key findings relating to a specific part of the project. Section 6.1.1 presents the findings from analysing the children's perceptions of thinking at the start of the action research, compared to Section 6.1.2, where their perceptions of thinking at the end of the project are discussed.

Section 6.2 presents the findings from the two action research cycles and reports on two particular elements (part 2a reports on the first visit to schools, part 2b on the second). These findings relate to any metacognitive incidents observed during the teaching activity and the VSRD carried out with the children after they had made their films. Finally, Section 6.3 considers the data from the standardised tests that the children completed before and after the intervention.

6.1

6.1.1 Children's views on the nature of thinking at the start of the project

After initial introductions, each of the thirty-six children in the intervention group were asked to look at eight photographs and tell me whether they thought that any of these showed people thinking.

As discussed in Chapter 3, these photographs were selected to show a people in a range of contexts, such as in a classroom, on a beach, playing, reading and laughing. Some contexts looked like classrooms, others were outdoor spaces. In some pictures there were adults and children, and in others there were just children. Some pictures showed children alone. The table below summarises the children's responses. The children sorted the photos into those showing thinking going on and those where they felt that it was not taking place. All of the children participated willingly in this activity, and were enthusiastic in sharing their responses with me. The following table summarises their responses:

Photograph	Shows thinking	Does not show thinking	Not sure
Child reading a book on their own	30	4	2
Child reading a book with an adult	34	2	0
Children on carpet with fingers on lips	36	0	0
Children at a table writing	36	0	0
Children playing with a ball on the beach	3	30	3
Children laughing together – in a park	3	32	1
Children laughing together in a classroom	4	31	1
Children reading a book on the grass	6	28	2

Table 6.1 Summary of how many times each photograph was labelled by the children as showing thinking or not showing thinking (pre-intervention)

The table indicates that many of the children felt that certain photographs showed thinking more than they felt other photographs did. The children generally identified those pictures with images of children inside classrooms as those where thinking was happening. Those where children were outside were generally seen as being representative of children 'having fun' or 'playing', and were not identified as showing thinking by the majority of children.

Context was important – the same sort of activity was viewed differently depending on whether it was shown to be taking place inside or outside. In other words, reading a book inside the classroom, (especially with an adult) was seen by the majority of children as thinking, whilst reading a book outdoors was generally not viewed as a thinking activity.

I asked the children to explain to me what being a 'good thinker' meant to them. In all cases the children were all able to give a response, except in Ceri's class where one boy shrugged his shoulders and said 'I don't know.' The general responses were similar across the schools, children described 'good thinkers' as people who '*have big brains'*, who are '*smart dressers*', who are '*are quiet'* or who as people who '*sit on chairs'*. These comments possibly reflected perceptions of 'good workers'. At the start of the project all the classrooms had displays relating to classroom rules, and these included suggestions that linked to behaviour. In the cases below the displays were labelled 'good thinkers' and referred to behaviours such as following directions and raising your hand, as illustrated in the following photographs:

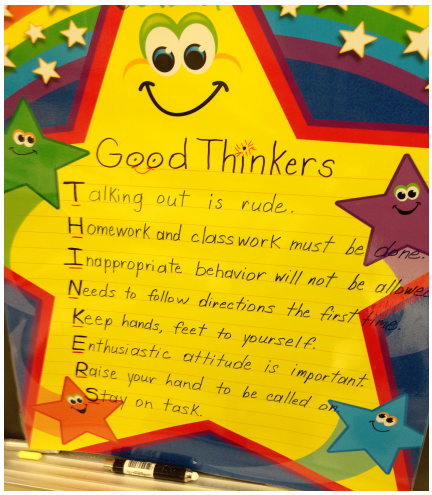


Figure 6.1

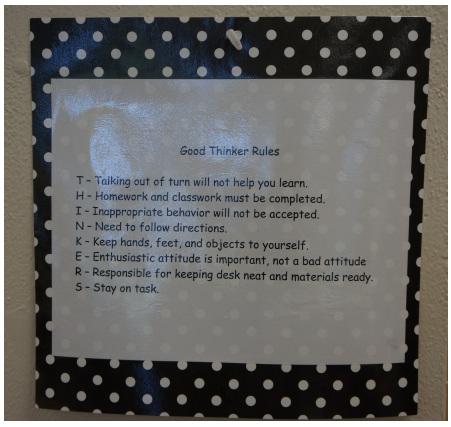


Figure 6.2

Figure 6.1 and 6.2: Classroom displays relating to 'Good Thinkers' (source: author's own, taken in Olivia's classroom (a) and a Key Stage 2 class (b) in her school)

Although labelled as 'good thinking', the message these photographs communicate relates to expectations about behaviour. 'Staying on task'

relates to particular learning dispositions such as resilience (*eg* Costa and Kallick, 1996), but the other rules relate to behaviour. This may explain why children responded as they did – they were providing me with the class rules associated with thinking.

The idea of thinking being something that happens in quiet classroom contexts was similar to many of the responses from the pilot study, where children were generally adamant that, for example, you cannot talk and think at the same time – because it '*might disturb you'*.

When children were asked to describe 'good' thinking, and what they did when they were thinking, several of their responses included the statement '*We put our thinking caps on'*. This was particularly true in Sam and Mel's classes where several of the children said that this was an approach that they took in order to think. This was a phrase that they used without then being able to elaborate on what this meant in terms of what they would actually do. I asked them what the thinking hat did when they put it on, and how it helped them, but the children could not provide an explanation. Whilst the 'extent to which children can articulate their thinking about thinking is clearly dependent upon their language development' (Tanner *et al,* 2011:76), these children could not begin to provide me with an explanation about the thinking cap. Yet they could elaborate on other questions I asked, which suggests that the idea of 'putting on a thinking cap' was a mechanical response rather than a metacognitive strategy.

When asked what they would do when they were stuck, most of the thirty-six children responded by saying they would ask the teacher, two said they could ask a friend and one said they would '*think about it'*. They did not demonstrate awareness of the strategies they could use in tricky situations – or at least they did not verbalise any metacognitive strategies at this point.

As outlined in Chapter 3, I also asked the children to draw pictures of thinking. The pictures that they drew usually showed an awareness that thinking goes on in the head, and is something to do with the brain.

The pictures conformed to typical images of thinking, and were generally characterised by common symbols. For example, in the picture below,

thoughts are seen as a bubble coming from the head – this was a common symbol used by the children. Because of the age of the children in the project they are likely to be at the 'schematic' stage of drawing (Steel, 1997), where children often have established schema about a way to draw things. The drawing of thoughts as a bubble coming from the head is replicating what is a socially accepted representation of thinking.

Drawings of people may lack proportion and detail, and often the person is depicted with large heads and small arms, such as in drawing below, which was a picture drawn by a child in Mel's class:

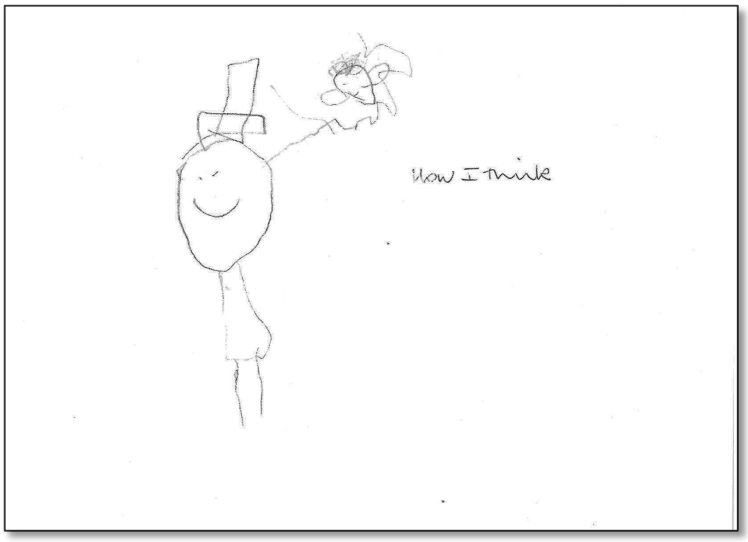


Figure 6.3 Child's drawing of 'How I think'

This child's response was typical of the majority of pictures. The picture shows a person who has a cloud/ bubble coming from their head. When asked what was happening, the child said that *'This is me thinking about things. That's my thinking coming out'* (pointing to cloud). The children were able to indicate thinking using the symbol of a bubble or a cloud, but not elaborate on what happens when they think. In Figure 6.3, the child has drawn one thought coming from his head, which I asked about. The child told me that he was '*Thinking about being good and kind.*' He said that he could only think about one thing at a time. Most children drew pictures of one thought coming out of the head of the person.

In the following drawing (Figure 6.4), drawn by a child in Olivia's class, the child drew a picture that indicated that thinking can happen in a person's

head, and she also demonstrated that she thought that thinking could be about various things. She also used a familiar representation of thinking – bubbles coming from the head. These showed her thinking 'about school, home and the car'. She could talk about what she thought about – her house, her car and playing in school, which are shown as separate thoughts coming out from her head. However, she could not explain in any more detail what happened when she thought, or tell me any of the strategies that she might use when thinking.

Figure 6.4 Child's drawing of 'What I think about'

Common across all six schools was the fact that the children generally associated thinking as something happening in their heads regardless of their age. In fact, only one child talked about thinking happening elsewhere in his body - namely in his elbow and arm. He could not tell me why he thought this was the case, but he did show me that when he thought hard he would rub his arm.

When asked to talk to me about what their pictures showed, most children said that they had drawn pictures of them thinking about being good, kind or nice. Few children in any of the schools could tell me whether thinking was easy or difficult, but most said that they were good at thinking.

Three noted that sometimes it made them tired. When I asked them to explain why that might be the case, two children said that it was because it is hard. The third, who was in Sam's class, said it was because thinking is '*complicated*.' When prompted further, she said that it was tricky to think – and that it was also tricky to tell me about what it was like to think. This child drew the picture that follows as her illustration of what thinking is like:

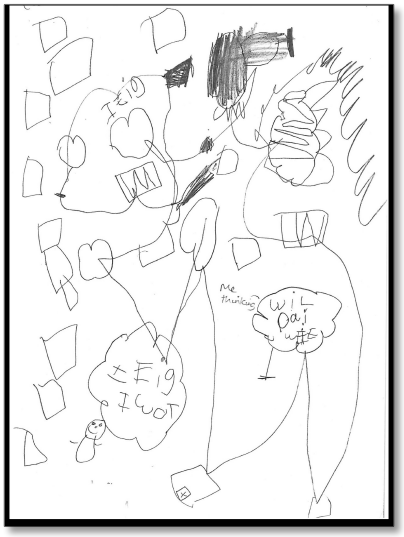


Figure 6.5 Child's representation of thinking as 'a muddle'

This child also said '*I just don't know what thinking is so I have drawn a muddle*'. Her picture shows thinking as complex, with many ideas (shown as squares and bubbles) with connecting lines and boxes all around the page. These join things that she thinks she wants ('I Fig I Wot') to what she thinks about – which is what she will play with ('wil paj wils'), which also connect to other bubbles and ideas. This view of thinking processes involving the making connections links to the work of researchers such as Ritchhart *et al* (2011), as discussed in Chapter 2. For instance, McGuinness (no date) suggests that a crucial thinking skill involves being able to make connections - 'to see that there is a similarity between this situation and something that I did a long time ago and that I can make a connection between those things'. In Picture 6.3 the child is drawing thinking as something which involves connecting ideas. She was the only child to do so.

Section 6.1.1 Summary: To summarise the findings from Section 1a, at the start of the project, in all of the classes, children's perceptions of thinking tended to be generalised – most were aware it was something that happened in their heads, most indicated that it happened in a classroom, many aligned it to behaving well, and most suggested that if they were stuck they would ask the teacher what to do. No child suggested any metacognitive strategies although 'putting on thinking caps' was an approach that some said they would take in a tricky situation – even if they could not explain what this would do or how it would help them.

6.1.2 Children's perceptions of thinking at the end of the project

On my final visit to schools, I asked the children to talk to me about their understanding of thinking. I was interested in seeing whether their thinking had changed in any way from the start of the study. Analysis of the pupil responses demonstrated a growing awareness of aspects of the thinking process, and the beginnings of a common language of thinking between children and teachers and peers. When asked to tell me which of the photographs showed children thinking it was apparent that there were some differences between their views pre and post-intervention. Reading was seen by all children to involve thinking, whether it was with an adult or not. The following table summarises the responses:

Photograph	Shows thinking	Does not show thinking	Not sure
Child reading a book on their own	33	0	0
Child reading a book with an adult	33	0	0
Children on carpet with fingers on lips	28	4	1
Children at a table writing	33	0	0
Children playing with a ball on the beach	26	5	2

Children laughing together – in a park	18	15	1
Children laughing together in a classroom	22	10	1
Children reading a book on the grass	30	1	2

Table 6.2 Summary of how many times each photograph was labelled by the children as showing thinking or not showing thinking (post-intervention)

When compared to their responses in the pre-intervention discussion, there are some differences. Reading, whether alone or with an adult in a classroom was seen by all children to involve thinking in the post-intervention discussion. Previously the majority, but not all children had thought this. They had previously seen thinking as involving activities where they were being quiet and well behaved. Most children (91%) also saw reading in an outdoor context as involving thinking post-intervention, whereas at the start of the project only 17% thought that reading outdoors was a thinking activity.

Other outdoor and social activities shown in the photographs that had generally not been seen as thinking pre-intervention were seen by over half the children as involving thinking post-intervention. When asked why they decided that these showed thinking, one child in Ceri's class responded '*Well, you can think anywhere. About lots of things. You can think in space as long as you have a space suit*.'

These findings are summarised in Table 6.3 which follows. Percentages have been used because the number of children pre and post-intervention was not the same (n=36 visit 1, *cf* n=33 visit 2).

Photograph	Shows thinking		Does not show thinking		Not sure	
	Pre	Post	Pre	Post	Pre	Post
Child reading a book on their own	83%	100%	11%	0%	6%	0%
Child reading a book with an adult	94%	100%	6%	0%	0%	0%
Children on carpet with fingers on lips	100%	88%	0%	12%	0%	3%
Children at a table writing	100%	100%	0%	0%	0%	0%
Children playing with a ball on the beach	8%	79%	83%	15%	8%	6%
Children laughing together – in a park	8%	55%	89%	45%	0%	0%
Children laughing together in a classroom	11%	67%	86%	30%	3%	3%
Children reading a book on the grass	17%	91%	77%	3%	6%	6%

Table 6.3 Comparison of how many times each photograph was labelled as thinking pre and post intervention

To show the shifts in the children's perceptions of what thinking was, I summarised the results into a graph (Figure 6.6 overleaf). This shows clearly where the children's views about thinking altered most – photographs of non-classroom based activity tended to see the largest increases. This may indicate that the children became aware of the complexity of thinking and better aware of the nature of it as the project progressed.

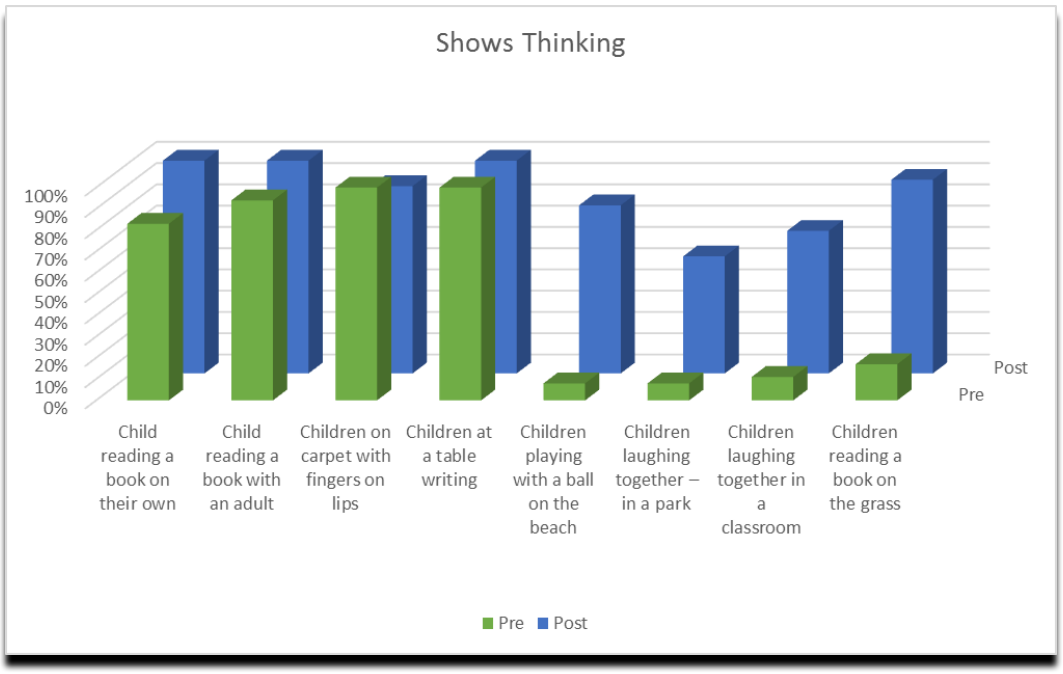


Figure 6.6: Children's views of whether an activity shows thinking pre- and post-intervention

The graph shows how the number of children who thought that sitting with fingers on lips was an image of thinking was the only photograph that had fewer children saying it showed thinking post-intervention when compared to pre-intervention. When I asked the children why it might not show thinking, one child in Sam's class responded by saying '*You might just be waiting. You know. To find out what you are going to do.'*

A child in Olivia's class said *'Well, you know. You might not be thinking 'cos you are just going to be told what to do.*' They seemed to be associating thinking with a more active type of involvement, and sitting quietly was perceived by some to be a passive activity where they were just waiting.

The children were also generally able to describe good thinkers in more depth than they had previously, going beyond the familiar 'bubbles in the head' explanation. For example, there was an emphasis on body language and gesture in the post-intervention responses. For instance, the children tended to describe good thinkers as people who '*look up and close their eyes'*, as those who '*put their fingers on their heads to get the ideas*'. These are possibly images of thinking that are often portrayed in the media.

For example a search on google images for 'cartoon of people thinking' displays a number of images similar to the one below:

Figure 6.7 common images of people thinking. Source: clipartbro(2016)

The children were also able to move beyond the typical, and use more specific vocabulary relating to thinking such as good thinkers being those who '*make good connections'*, and suggestion as to strategies they could use such as '*you could use a number line and good thinkers might just put it in their heads for when they are stuck*.' The idea of pictures and images in your head as an effective strategy was common. For example, the following comment from children in Olivia's class explains what one child suggests could be done if you get stuck reading: '*If you get stuck you have to sound out the word – it's like having the letters in your head and putting them together – and that really is a lot of thinking. You need to look to remind you what to do.*

You could put string around your finger to remember something, but it's good to close your eyes and look into your mind.' (Lewis, 2013:50). Another common feature that the children referred to was body language – for example '*holding their face', 'tapping chin*' and '*put your finger on your brain'* were the sorts of gestures seen by many children in all of the schools as ways that good thinkers might behave. Child B, in Lucy's class suggested that '*I was biting my cheek and looking at you, thinking about what you were saying. I tried to make a link to what I knew*.' (Lewis, 2013:50). This child is also using thinking language – such as 'making connections' independently.

Classroom displays also reflected the language of thinking more frequently, which may have provided a scaffold for such language. For example, Figure 6.8 below, taken in Lucy's class, encourages children to reflect directly on their learning and whether they feel that they could improve. It asks whether they feel that they could do better, and this was a display children were encouraged to refer to at the end of sessions when self-assessing. Lucy said that this display was about '*empowering the children – helping them to think about their own thinking and learning, and what they might do next.'*

Figure 6.8 One of Lucy's classroom displays at the end of the project

Figure 6.9, taken in Olivia's classroom at the end of the project shows a similar display to encourage pupils to reflect on their learning. It asks specifically about the skills that the children feel they have used, and the strategies that they may have employed in order to complete their tasks. It includes reference to 'making decisions', 'predicting', 'having thinking time', 'reviewing' and 'sharing ideas', which are all relevant to thinking processes.

Figure 6.9 One of Olivia's classroom displays at the end of the project

In Sam's class, there was a display referring to De Bono's Thinking Hats (De Bono, 1985). Although these were not a strategy that we used as part of the project, Sam said that as a result of being involved she had '*started to get really excited by thinking, and the whole school is starting to make thinking more visible in everything we do. All classes have a thinking wall where we put stuff to remind the children. The thinking hats are something we are going to explore next*.' Figure 6.10 below shows part of this display.

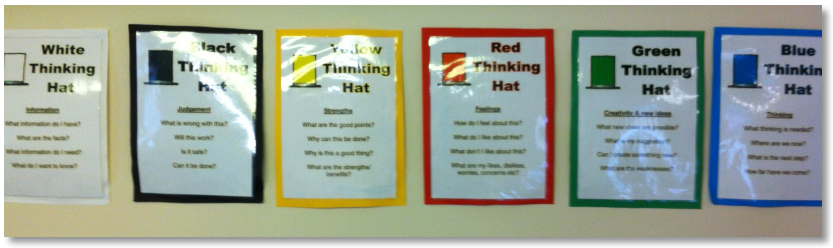


Figure 6.10 Sam's Thinking Hat display

VTRs were also evident within classroom displays and planning. The following picture (Figure 6.11) shows the planning in Olivia's class for a 'See, Think, Wonder' VTR activity, and some of the work that the children produced when carrying out the task. The sticky notes have been used to keep a record of the children's ideas and responses during the activity. Olivia was developing a 'thinking wall' display where these sticky notes and ideas were going to be collected.

Figure 6.11 Olivia's planning for VTR activities

The increased evidence of vocabulary associated with thinking, and of activities related to thinking being visible in the classroom and in planning is indication of a learning environment which fosters and values thinking (*eg* McGuinness, 1999; Ritchhart *et al*, 2011).

Summary of 6.1

To summarise, after the intervention, children showed some changes in their ideas about thinking. They saw a wider range of activities as involving thinking, and were less context dependent than they were in the initial meeting. They considered thinking to be something that could happen indoors or outdoors, with or without an adult. They were able to refer to indicators of thinking such as body language and gesture, and skills such as making connections. When asked what they would do if they were stuck, they were more able to refer to strategies such as using number lines or pictures in their head, rather than saying that they would rely on asking the teacher if they found something challenging.

Classroom learning environments also showed a change. Thinking was referred to more frequently in displays, and some of these displays encouraged pupils to reflect on their learning, rather than the emphasis on encouraging certain 'good' behaviours that was prevalent at the start of the project.

So, in summary, the first question that this chapter explored related 'to what extent did children in the project demonstrate development in their awareness of thinking?' The findings indicate that over the course of the project, children's awareness of thinking did change. The children began to view thinking as happening in a wider range of contexts than at the start of the project, and began to recognize certain key behaviours or statements as indicators of thinking, beyond the observation of compliant behaviour.

In order to explore whether the changes in pupil's perceptions and views regarding thinking were transferred into their metacognitive behaviours, I needed to analyse the observational data from each school visit. The next section looks at the findings from each class on visit 1 and visit 2.

6.2 School visit – the action research cycle

As discussed in Chapter 3, I needed a tool to assist me in trying to answer the question relating to children's awareness of their own thinking. I used a framework that I generated from review of the literature to analyse the videoed lesson with regard to metacognition. When I viewed the lesson observation videos I used this framework to help me code and analyse the children's responses. When I conducted VSRD with the children, based on their own films that they had made, I also used the metacognitive framework to analyse their responses. The framework follows below:

Component of metacognition	Type of behaviour	Terminology commonly associated	Citations include	Example
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self-appraisal • Declarative knowledge	Flavell (1979) Kuhn and Dean (2004)	'I know what to do' 'She doesn't know how to do it'
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	Kuhn and Dean (2004) Flavell (1979)	'We've got to solve a problem' 'I think that's right but is it?'
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	Schraw *et al* (2006)	'Something is missing' 'This is like the one we did last week'
Cognitive regulation	Identification and selection of appropriate	• Plan	Whitebread *et al* (2009) Schraw *et al*	'We need to know which way to go'

strategies		(2006)	
Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experience	Whitebread *et al* (2009) Flavell (1979)	'this is so hard to do'
Assess processes and products of learning	• Evaluate	Whitebread *et al* (2009)	'we should build boxes – that would be quicker' 'this one is good isn't it'

Table 6.4 Metacognitive components framework

6.2.1 the first visit

In all cases, the first visit to schools took place after Teacher Network Day 1, in the Autumn term. As outlined in Chapter 3, during these visits I spent the day in each school, and worked with the selected children and the teachers. I carried out an observation of an activity (led by the teacher which involved the selected children), and then a VSRD with the children based on the films that they made of people thinking in their classes.

Olivia's Class

Analysing Olivia's first lesson

In the first observation, the lesson involved a task that aimed to encourage children to generate questions about an event in history and make suggestions as to why it had happened. The task involved all six children, and took thirty minutes. The video was first analysed using the metacognitive framework (table 6.4).

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	‘‘I didn’t like it when I learnt that the people in the story died. It made me feel sad. It was a sad thing to learn.’
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	‘‘You could say ‘how’ at the start to find out how it started.’
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed ‘
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	None observed
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	‘‘I didn’t have an idea about this.’
	Assess processes and products of learning	• Evaluate	‘‘I would like to find out more about what the oven looked like. The book didn’t have much about it, so I will have to think some more.’

Table 6.5 Metacognitive behaviours observed in Olivia’s first teaching episode

I observed four instances of explicit metacognitive behaviour during the lesson.

These behaviours related to knowledge that the child possessed about their own learning – such as whether or not they had an idea to suggest, or how a particular task made them feel, but also related to their ability to apply existing knowledge and to plan for future learning. The metacognitive behaviour was generally preceded by a question from the teacher – either directly to an individual or to the group in general. These questions tended to be open in nature and speculative – starting for example with 'I wonder', or 'What else'. For example, Olivia asked 'Is it a good question? What could we do to start our question?' to which the child responded with some strategy knowledge – explaining what vocabulary would be appropriate to use in order to find out how the Great Fire started.

During the session, Olivia asked many other questions, generally these were questions which had 'right' answers – such as 'Where did the Fire start?' or 'Whose house did the Fire start in?' Children responded to these questions by providing an answer. The typical pattern of the interaction in the session tended to be IRF (as discussed in Chapter 2) – *ie* Teacher initiation (I), Response (R), Teacher feedback (F) (*eg* Sinclair and Coulthard, 1975*;* Tsui, 1995; Mercer, 2003*)*. This type of three part exchange contained more of the 'teacher display questions' (*eg* Macedo, 2009 as discussed in Chapter 2) than open questions. In these questions, the teacher knows the answer and asks the question to see if the pupil can answer correctly. For example, interactions commonly looked like the transcript which follows:

Olivia (I): Is London like (names village where school is)?

Child: (R): It's big.

Olivia: (F) Yes - we know it's a big place.

Transcript 6.1 Extract of conversation from Olivia's first lesson observation – IRF exchange

As well as IRF interactions, throughout the session Olivia encouraged the children to take part in what she described as think-pair-share activity (*eg* Lyman, 1981 see Chapter 2) – typically for around 1 minute at a time, prior to questioning the children directly. In these tasks the children were all seen to participate in conversation with one another.

The pattern of their responses tended to be presenting individual ideas to one another. They did not build upon one another's ideas, or challenge each other's thinking. The exchanges were typical of the one below:

Olivia: Shall we talk about it with our partner? Have a few ideas.

Child A to child B: It was black.

Child B to child A: It was stone.

Olivia: Have you got an idea?

Transcript 6.2 Extract of conversation from Olivia's first lesson observation – paired work

Throughout the session, Olivia demonstrated many teaching behaviours identified within the literature as supportive of children's thinking *eg* showing genuine interest, respecting children's contributions and clarifying ideas (see Chapter 2). Olivia made effort to include all children throughout the session. The analysis indicates that during this activity there were no episodes of sustained dialogue. Children's responses were not elaborated on, nor were they asked to extend their discussion in the light of their responses. Instead the lesson followed what Sinclair and Coulthard (1975:6) would describe as a 'simple type of spoken discourse' and was generally teacher-led.

Initial VSRD with the children – Olivia's class

The children all understood how to use the video camera, and after some practice successfully made film clips.

The six children were able to give an explanation as to why they had chosen certain children to film. When we reviewed the clips together it became apparent that they tended to focus on children that they identified as their friends, or children who were involved in certain types of behaviour. These explanations in the main referred to finding children who had been demonstrating what the children felt were desirable behaviours, and included:

- '*I chose him because he was doing good writing*'

- *'She was colouring neatly'*
- *'She was listening to the teacher and you can see them sitting really nicely'*
- *'He was thinking really well. I saw him. He had his hand up and was listening.'*
- *'He was being good. Sitting good and quiet'*
- '*Jack was the best thinker. He had his hand up.'*

This focus on behaviour is exemplified in more detail in the following transcript[2]:

R: Can you say who did the best thinking in your film?

Child A: The three boys there.

R: How do you know that they were doing good thinking?

Child A: They look a bit sad.

R: Gosh, that's interesting. Sad? I am interested how looking sad tells us someone is thinking.

Child A: They are thinking about their behaviour. They are worried that they might get a sad face. So they have to think about being gooder…umm about being friends.

Transcript 6.3 Initial VSRD with child A in Olivia's class

Here Child A is using body language as a cue for deciding whether a child is thinking. The actual thinking that he suggests is happening refers to his idea that the child he has filmed is thinking about behaving well.

This was common in all classes at the start of the project. For the children in Olivia's class, when I questioned them further about how they knew a childwas thinking, they tended to say that it was because '*they knew*'. Only one pair were able to extend their explanation in order to add more information, and this is presented overleaf:

[2] In all VSRD transcripts with children in this chapter, individuals are identified using letters. Any names used within transcripts are pseudonyms – see Chapter 3 for more detail.

R: Who was the best thinker in your movie?

Child C: Kade and Tom – he is thinking and colouring in.

R: That's interesting. When Tom was colouring in, how did you know he was thinking?

Child D: No – he wasn't.

Child C: Yes – you think what colour to use.

R: Can you see that he is thinking?

Child D: Ummm – sort of - he's thinking about colours.

R: I'm still not really sure how you knew he was thinking. Can you help me understand?

Child C and D both silent.

R: Ok. That's maybe a difficult question to answer. I wonder if we could think about Tom. Let's watch him again, how did we know he was thinking? (*We watch the clip*). Do you agree with (child C) – if you colour in you do think - about the colours.

Child D: Yes. But if you don't want to think you can just colour.

R: You both have very interesting ideas. I am still wondering how I can find out how you know someone is thinking.

Child D: Kade is the best thinker. He is reading and it's a new book and if he gets stuck he has to sound it out.

R: Can you tell me what you mean by 'sounding it out'?

Child D: You know. You go 'a-n-d' and say the letters to make the word if it's hard. That's really a lot of thinking.

Transcript 6.4 Initial VSRD in Olivia's class - Child C and D talking about their thinking

Child D is referring here to some metacognitive strategies - and can provide an example of good thinking in terms of identifying a strategy that can be used when a task is difficult – ie the use of sounding out letters. According to the metacognitive framework (Table 6.4), this indicates that the child is demonstrating some Strategy Knowledge - he is able to refer strategies to help solve a problem.

Child C is also referring to elements of strategic control when he says that the child is thinking when deciding the choice of colour to use. In this round of VSRD this was the only time that metacognitive strategies were referred to by any of the six children in Olivia's class.

Ceri's Class

Analysing Ceri's first lesson

Ceri used two VTRs most frequently during the project – (See-Think-Wonder and Chalk Talk), and made occasional use of a third. She chose these three as she felt they were most appropriate for the age of children she was teaching. However, Ceri did not use a VTR in the first observation. The lesson context was a practical mathematics task, which involved all six children. The objectives were for children to apply previous knowledge of number facts to solve new problems. The questions were presented as simple word problems or tasks to complete. Ceri reminded the children of their maths targets at the start of the session and throughout. The session lasted for twenty minutes. The video was first analysed using the metacognitive framework (Table 6.4), and results are presented below:

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	None observed
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	None observed

	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	'I could use that number line to help 'cos I could count on in jumps'
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	'I need to find a space for the 9 to go on the number line. It belongs there'
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	''I haven't got a zero so I can't start'
	Assess processes and products of learning	• Evaluate	None observed

Table 6.6 Metacognitive behaviours observed in Ceri's first teaching episode

I observed three incidences of metacognitive behaviour in this session. These were preceded by direct questions from Ceri, such as 'How are you going to do it?' In total, Ceri asked 39 questions during the session, some targeting individuals and some the group in general. As in Olivia's first lesson, these questions were generally part of IRF exchanges. They generally involved closed questions, requiring the children to respond with a correct answer – possibly due to the learning outcomes and curriculum focus of the session *eg* '*Where should 2 go*?' '*What's one more than 6*?' Again, as with Olivia's first lesson, these were 'teacher display' questions (*eg* Macedo, 2009), that Ceri already knew the answer to and was checking if the pupils did too. Children's responses tended to be one or two word answers, consisting of a number or occasionally a strategy.

The children appeared to remain on task throughout the session, and all completed the activity in the time given. Ceri responded positively to all the contributions made, and showed an interest in the children's comments.

Ceri rarely asked children to elaborate on their thinking, but she did ask the children to explain '*Why are you moving the numbers along'* which elicited some metacognitive behaviour as the child explained how and when to use the number line strategy. Ceri did remind children about previous learning frequently *eg* '*Can you remember where we put*…?' There were no periods of sustained dialogue in the session.

Initial VSRD with the children – Ceri's class The children were excited to make the films and come back to talk about them. They chose children to film for a variety of reasons:

'*He's doing thinking and reading.'*

'He's holding his chin.'

'He's listening.'

'He's funny and my friend.'

'She's my best friend and she is really clever.'

'I think Serena was thinking cos she was stretching.'

As with Olivia's class, the reasons were often due to friendship, or behaviours that suggested good behaviour – such as listening. However, one pair struggled with the task as '*It was hard to find anyone thinking'* – so they videoed each other instead because that '*was fun'*.

The children were the youngest in the project, and found expressing their reasons beyond simple statements difficult, as the following transcript shows:

Child A: I chose Michael because he was doing thinking and reading.

R: That's interesting. How did you know he was thinking?

Child A: Cos he wasn't talking.

R: Oh. So can you talk and think at the same time?

Child A: Yeah. Not always. And Michael did this (taps his chin).

R: So that meant he was thinking?

Child A: Yeah. Well, I dunno. I think so.

Transcript 6.5 Initial VSRD with Child A in Ceri's class

Child A is referring to particular gestures that he feels indicate thinking is happening, and is suggesting that thinking happens when there is quiet. However, he was not able to extend his response to give any further explanation. This was typical of the responses given on the initial visit.

Lynda's Class

Before my visit, Lynda had tried two VTRs with her children, and was particularly keen on the Chat Mat activity, which she used when I observed the session.

Analysing Lynda's first lesson The lesson context was a session based on comparisons, and knowledge and understanding of musical instruments. It took the format of a 'Chat Mat' VTR, which involved the six children. The objectives were for children to compare and contrast some different musical instruments and to give reasons for their decisions. The session lasted for twenty minutes. The table below illustrates the metacognitive behaviours that I identified during the session:

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self-appraisal • Declarative knowledge	'well…ummm… I need a little more thinking time' 'I'm changing my mind to say that one because they both have silver on them'
	Awareness and management of cognition including knowledge of	• Procedural knowledge • Strategy knowledge	'*Miss, mine (thinking hat) is not working*'

	strategies		
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	'*We put our thinking caps on'* *'I am charging up my brain ready'*
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	'We concentrate and have a good look at the instruments first then see the connection' I need to think some more about this one. It's not easy so I have to think what to do '
	Assess processes and products of learning	• Evaluate	None observed

Table 6.7 Metacognitive behaviours observed in Lynda's first teaching episode

I observed seven instances of behaviour that I first classified as metacognitive during the lesson. However, when I analysed these in more depth I noticed that when these related to knowledge that the child possessed about their own learning – such as the strategies they would use – they tended to be general rather than specific comments. These usually referred to a 'thinking hat' or similar as opposed to a particular strategy such as looking for connections, or counting on. These are more mechanical responses, and the children could not explain to me what these involved in any more detail. As such, I have put them in italics in table 6.7. The children demonstrated an awareness of when they needed more time to think, and concentrate and were able to state that this would help them for connections.

There were eight occasions in total where the interaction between Lynda and the children followed the IRF pattern. However, the questions Lynda asked most frequently tended to be open in nature and speculative – starting for

example, ‘Why have you...?’

Lynda used frequent statements to elaborate or confirm the thinking that had gone on, and an example of this is presented in the transcript which follows:

Lynda: Can anyone else give a reason?

Child A: I’m choosing Amy and Abby because they have both got googly eyes.

Lynda: That’s a lovely idea – (Child A) has thought of a different connection. Googly eyes. I can see why she has said that. (Child A) has thought hard to find something different. What do you all think?

Transcript 6.6 Giving reasons – from Lynda’s first lesson observation

Throughout the session, Lynda asked questions such as those in the transcript above that invited the children to give their own reasons and ideas. Lynda demonstrated many teaching behaviours identified within the literature as supportive of children’s thinking *eg* showing genuine interest, respecting children’s contributions and clarifying ideas (see Chapter 2). The analysis indicates that during this activity there was one episode of sustained dialogue. This is detailed in the transcript below:

Lynda: So – you have chosen some instruments. What is the connection?

Child A: With Vanessa’s. Hers is blue and yours is blue.

Lynda: Good idea. But what about this?

Child B: It’s like them cos they do a shaking noise. So does that one.

Child A: And that one does.

Lynda: Good idea. That’s persuading me. Does that make them similar? Have they got a connection?

Child C: But they make a different sound.

Child B: It’s still a shaking noise – just not…just not …you know.

Lynda: Ok. Let’s have some thinking time. We want a connection. Can they be connected if they don’t make the same sound exactly, but it is similar? Let’s have a minute to think in our heads.

Transcript 6.7 Sustained dialogue in Lynda's activity

In extract 6.7, there is evidence of a sustained dialogue in which Lynda extends the children's thinking.

Rather than following the IRF pattern of question and response, where Lynda knows the answer and wants the children to provide it, she models the language of thinking and asks the children to elaborate on and explain their thinking. This could be a reflection of the VTR selected, as it clearly structures the activity to focus on connections. Lynda also challenged the children's responses, something discussed in Chapter 2 as a characteristic of effective sustained shared thinking (*eg* Sylva *et al*, 2004). She then provided some time for the children to think about their responses following on from the discussion.

Initial VSRD with the children – Lynda's class The children were keen to make films and talk about them with me. They chose people to film for reasons that mainly related to behaviour - such as:

'*They were singing properly'*

'They were sitting nicely'

'She was sitting quietly'

'They were all looking at miss.'

'They were thinking – like an electric bulb – putting it on charge.'

As detailed in the following transcript, two children in this class also decided to film one of the adults in the room. Most children in the project did not focus on the adults, rather they concentrated on the children. These children were beginning to consider how what people think about may differ from person to person, and to suggest that adults and children may think about different things. I must acknowledge my role in this discussion - I asked them specifically to talk about whether adults think differently to children - they may not have volunteered this information without being probed.

Child C: We filmed Ms G cos she was doing good thinking.

R; Was she – how did you know?

Child C: Cos grown-ups do thinking and she was doing it about the work.

R: How did you know she was thinking?

Child D: Her face and her face is concentrating and being serious.

R: Is grown-ups' thinking the same as children's or different?

Child D: Different. They think about what we do and what they do.

Child C: My mum and dad don't think about the same stuff as me.

R: Can you explain a bit more?

Child C: ummm I think about my work and stuff and my computer and stuff and dad thinks about his work.

Transcript 6.8 Initial VSRD with children in Lynda's class

Lucy's Class

Lucy said that she was keen to try VTRs out in her classroom. She used four of these in total during the project, most frequently See-Think-Wonder and the Chat Mat. Lucy carried out further research and as a result also carried out 'Main, Side, Hidden' routine.

Analysing Lucy's first lesson

Lucy did not use a VTR in her first observation, but did chose to use another resource developed to support thinking based on a 'Let's Think' story sequencing activity with all six children. 'Let's Think' materials are based on cognitive acceleration principles (Adey *et al,* 2001 see Ch. 2). The children were asked to order picture cards which told a story, discussing with one another which card belonged in which place in the story to reach a consensus.

The session lasted for twenty minutes, and the following table outlines metacognitive behaviours that I identified:

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	None observed
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	'We have to check – you think about what picture comes first. Then you check and see if the next makes sense.'
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	'I know – we could see which one goes first by seeing what she is doing. Then we can look at the rest.'
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	None observed
	Assess processes and products of learning	• Evaluate	None observed

Table 6.8 Metacognitive behaviours observed in Lucy's first teaching episode

I observed two incidences of metacognitive behaviour in the session.

These related to identifying a suitable strategy to help with solving a problem, which was the aim of the task, and also to planning when to use this. These behaviours happened after Lucy asked general questions. Lucy asked a number of questions throughout the session, these were a mixture of some open ended and more frequently, IRF interactions (*eg* Sinclair and Coulthard, 1975). Typically both of these types of interaction received one or two word answers from the children, as indicated overleaf:

Lucy: What is happening?

Child A: She is tying her apron.

Lucy: Excellent. Then what?

Child B: Writing things.

Lucy: What's she writing?

Child B: A list maybe.

Transcript 6. 9 Extract of conversation from Lucy's first lesson observation

During the session this type of exchange was typical. Lucy encouraged the children to talk to one another about their ideas and explain their answers, although analysis indicates that the children did not engage in discussions with one another about their ideas. Their feedback was always directed to Lucy. Lucy provided confirmatory feedback to the children's responses throughout the session. There were no periods of sustained dialogue.

Initial VSRD with the children – Lucy's class The children were keen to make films and talk about them with me. They chose people to film for reasons that mainly related to working - such as:

'He was working really well'

'Josh was writing'

'She was thinking hard'

'He was doing his work'

'He was doing good work.'

When I prompted the children to elaborate on their reasons, this group found giving further information challenging. Their responses were generally that they 'just knew' or that they were 'doing good thinking', as the following transcript indicates:

R: Can you explain why you made a film of these children?

Child C: Josh was writing.

R: So when he was writing he was doing good thinking? I wonder what about?

Child C: ummm thinking about ….umm just thinking.

Transcript 6.10 Initial VSRD with children in Lucy's class

These children did not articulate their reasons to me in any greater depth than this, and this could have been down to a number of factors, such as their verbal fluency, comprehension of the questions, reluctance to talk with an unfamiliar person etc. However, it could also be that they did not have well-developed reasons relating to thinking that they were able to share.

Sam's Class

Sam was keen to embed VTRs into her classroom practices and had used four (see-think-wonder, 3-2-1 Bridge, chat mat and think-puzzle-explore) by the time I visited for the first time. She felt that '*the VTRs are really useful and already I think the children are responding better to them*.'

Analysing Sam's first lesson Sam's first lesson was based on a VTR (chat mat) activity. The activity involved all six children thinking about their favourite superheroes. They were asked to discuss the characters and why they liked them before looking for similarities and differences between the characters. The activity lasted for 25 minutes.

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	'We did this before when we made connections. First choose one and look at it and think about it carefully. Think what's it like?'
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	'I will keep my eyes open to look at it. Then the idea will get in my brain. My brain puts the same ones together and that's the connections.'
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed '
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	'I will choose one I like and then look at the others so that I can see what is the same to make a connection.'
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	None observed
	Assess processes and products of learning	• Evaluate	None observed

Table 6.9 Metacognitive behaviours identified in Sam's first lesson

I observed three incidences of metacognitive behaviour in this session, following general questions. Sam questioned the children throughout the session.

These questions were generally IRF exchanges that required the children to give answers relating to their choices, and the reasons underpinning these. Children's responses tended to be short sentences and Sam then praised the response. The children appeared to remain on task throughout the session, and all completed the activity in the time given. Sam responded positively to all the contributions made, and showed an interest in the children's comments. She asked them to 'make connections' or 'spot connections' frequently through the session, and the metacognitive responses came after open questions asking the children to 'Tell me how you..' or 'What shall we do first?'. During the session Sam encouraged the children to talk to one another about their ideas. Analysis indicates that the children did not engage in discussions with one another about their ideas. Their feedback was almost always directed to Sam. There was one period of extended dialogue in the session. In this episode, as seen in the transcript below, the children added to one another's ideas cumulatively:

Sam: So we have picked Spongebob and Mickey Mouse. What could connect them?

Child A: They both have yellow on them.

Child B: Yeah and they are both happy.

Child A: Yeah and squidgy.

Sam: So the connection might be the colour or how they feel. Do we all agree?

Child B: Yeah. And they are nice.

Child C: The connection may be they are in programmes.

Child D: They are funny programmes that they are in.

Child C: Yeah. Like cartoons.

Sam: Good connections.

Transcript 6. 11 Extract of conversation from Sam's first lesson observation

This transcript shows children engaging in cumulative talk (*eg* Mercer, 2000) – because they do share knowledge and accept and agree with one another. The conversation elaborates on one another's ideas. The children do not evaluate or challenge these as they would in more exploratory dialogue.

Initial VSRD with the children – Sam's class The children were keen to make films and talk about them with me. They chose people to film for reasons that mainly related to behaviour - such as:

'*He was being quiet'*

'She is closing her eyes so that the others can't interrupt'

'He's looking and concentrating'

"She is doing what she's told'

'He's looking at the paper'

'I just knew'

One conversation involved children using some language relating to thinking in order to explain why they had selected particular children to film. They acknowledge that whilst thinking is invisible to the eye, it is possible to know that thinking is happening because of the responses that we might give. The following transcript illustrates this:

R: Why did you chose these children to film?

Child A: Well, I thought they were working really hard.

R: So if you are working really hard, you are thinking?

Child A: Yep. For sure.

R: How do you know – can you see that they are thinking?

Child A: ummm. It's invisible but they might ask a good question or make a good connection and have a good idea then you know.

Transcript 6.12 Initial VSRD with children in Sam's class

In the transcript above, the discussion was shaped by my questions.

I asked the child whether or not they could see thinking – without my questions they may not have considered or articulated their thinking about this. This illustrates the importance of acknowledging the role of the researcher when engaging in such dialogues.

Mel's Class

When the first observation visit took place, Mel had tried one VTR with her class – the Chat Mat, and had also used the 'See-Think-Wonder' prompts to make a display about 'People Who Help Us'.

Analysing Mel's first lesson This was a session which used the Chat Mat VTR and which involved all six of the children. The children looked closely at a number of different toys and then had to make a choice of their favourite before comparing and contrasting this toy to others.

Mel began the activity by recapping on thinking specifically – in terms of language of thinking and thinking skills - before moving into the task.

The table below indicates the metacognitive behaviours observed in the session:

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	None observed
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	"I am going to use my thinking bubble. So if I forget I can remember by going to my bubble and I can try and pull the idea out of it.'

			'Some people put their fingers on their heads or their chin or on top of their head … to get the remembering out of your head. I put my finger here.'
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	'Some people put string around their finger to remember. I haven't got string so I am going to make connections and remember them.'
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	None observed
	Assess processes and products of learning	• Evaluate	None observed

Table 6.10 Metacognitive behaviours observed in Mel's first teaching episode

I observed three metacognitive behaviours. These were in response to questioning during Mel's recap on thinking at the start of the lesson. This provided the children the opportunity to talk about some of the strategies that they could use. In this lesson there was also some evidence of sustained dialogue. This were facilitated by Mel, and extended beyond IRF interactions. The children were beginning to build upon one another's answers in order to explore an idea. Most of their comments were directed to Mel, but there were two occasions where there was a sustained dialogue, as illustrated in the following transcript:

Mel: So, we have looked at lots of toys. We are thinking about their parts. What parts do you think they have to have?

Child A: Wheels.

Mel: Oh, wheels.

Child A: Yes, that's important because if you didn't have wheels you couldn't move.

Child B: If they didn't have wheels the back of the car …. it would scrape. Scrape on the road.

Child C: Yeah. You'd have to push it.

Mel: That's really interesting. Do you agree (Child 3)?

Child C: Yeah. If you had 3 wheels the car would be wobbly. It would scrape the floor.

Child A: Yeah it might fall over.

Mel: (Child D) do you think all the toys have to have wheels?

Child D: No. Some things …umm… some toys don't have wheels. I chose the rabbit he's not got some.

Mel: Oh – so not all the toys have wheels?

Child A: Oh. Yeah. Ummm. Yeah, not everything. Not the rabbit.

Mel: I wonder how they move?

Transcript 6.13 Extract of conversation from Mel's first lesson observation

In this extract Mel prompts the children to build upon one another's ideas about toys, giving some explanations and offering some reasoning. Through the dialogue there is a counterpoint made by Child D, which results in Child A changing his view that all toys have wheels, to deciding that some toys do not have wheels. This extract is more exploratory (*eg* Mercer, 2000) in nature than others that have been discussed so far since the children do not just agree with one another – they begin to build on contributions and challenge the initial ideas.

Initial VSRD with the children – Mel's class The children were keen to make films and talk about them with me. Some of the group chose people to film for reasons that mainly related to good behaviour - such as:

'She was sat nice'

She's being quiet'

'Sitting nicely'

'Being kind'

However, there were also other reasons suggested which related to specific indicators of thinking which included:

'She's looking carefully to remind her what to do'

'He was squeezing his chin to make his head think'

One conversation developed the idea of the nature of thinking further. The following transcript illustrates how the child is beginning to talk about what they believe happens inside their mind when they think. They refer to needing to close their eyes and have quiet in order to think. They refer to ideas being in their brain and somehow going from there into their head. They also discuss how thinking may be something that only happens after a certain age:

R: So- you chose these children to make a film of. You said this girl was thinking of ideas. How do you know?

Child D: She's being quiet and looking hard.

R: That's interesting. Why does looking help you think?

Child C: ummm

Child D: 'cos you get the ideas in your head so you look for them.

R: Ok. That sounds quite hard.

Child D: Yep. Little girls can think but not babies. They don't know what thinking is. They just play.

R: Do you know when you are thinking?

Child D: Yep. My brain is evaporating so I close my eyes and look at my brain in my mind and then it goes up in my head.

R: What goes up?

Child D: Ideas.

Child C: Yes ideas go up.

R: That sounds quite hard to do.

Child D: No – I just need to be quiet and I do it

Transcript 6.14 Initial VSRD with children in Mel's class

Again, I think that the children explored these questions in more detail because I prompted them to explain in more depth.

For example by asking them why looking might help them think, I was prompting them to consider certain aspects of the video. They might not have given the explanations that they provided without this.

Summary of Section 6.2.1

In all of the lessons observed, the children were able to answer questions asked by the teachers, and IRF exchanges led by the teacher were the main interactional style. The children tended to not have control over the direction that discussion took. They did offer answers to the questions asked. There were very few examples of children asking each other questions, or of extended periods of dialogue in any class. Whilst in Olivia, Ceri and Lucy's classroom there were no periods of sustained dialogue, in Lynda, Mel and Sam's classes there was some evidence of this type of interaction taking place. The talk during such sustained dialogue tended to be cumulative in nature.

In all observed sessions, there were examples of metacognitive behaviour being demonstrated by the children. These were most frequent in Olivia and Lynda's activities, and happened least often in Lucy's. The two most commonly occurring metacognitive behaviours were children making reference to the strategies that they would use and children showing an awareness of themselves as learners.

All of the children succeeded in making a short film of someone that they had identified as doing good thinking, and were able to discuss the film with me. In all of the classes, the children were able to talk to me about the reasons that they had chosen certain children to film.

They generally chose friends, or children who were conforming to perceptions of 'good' behaviour – such as sitting well or being quiet. Some children did refer to indicators of thinking revealed in body language such as tapping heads or chins. Some children referred to how older and younger people may think differently. My role was important – I reflected on the fact that in many of the VSRD episodes it was the nature and extent of my questioning that led to the discussion taking the direction that it did.

6.2.2 the second visit

The second visits to the schools took place in the summer term, and as explained in Chapter 3 followed a similar format to the first visit. I observed a session in which the teachers planned to develop aspects of the children's thinking. I then worked with the same children as on my first visit to complete a VSRD episode with them, based on a film that they made themselves.

Olivia's Class

Five of the original six children were present. The activity was based on a book, intended to develop the children's appreciation of other people's perspectives. The following table indicates metacognitive behaviours observed.

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	'I am going to think about how I can persuade you by telling you some really good stuff about my dinosaur and his teeth.'
	Awareness and management of cognition including knowledge of	• Procedural knowledge • Strategy	'I always think about which book to choose. I decide what would be interesting or what I need to know then I can pick a book to help.'

	strategies	knowledge	
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed. ‘
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	None observed.
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	‘I disagree with you Callie because you could just glue them together and they would make a new one.’
	Assess processes and products of learning	• Evaluate	‘I don’t know why I decided to buy a shark book. I should have chosen a dinosaur one that would have been better cos it would have helped me work it out.’ ‘Doing team work today was good. We listened to our ideas. We help make our ideas better then cos we have other people’s ideas too.’

Table 6.11 Metacognitive behaviours observed in Olivia’s final teaching episode

I observed five metacognitive behaviours during the session. These were generally after Olivia asked an open question such as ‘What do you think you did well today?’ or ‘What should we do first?’ As explained in Chapter 3, I also wanted to find out whether there was a difference in the frequency of IRF exchanges happening in the two sessions. I therefore counted these during the introduction (or first ten minutes) of each session. There were IRF exchanges in Olivia’s second session, but analysis indicated that Olivia asked more open ended questions than she had in the first observation, as illustrated in Table 6.12 which follows:

Number of IRF exchanges	First visit	Second visit
	10	5

Table 6.12 Comparing the number of IRF exchanges in introductions during the first and second visit to Olivia's classroom

There were three episodes of extended dialogue in the activity. The following example arose when Olivia used a 'Tug-of-War' VTR which she had researched herself. She wanted to see if it would support the children in justifying and elaborating on their ideas to try and 'tug' their friends towards agreeing with them. Olivia drew a rope on a sheet of paper and put the dilemma (Should Harry be kind to Sam?) above it. At one end of the rope was a 'yes' and at the other was a 'no'. The following picture (Figure 6.12) illustrates how the activity would appear:

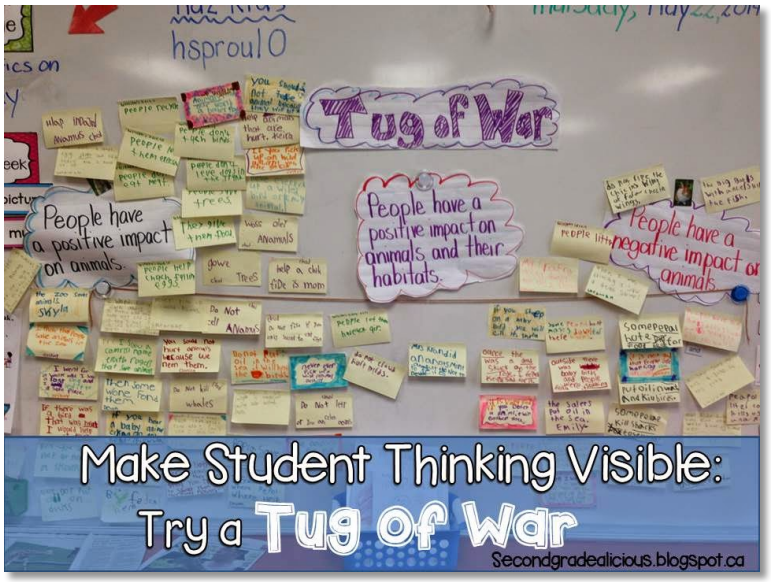


Figure 6.12 Exemplar Tug of War VTR (source: bloglovin.com, 2016)

As children gave reasons or justifications Olivia would write them next to the yes or no so that the thinking was visible and at the end the children placed a post-it note with their name on it at the end they wanted to vote for. Four voted 'yes' and one voted 'no'. The following transcript presents part of the discussion that characterised this activity:

Olivia: Should Harry be kind to Sam?

Child A: Yes.

Olivia: Why do you say that?

Child A: 'Cos if Harry is nice Sam will be too.

Olivia: I saw some heads shaking. Do we need to tug our rope?

Child B: Sam is naughty mind.

Child C: Yeah – so if Sam is naughty then Harry should be back 'cos she's being a bully.

Child B: Bullies are not nice. They are horrible and nasty.

Child D: No – Harry should be nice 'cos Sam is nasty but if you are nasty back you are just as nasty.

Child C: (looks at Child D) – ummm yeah. But….ummm.

Olivia: Can you persuade Child C a bit more?

Child D: Ummm. Well, if everyone is mean it won't be nice. You should try and be nice and Sam might learn to be nice. It's important to be nice.

Transcript 6.15 Extract of conversation from Olivia's second lesson observation

This extract shows some extended dialogue between the children with Olivia facilitating the conversation. The children were able to extend their ideas and the talk had some exploratory elements to it (*eg* Mercer, 2000). For instance, the group did not always agree, but extended their disagreement beyond disputation because Child D tried to engage critically and constructively with the others – offering reasons for her comments. This type of interaction was not observed in the first lesson that I watched in Olivia's class, but happened on three occasions in this lesson.

Final VSRD with the children – Olivia's class Five of the original children were present for the final VSRD session, but one was absent. They were keen to participate in making films and talking about them. This time, it was evident that they were frequently selecting children to film based on certain key behaviours or responses that they felt indicated thinking, rather than selecting children who were friends or who were generally 'working hard'. For

example, their reasons included:

'I chose him 'cos he made good connections'

'I like the way they were persuading me' although two children did still film those who were '*being quiet and good'*.

The children were able to explain their focus on thinking in more detail than on my first visit, and give specific examples of when activities in the class supported their thinking. These related to one of the VTRs that Olivia had been using frequently that week to scaffold the children's thinking. This is illustrated in the following transcript:

R: So, can you tell me why you filmed these children?
Child A: 'Cos they are saying about what they think.
R: How do you know they are thinking?
Child B: Yeah – see they are trying to say why they think it.
R: That's interesting.
Child B: Yeah. It's like when you win the Tug of War.
Child A: Yeah.
R: Why is Tug of War about thinking?
Child B: You got to say your idea and make your friend agree.

Transcript 6.16 Final VSRD with children in Olivia's class

Whilst the aim of the Tug of War is to persuade rather than make your peers agree with you, this transcript demonstrates how the VTR has supported children to identify specific skills that they refer to as thinking.

Ceri's Class

Analysing Ceri's second lesson All six children were present when I visited for the final observation and VSRD. The activity was based on a 'chat mat' task to make connections between items from the gardening role play area.

The metacognitive behaviours observed are presented in Table 6.13

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	'We have done this before. I can do it – I remember doing the groups. Putting things in groups.'
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	None observed
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	'I think we should do the thing where we look at both and .. umm.. find the same things. Like the packets have writing on them – we could write that down'
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	None observed
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	'I have made a good connection 'cos the others can't guess it yet'
	Assess processes and products of learning	• Evaluate	'Harley has made a good connection 'cos he has used the unusual pair. It's a tricky one. I think it's 'cos they are plastic''I don't think it was my best thinking 'cos it was hard to think up a new idea'I did good thinking 'cos I found the things that were the same and different'

Table 6.13 Metacognitive behaviours observed in Ceri's final teaching episode

I observed six instances of metacognitive behaviour in this session.

These were mainly evaluations of the thinking that had gone on, and these were as a result of the inclusion of a specific question at the end of the lesson.

Ceri asked the children to say whether they thought they had 'thought well' in the session which encouraged them to be evaluative. During the session Ceri asked more open-ended questions that she did in the first session. These included asking the children to focus on the thinking eg 'Let's see if we can figure out what Evan is thinking about', 'Have you done some good thinking?', 'Can you explain?' and 'Are our reasons the same?'

This is illustrated in the table below:

Number of IRF exchanges	First visit	Second visit
	15	7

Table 6.14 Comparing the number of IRF exchanges in introductions during the first and second visit to Ceri's classroom

Ceri's questioning had altered from the first visit in several ways. Firstly, although the introduction did contain some IRF type questioning, there were times when Ceri did not give the feedback – sometimes it was other children. This happened twice during the introduction – for example:

Ceri: I am matching mine with cauliflower seeds. I wonder why?

Child 1: They both grow. They are both vegetables.

Child 2: Yes, good idea and they are both seeds so they will grow through the top.

Ceri: Good thinking.

Transcript 6.17 Extract of conversation from Ceri's second lesson observation

In the transcript above, there is a change from the initial lesson where she had asked over 30 questions which usually were closed in nature, eliciting a one or two word answer from the children. There was one period of

sustained dialogue, and Ceri herself reflected that she felt there could have been more opportunity for this.

She felt that the children found some parts of the activity challenging – she thought the children would have made connections more easily. She reflected that 'maybe they found it hard because they are used to answers that are 'yes' or 'no', so this made them have to think more.'

The sustained dialogue was cumulative in nature, and Ceri played an active role in supporting the conversation as illustrated in the extract below:

Ceri: So what might the connection be?

Child A: It's 2 bottles

Child B: Yep- they are the same.

Child A: Yep – bottles.

Ceri: So – do you all think they are the same?

Child C: Well .. no, one is big and one is little. So they aren't the same.

Child B: They are the same.

Ceri: Hmm. So we aren't quite sure if they are the same?

Child D: They both make the same sound (taps them)

Child A: They both have water in them.

Child D: And they are plastic. So maybe. Umm. Yes, sort of the same.

Ceri: Maybe we could say they are similar – they have connections.

Transcript 6.18 Extract of conversation from Ceri's second lesson observation

After an initial disagreement between Child A and C, the interaction between children tended to be cumulative – the children agreed with one another and repeated and elaborated on one another's ideas. Ceri facilitated the conversation, and used questions to clarify and extend the group's understanding. This was a change from the first lesson observed in which Ceri tended to ask questions which she already knew the answer to, and in which there was no sustained dialogue.

Final VSRD with the children – Ceri's class The children were all present and were keen to take part in the filming and subsequent VSRD. The reasons that the children gave for choosing children to film did not vary greatly from those given in the first visit – they included '*I liked his writing it was neat*', 'She was being very quiet' and 'she was doing a thinking face'.

One child did give a reason as '*Because they were making good connections'*, and in the transcript below the child tried to articulate his reasons drawing on his view of a mental calculation strategy.

Child A: We filmed James. He didn't look at the camera, he looked at his work.

R: Why was that important?

Child A: He was really looking and concentrating. I saw him.

R: What do you think he was concentrating on?

Child A: The number line.

R: What number line – I can't see a number line in the video?

Child A: He didn't have one, only in his brain so he was thinking hard about how to do it with the numbers in his head.

Transcript 6.19 Final VSRD with children in Ceri's class

Through questioning, the child was able to indicate an awareness of how there are images of useful tools for mental calculation, stored in his friend's brain, and by thinking hard this would help apply these to the problem.

Lynda's Class

Analysing Lynda's second lesson

Lynda taught a chat mat lesson based on Noah's Ark for the final observation. All six of the original children were present. The metacognitive behaviours observed are presented in the table which follows:

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self appraisal • Declarative knowledge	'Yep, I can do this, I can find really good connections.'
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	'I am going to persuade Amy 'cos I have a good idea and I want her to agree. I am going to persuade her by showing her my idea'
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	'Look at what is the same if you need to find a connection – like the colour maybe'
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	None observed
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	None observed
	Assess processes and products of learning	• Evaluate	'I've done really good thinking so my connection is really hard to guess …bet you can't'

Table 6.15 Metacognitive behaviours observed in Lynda's final teaching episode

I observed four metacognitive behaviours in the lesson. These generally followed a question from Lynda, where she encouraged the children to explain or elaborate on their thinking.

In both of Lynda's sessions there were comparatively fewer IRF exchanges than in the lessons taught by the other teachers. There was one fewer IRF interaction between Lynda and the children in this observation than in the first:

Number of IRF exchanges	First visit	Second visit
	5	4

Table 6.16 Comparing the number of IRF exchanges in introductions during the first and second visit to Lynda's classroom

The difference in exchanges between the first and second visit was small. Lynda did not ask a large number of IRF type questions in the first few minutes of either session. She extended the questions in order to allow the children to respond in more detail, particularly in the second lesson. For example, in the transcript below there is an extract of conversation where Lynda offers a challenge to a child's response.

Lynda: I wonder what is similar about these – are any the same?

Child A: The cheetah and the dog. They are both black.

Lynda: I'm a bit puzzled. Are they?

Child A: Yep. See by there – black bits the same.

Lynda: Well – who would have thought it? That is extra clever and thinking differently.

Transcript 6.20 Extract of conversation from Lynda's second lesson observation

Overall, in the second visit Lynda tended to speak less than she had in the first visit, and there were four periods of extended dialogue in which the children took the lead. An example follows:

Child A: I have guessed a connection. I have got one. Cheetahs and millipedes.

Child B: Why?

Child A: 'Cos they can both go fast on four legs.

Child C: Millipede's got more legs than four mind.

Child A: Oh. Yeah. I mean they can both crawl.

Child B: Not crawl, run.

Lynda: What do you think (Child A) – do you agree with (Child B)?

Child A: Yep.

Child D: Well – my connection wasn't that. They do run but my connection was really good. Mine was 'cos the colour was the same. On their bodies. Both got brown.

Transcript 6.21 Extract of conversation from Lynda's second lesson observation

Lynda supported this interaction, and the children were, at times able to elaborate on and extend their discussion. There is one moment where a child challenges the thinking of another who has mistaken the number of legs a millipede has.

Not all of the children in Lynda's class were able to do this with as little support from Lynda as these were. For others she needed to provide further prompts to encourage dialogue, as the following transcript shows:

Lynda: Do you agree with Carys?

Child F: Yes…ummm..well. Sort of.

Lynda: It doesn't matter if you disagree, because this is Carys' thinking. You may have a different idea. Sometimes we need to listen to lots of ideas before we find a good idea.

Child D: It could be on a rock – some of them are.

Lynda: I would never have thought of that connection. We could try and find out why those sit on the rocks. Well done. You have thought differently to us all – that's interesting.

Child F: I would have done it .. not the rocks… 'cos they have black paws and so does that dog.

Child F: Let's try and think of another reason. We might find a pattern.

Child D: Yes – there's more with black on. That might work.

Lynda: You two are not thinking the about the same reasons – but it doesn't matter if you can explain your reasoning and thinking. I am wondering why they might have black paws.

I think I need some thinking time to try and make a good connection with these.

Transcript 6.22 Extract of conversation from Lynda's second lesson observation

For these children, Lynda needed to structure the conversation more than she had with the first group. By doing this she encouraged the children to think of and explain their connections to one another. The children were able to extend their thinking beyond one connection. Lynda encouraged them to realise that they may have different ideas to one another.

Final VSRD with the children – Lynda's class The children were all present and keen to make more films. The reasons that the children gave for selecting people to film were similar to the first time I visited – '*they were sitting quietly*', '*they were listening to the teacher'*, and *'they were working hard'*. These children did not refer to specific thinking skills, body language or vocabulary as indicators of thinking.

Two of the children did refer to more general indicators as the following transcript illustrates:

Child A: I chose Jack 'cos he was really thinking hard.

R: Oh – how do you know that?

Child A: He put on his thinking hat at the start of the work.

R: What's that? What's his thinking hat?

Child B: It's got batteries.

Child A: To make his thinking strong.

R: That is really interesting. But I wonder how you know he's got his thinking hat on – I can't see it.

Child A: 'Cos he is looking at work. He's got numbers in his head then he is using his fingers and his head to work it out.

Transcript 6.23 Final VSRD with children in Lynda's class

On the first visit, children in a number of classes, especially Sam and Mel's, referred to thinking hats, but could not elaborate on what this meant.

In this extract, the children refer to a thinking hat and they are able to explain how they know Jack has it on. They also refer to strategies Jack is using when wearing this hat, in order to solve a problem – in this case by using mental representation. This is showing an awareness of others as learners.

Lucy's Class

Analysing Lucy's second lesson Lucy's lesson was based on solving real-life number problems relating to money. Five of the six of the original children were present. The metacognitive behaviours observed are presented below:

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self-appraisal • Declarative knowledge	None observed
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	One child used a tapping head gesture to show she would use counting on as a strategy
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	None observed
	Attend to and awareness of	• Monitor/	'I think I've got it. I will start with this one, and change the last number

	task performance and understanding	• regulate • Cognitive experiences	(from 2p to 5p)'
	Assess processes and products of learning	• Evaluate	'I did my answer wrong. I didn't add up right'

Table 6.17 Metacognitive behaviours observed in Lucy's final teaching episode

I observed three metacognitive behaviours during the lesson, one of which was a non-verbal gesture that I interpreted as indicating knowledge of a strategy. Lucy used several open questions during the lesson, encouraging the children to explain their thinking. She modelled several strategies, and questioned the children when they used them. Overall, there were fewer IRF interactions between Lucy and the children in this final observation than in the first, as illustrated below:

Number of IRF exchanges	First visit	Second visit
	14	8

Table 6.18 Comparing the number of IRF exchanges in introductions during the first and second visit to Lucy's classroom

There were still several IRF interactions during the session, possibly because of the nature of the curriculum area being taught – Lucy wanted quick recall of key facts at the start of the lesson and so asked a number of closed questions near the start to check this. For example the following transcript was typical of the questioning at the start of the session.

Lucy: 'What is the next coin after 2p?'

Child A: '5p'

Lucy: Yes, good.

Transcript 6.24 Extract of conversation from Lucy's second lesson observation

Children generally directed their responses, whether to open or closed question to Lucy. There were no periods of sustained dialogue involving the group of children and Lucy in the lesson. The children did have more opportunity to explain their ideas than in the first lesson, generally these did not develop cumulatively between the group – they were typically extended responses from a single child. The following example shows this type of interaction.

Lucy: How did you work it out?

Child A: A 10p and a 5p is 15p, and another 5p is 20p

Lucy: That is good but I wonder if there is another way?

Child A: Umm.

Lucy: Think about our doubles work.

Child A: Yep. 5 and 5 is 10. 10 and 10 is 20p.

Lucy: Excellent – that is good explaining.

Transcript 6.25 Extract of conversation from Lucy's second lesson observation

In this extract, Lucy encouraged the individual child to explain his thinking, and throughout the sessions Lucy encouraged individuals to elaborate on their ideas more frequently than in the first session.

Final VSRD with the children – Lucy's class Five of the children were present. All were keen to come and make a film. The reasons that they gave for selecting certain children to film related more to the use of resources than in the previous visit. This may have related to the fact that the areas of learning being taught were different on the visits – and during the second visit there was a lot of mathematics going on with structured resources.

Reasons included:

'I chose Ben 'cos he was writing down stuff and didn't need the numicon'

'He was trying very, very hard'

'He was holding his head and then he got the numicon'

'She was looking like she had ideas in her head and she was going to get the answers out'

Numicon® is structured mathematical apparatus which uses a multi-sensory approach and which supports children represent abstract concepts visually. I was interested in finding out why several of the children associated the use of these resources with thinking. The following extract illustrates what one child said when questioned about this.

Child A: 'He was holding his head and then he got the numicon'

R: So how did you know he was thinking?

Child A: He was thinking and thinking. Then he got his numicon.

R: Why did he get the numicon ?

Child A: He was stuck – numicon helps if you are stuck.

R: Oh – so can you stop thinking once you get the numicon.

Child B: nuh. You could ask miss for help. Or make a little picture in your head.

Child A: Yeah – a little picture of numicon. As you think the picture gets bigger and bigger.

R: How does the picture help?

Child A: Makes it easier. The numicon isn't in your head. Just a picture. Not the real numicon.

Child B: Or if it's a big number and you haven't got fingers…umm.. like..umm 99 get a picture in your head.

Child A: Thinking of numicon helps work it out.

Transcript 6.26 Final VSRD with children in Lucy's class

These children are able to explain how the resources – whether real Numicon® pieces or an image of these held in their head, helps them to work

out answers if they are stuck. This shows a clear awareness of a strategy, and awareness of when it is appropriate to use this.

Sam's Class

Analysing Sam's second lesson Sam's lesson was based on creating a kite, and had a carousel of activities taking place using a variety of thinking routines such as See, Think Wonder. Five of the children were present.

The following table presents the findings for the number of metacognitive behaviours observed:

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self-appraisal • Declarative knowledge	'I am going to think about being the quality checker cos I am good at thinking about the parts I need.'
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	'I made good eye contact to show that I am a good listener.'
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	'I need to chunk the challenge – so that I can then do a bit at a time. That will make it easier to do.'
	Attend to and awareness of task performance and	• Monitor/ regulate • Cognitive experiences	'I don't think that an hour will be enough. There are lots of things I need to think about. My kite is so big so it will need me to work on it for

	understanding		longer. I will try and work fast but it's a big job!'
	Assess processes and products of learning	• Evaluate	None observed

Table 6.19 Metacognitive behaviours observed in Sam's final teaching episode

I observed four metacognitive behaviours during the session. The children were aware of how they were going to plan to tackle the tasks set – for example by 'chunking the challenge', they could talk about themselves as learners and they also identified how they were going to try to complete the task in the time allowed. Sam used several open questions during the lesson, encouraging the children to explain their thinking. She modelled several strategies, and questioned the children when they used them. Overall, there were slightly fewer IRF interactions between Sam and the children in this final observation than in the first, as illustrated below:

Number of IRF exchanges	First visit	Second visit
	11	9

Table 6.20 Comparing the number of IRF exchanges in introductions during the first and second visit to Sam's classroom

There were slight differences in the nature of the IRF exchanges between the first and second lesson. In comparison to the first session Sam encouraged more than one child to respond before giving feedback, as illustrated in the transcript below:

Sam: We are going to do our kite challenge. What will good group work look like?

Child 1: Eye contact.

Child 2: Working as a team.

Child 3: We would listen.

Sam: These are good ideas. If we talk about listening, what would I hear a good group do?

Child 3: Talk to each other.

Child 1; One at a time. And do piggybacking.

Sam: Yes, and we could piggy back off each other's ideas.

Transcript 6.27 Extract of conversation from Sam's second lesson observation

This is an interactional style characterised by initial question by the teacher, response and feedback, however Sam allowed several children to respond before providing the feedback in the second session. When watching this back, Sam did note that she felt the video showed that she was speaking less than she had done before. Sam also related to the idea of intentional teaching – although she acknowledges the importance of the children having ownership of the discussion she is also commenting on how there is a purpose to this that she trying to guide the learning towards.

There was one period of sustained dialogue during the session, where children justified and explained their kite designs.

Sam: So what was the most important thing to think about?

Child A: Probably the size.

Sam: Why?

Child A: 'Cos you need to think about how big it is going to be.

Child B: But you need to think about how it will work.

Child C: Yeah – like how it is going to fly.

Child A: But very big ones may not take off.

Child B: Yeak, ok. And very small ones might go too high away. So size yeah.

Transcript 6.28 Extract of conversation from Sam's second lesson observation

Final VSRD with the children - Sam's class The children were keen to make their videos. They chose people who were:

'Listening well – looking at the person talking'

"Working hard on their kite'

'Making good connections on their thinking sheet'

'Doing good group work.'

'Doing good work – they were listening to each other very well.'

'They were working things out in their head.'

These reasons reflected Sam's initial input to the class where the rules of good group work were discussed. The children were able to elaborate on some of these explanations during the VSRD discussion, as below:

R: Why did you choose these children?

Child A: They were working stuff out in their head.

R: Was that good thinking?

Child B: Yes, 'cos they were thinking and concentrating.

R: How do you know?

Child A: 'cos it was hard not just 4=4 but writing about kite ideas.

Child B: They were working the answers in their head.

R: That's interesting. Can you say more about what happens in your head?

Child B: Yeah, there's a little person helping me in my head. A ghost.

R: How does that person help?

Child B: If I am stuck.

Child A: Like a fluffy brain.

Child B: Yeah – you have pictures and numbers to help you work in your head.

Child A: Or you could ask a friend to help you.

Child B: Yep. Or use an iPad and look for the answer on that.

Transcript 6.29 Final VSRD with children in Sam's class

These two children identify 'working something out' as an indicator of thinking, and although this is not a visible process, they decided that

concentration was a sign of this taking place.

When I prompted them to explain and elaborate on what happens in their head when they are thinking, they had some creative ideas about little people. This could well be a reflection of common ideas to do with the workings of the brain – certainly there are popular images of little people inside our head. For example, the Usborne Flap Book '*See Inside Your Head'* has a cover image, which shows little people, and creatures busy inside the brain. The 2015 Disney film *'Inside Out*' had the tag line 'Meet the little voices in your head'.

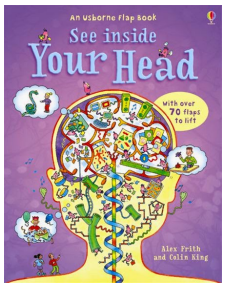


Figure 6.13 'See Inside Your Head source: amazon.co.uk (2016)

Figure 6.14 Inside Out source : google.com (2016)

When probed a little further they could extend their discussion beyond the idea of little people inside their heads. They could talk about a number of ways to solve difficult questions – including mental representations, peer support and use of technology.

Mel's Class

Analysing Mel's second lesson Mel's second lesson involved the six children designing 'Top Trumps' cards based on animal characters. The metacognitive behaviours observed are presented below:

Component of metacognition	Type of behaviour	Terminology commonly associated	Examples observed in session
Cognitive knowledge	Knowledge of oneself / others as a learner and factors	• Person and task knowledge • Self appraisal	'I have to unlock my thinking – I'm going to Jack talk about my idea.'

	affecting cognition	• Declarative knowledge	
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	'You could think it is friendly by giving it a number if it can be a pet. So if it is a good pet I could think a big number. If it's a scary pet I could think a low number.'
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	None observed
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	None observed
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	None observed
	Assess processes and products of learning	• Evaluate	'I don't agree with that. We couldn't keep a wolf 'cos it is wild. So it should have a smaller number than it has got'

Table 6.21 Metacognitive behaviours observed in Mel's final teaching episode

I observed three incidents of metacognitive behaviour. These related to the children's understanding of strategy and of their own thinking processes, and also from evaluating the top trump cards when they were completed. The number of IRF interactions was lower in the second lesson. She asked some 'display' questions – such as 'What sound does the cat make?', but also encouraged the children to explain their thinking – asking more open questions such as 'How could we find out about the wolf?'

Number of IRF exchanges	First visit	Second visit
	9	4

Table 6.22 Comparing the number of IRF exchanges in introductions during the first and second visit to Mel's classroom

Mel encouraged the children to explain their thinking throughout the session. This encouraged some sustained dialogue, and I observed three episodes of this in the session. She supported the children in their reasoning as illustrated in the following transcript:

Mel: Which would you rather meet then – the lion, the elephant or the wolf?

Child A: Elephant.

Mel: Why the elephant – he's very big!

Child A: 'Cos in Africa my auntie sees lots of them, and she says they are nice.

Mel: Ok, that's an interesting thought. Do we agree?

Child B: Not lion 'cos when I went to Longleat the signs said keep the window closed.

Child C: That's 'cos they could eat us. Do elephants ever eat meat 'cos wolf and lions do.

Child B: Trees. They eat trees and stuff.

Child A: So choose the elephant! Choose the elephant.

Mel: That does seem like a good reason to choose the elephant.

Child B: Yeah – it might be friendlier than a lion too.

Child C: In the *Jungle Book* the wolves are really kind 'cos they look after him and he is like their baby. The elephants are a bit scary 'cos they do the marching.

Mel: Gosh – this is really good thinking. We are talking about lots of ideas about why. Well done.

Transcript 6.30 Extract of conversation from Mel's second lesson observation

In this extract Mel supported the children in justifying their choice of one animal. Before she provided the positive feedback to Child 1's reason ('that's an interesting thought') for choosing the elephant she offered a challenge – asking why choose such a big animal. This encouraged the child to elaborate on the response, and then Mel asked whether the others agreed. This was similar to the type of interactions observed in Mel's first lesson.

Final VSRD with the children - Mel's class

The children were keen to make videos. They gave a number of reasons for selecting certain children to film. These included:

She was working it out so she was thinking lots.

They were listening to Miss.

She's looking at Miss then looking in the air to get her mind to work.

They were thinking quietly about their work – you can see they are thinking 'cos then they can get on with their work.

He was thinking about elephants 'cos God tells us elephants can suck us up.

She was giving Miss her thinking ideas.

These reasons were largely based on general reasons such as listening, although one child did say that they had chosen people who were 'working it out'. On this visit, the children were the only ones in the project who talked about how they had to interrupt their filming of a particular pair of children. "*I started them 'cos they were in a group and were talking together about ideas but then they were snatching things not thinking So I did someone else then.*'

They were indicating that the behaviours that they identified as thinking process could be interrupted by other behaviours. The children also referred to using thinking caps to help them think, although they could not explain why putting the cap on was a good strategy. Body language was something that the children used as an indicator of thinking, as illustrated in the transcript which follows.

Child A: I chose her ‘cos she made a thinking face.

R: What’s a thinking face?

Child A: (models holding chin and looking up) It helps me think.

R: How do you think it works?

Child A: It makes my brain work. When Miss talks my ears go to my head and I hold them all in so I know what Miss is talking about.

R: What do you hold in?

Child A: My ideas. It stops my brain being crazy so I can think what to do.

Transcript 6.31 Final VSRD with children in Mel’s class

This child was suggesting that ideas come from listening, and then have to be kept in her head so that they can be considered. She indicated that holding her chin was a way of helping thinking take place in her head. The children could elaborate on their ideas, and some were able to suggest what they could do if they found something difficult:

Child A: We did them ‘cos they were trying hard and it was hard work.

R: Do you ever get stuck when it’s hard work?

Child B: A bit.

R: What do you do?

Child B: I could ask for help. I could think for a while, like, go outside and my brain would work it out when I come back.

R: Wow. So if you go outside, your brain keeps working it out?

Child A: Yep. But mine has to rest sometimes mind. I could use the cubes in numbers then to help me.

R: Would they have helped you today?

Child A: Umm. Well. Not for the animals but in other stuff yeah.

Transcript 6. 32 Final VSRD with children in Mel’s class

The children are able to offer some suggestions as to strategies to use when they are finding the work difficult. The children identify the fact that if they leave the activity that is difficult and have a break, they may have more success working on the problem a little later. Furthermore, they suggests that if they still cannot answer the problem, there are resources which are useful in specific situations – but which are not generalizable across all situations.

Summary of Section 6.2.2

Metacognitive behaviour

In all classes, on both visits, I observed behaviours from the children that, using the framework (Table 6.4) could be classed as metacognitive. For four of the classes, the number of these behaviours increased for the second visit, whilst in two classes (Lynda and Mel), the number of metacognitive behaviours remained the same. The maximum number of behaviours was six, observed in the second visit to Ceri's class. The least number was two, observed on the first visit to Lucy's class. The average number of metacognitive behaviours observed across the two visits was four.

The most commonly occurring behaviours demonstrated by the children were knowledge of themselves as learners, awareness and management of strategies and evaluation. Almost all of the behaviours were observed more often in the second visit, with the exception of planning. Children's own knowledge of when or where or why to use a strategy was the least commonly observed behaviour in all classes across the two visits.

These findings are summarised in the following table:

Component of metacognition	Type of behaviour	Terminology commonly associated	Observed in Visit 1	Observed in Visit 2
Cognitive knowledge	Knowledge of oneself / others as a learner and factors affecting cognition	• Person and task knowledge • Self-appraisal • Declarative knowledge	Olivia Lynda Sam	Olivia Ceri Lynda Sam

				Mel
	Awareness and management of cognition including knowledge of strategies	• Procedural knowledge • Strategy knowledge	Olivia (Lynda) Lucy Sam Mel	Olivia Lynda Lucy Sam Mel
	Knowledge of when/ where/ why to use a strategy	• Conditional knowledge	Ceri	Ceri Lynda
Cognitive regulation	Identification and selection of appropriate strategies	• Plan	Ceri (Lynda) Lucy Sam	Sam
	Attend to and awareness of task performance and understanding	• Monitor/ regulate • Cognitive experiences	Olivia Ceri Lynda	Olivia Ceri Lucy Sam
	Assess processes and products of learning	• Evaluate	Olivia	Olivia Ceri Lynda Lucy

Table 6.23 Summary of metacognitive behaviours observed in the two observed lessons

The teachers also noted a change in the children. For example, after episodes of VSRD, and discussion about the thinking that was going on, Olivia noted that in her classroom she was seeing pupils who she felt were '*better at talking about what they find hard.*

Watching themselves back on video helped them see what was hard…and what they could do about this.' This ability to talk about difficulties and consider possible solutions and alternative strategies shows metacognitive awareness on the part of the children.

Nature of interactions

In all of the lessons observed, the children were able to respond to the questions asked by the teachers. Although as in the first lesson observation, IRF interactions were the most commonly occurring interaction these were less frequent in the second lesson observation when the first ten minutes of each session was compared. The nature of children's responses also changed. In visit one, the responses in most classes tended to be single words or sentences, and were usually directed to the teacher. This was not so prevalent in visit 2, where there was an increased opportunity for children to respond to one another.

During the second visit, in all but one class I noted an increase in the number of episodes of sustained dialogue that took place. The following graph (Figure 6.15) shows this visually:

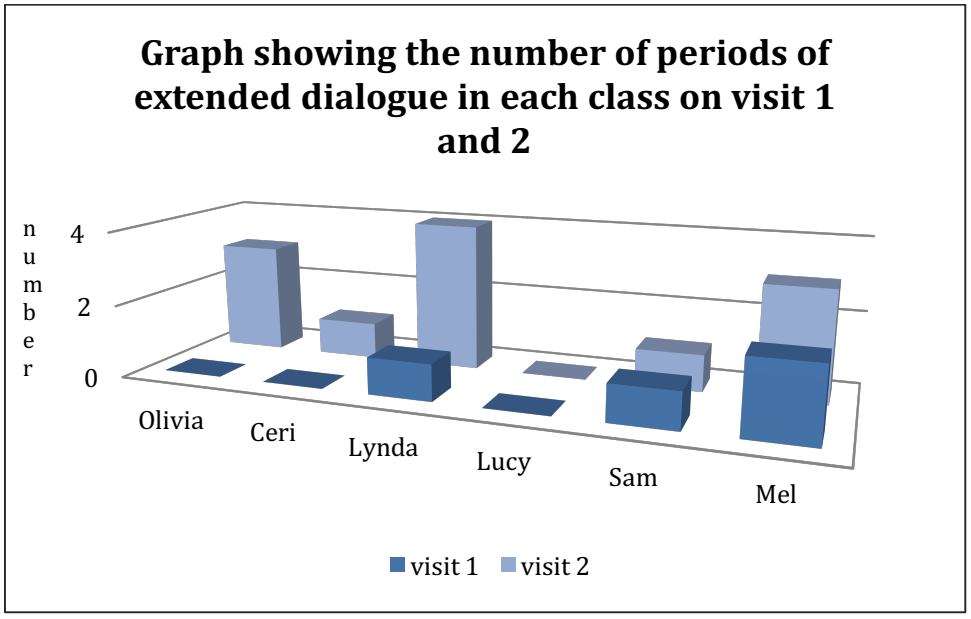


Figure 6.15 periods of extended dialogue in each class on visit 1 and visit 2

My own role

Throughout the visits I adopted the role of a supportive guide (*eg* Day, 1999), and when analysing the data gathered I could see that there were times when my questioning revealed insights into the children's thinking that they may not have articulated independently. As discussed in Chapter 2, my presence may assist reflection on what is occurring – and whilst Clarke (1997) discusses this with reference to the teacher's reflections, I believe the data I have collected indicates that the same is true for the children.

I also wanted to know if there were any differences in terms of cognitive development over the project, between the children involved in the intervention, and a control group. The next section presents findings from a battery of cognitive tests.

6.3 Reporting on the cognitive tests

The second question that the findings of this chapter seeks to explore relate to the question of 'What was the impact of the intervention on children's performance on a limited number of standardised tests?' As mentioned in Chapter 3, children in both intervention groups and control groups completed a series of four cognitive tests from the British Ability Scale II battery (Elliott *et al*, 1996). The children were tested at the start of the project and again at the end– which was nine months later. The children were in one of two groups as described in Chapter 3 – the intervention or control group. At the start and at the end of the project all children completed four batteries of tests from the British Ability Scale II. As discussed in Chapter 3, the standardised T-score was calculated for each child. This is score gained after converting raw data to the BAS II ability score, which:

> 'indicates raw level of performance on the scale. Based on level of difficulty of items attempted and number of correct responses' (Elliott *et al*, 1996:46).

This ability score is then converted to a T-score. This is an 'age-based, normalized standard score' (Elliott *et al*, *ibid*).

The null hypothesis in all cases would assume that there would be no significant difference in scores between the two groups when they were tested at the end of the project. As explained in Chapter 3, to control for continuous variables (covariates) that were not of interest, an analysis of covariance (ANCOVA) was used. The effect size measure used in the analysis was partial eta squared (η^2_p) which looks at the 'proportion of variance that a variable explains that is *not explained by other variables in the analysis*' (Field, 2011:417). I used Cohen's effect size (1988) for partial eta-squared:

Small effect size	0.01
Medium effect size	0.06
Large effect size	0.14

6.3.1 Describing the sample

As described in Chapter 3, the original sample consisted of 65 children in total, 34 girls and 31 boys, ranging in age from 4 years and 7 months to 6 years and 6 months (at the start of the project).

However, on the second testing day, only 61 children from the original sample were available. This was because three had moved schools, and 1 was on holiday during the testing period. Of the remaining children, 33 were part of the intervention group, and 29 children were in the control group.

6.3.2 Naming Vocabulary Test

The naming vocabulary test asks children to provide the name of a series of objects shown in line drawings. The test measures the child's knowledge of names but also expressive language – their ability to say the name of the object. The following table provides information on the mean scores for each group in the pre and post-intervention tests.

	Mean Pre-intervention standardised score	Mean Post-intervention standardised score
intervention Group	33	44
Control Group	36	41

Table 6.24 Mean scores for the Naming Vocabulary test

The data shows that both groups of children made progress in the intervention period and their standardised scores improved. Pre-intervention, the control group were performing at a higher level, with a mean pre-intervention T-score of 36 After the intervention period, the control groups' mean T-score had improved to 42, an increase of 6 points. The same pattern of improvement was present in the intervention group, where means T-scores increased from 33 to 44, which was an increase of 9 points. This was a greater increase than in the control group. In fact, this test was the one in which start and end points were lowest for both control and intervention groups. So, whilst the intervention group started at a lower point, they in fact out-performed the control group at the end of the project, and these children reached the average expected of their age group. This can be shown visually in the following graph:

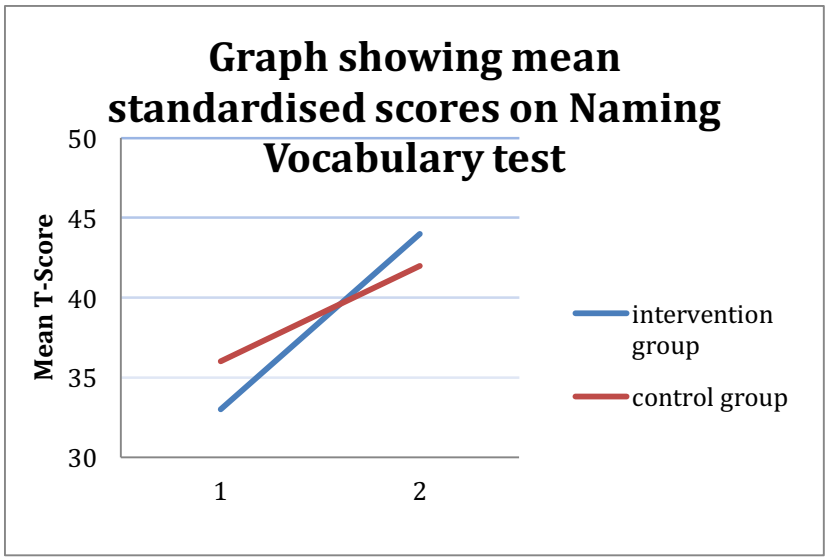


Figure 6.16 Mean standardised scores on the Naming Vocabulary test, for control and intervention groups where 1 = pre-intervention and 2 = post-intervention test

To consider whether this was a significant effect, I carried out a one-way between-subjects ANCOVA. The Levene's test for equality of error variances was >0.05 (p=0.19), so the ANCOVA performed satisfies the homogeneity of variances assumption. The pre-test scores were treated as the covariate. In this case, (F (1,61) = 5.062, p= .028 , η^2_p= 0.079) with a medium effect size value (Cohen, 1988). This indicates that in this case we can reject the null hypothesis of there being no difference between groups at the 5% level, and say that there was a difference in vocabulary test scores post-intervention depending on whether a child was in the intervention or control group, with a medium size of effect.

6.3.3 Early Number Concepts test

The early number concepts test asks the children to respond to a series of questions based on numerical concepts, calculations and size.

Figure 6.17 Child completing the early number concepts test (source: author's own)

The results for the pre and post tests for both groups of children are presented below:

	Mean Pre-intervention standardised score	Mean Post-intervention standardised score
Intervention Group	45	48
Control Group	44	44

Table 6.25 The early number test mean scores for control and intervention groups, pre and post-intervention

In this case the data does not show that both groups of children made progress in the intervention period. Pre-intervention, the control group were performing at a slightly lower level, with a mean pre-intervention T-score of 44. After the intervention period, the control groups' mean T-score had remained at 44, which showed no increase, but rather a maintenance of the level of performance. For the intervention group, the pattern was different – and overall a pattern of improvement was present, where means T-scores increased from 45 to 48, which was an increase of 3 points. In this test, scores before and after the intervention for both groups were within the 'average' range.

This can be shown visually in the following graph:

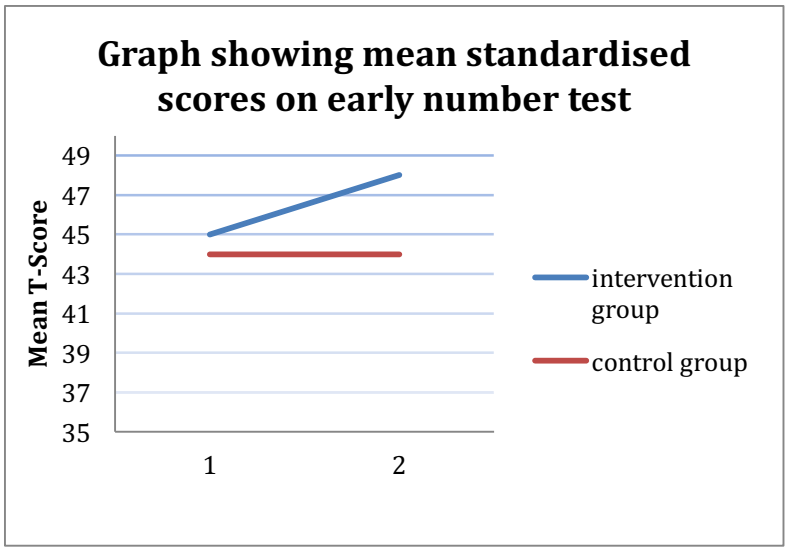


Figure 6.18 Mean standardised scores on the early Number Concepts test, for control and intervention groups where 1 = pre-intervention and 2 = post-intervention

To consider whether this was a significant effect, I carried out a one-way between-subjects ANCOVA. The Levene's test for equality of error variances was >0.05 (p=0.782), so the ANCOVA performed satisfies the homogeneity of variances assumption. The pre-test scores were treated as the covariate. In this case, (F (1,61) = 5.296, p= .025 η^2 = .082) with a medium effect size value (Cohen, 1988).

This indicates that in this case we can reject the null hypothesis of there being no difference between groups at the 5% level, and say that there was a significant difference in early number concept test scores post-intervention depending on whether a child was in the intervention or control group with a medium size of effect.

6.3.4 Verbal Comprehension test

The verbal comprehension test requires the child to point to pictures or manipulate small world items in response to simple oral instructions – this tests the child's receptive language skills - through their demonstration of their understanding.

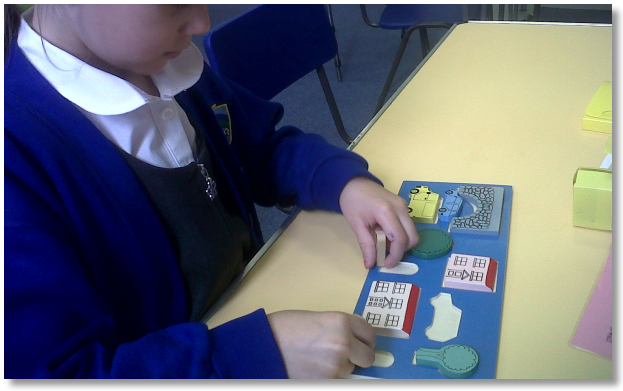


Figure 6.19 Child completing the Verbal Comprehension test (source: author's own)

The results for both groups of children, pre and post intervention are presented in the following table:

	Mean Pre-intervention standardised score	Mean Post-intervention standardised score
Intervention Group	46	50
Control Group	45	48

Table 6.26 The verbal comprehension test mean scores for control and intervention groups, pre and post-intervention

The data shows that both groups of children made progress in the intervention period and their standardised scores improved. Pre-intervention, the control group were performing at a slightly lower level, with a mean pre-intervention T-score of 45. After the intervention period, the control groups' mean T-score had improved to 48, an increase of 3 points. The same pattern of improvement was present in the intervention group, where mean T-scores increased from 46 to 50, which was an increase of 4 points. This was a slightly greater increase than in the control group. Overall in the four tests that were given, this was the highest mean value achieved by any group in any test.

The pattern of improvement is shown visually in the following graph:

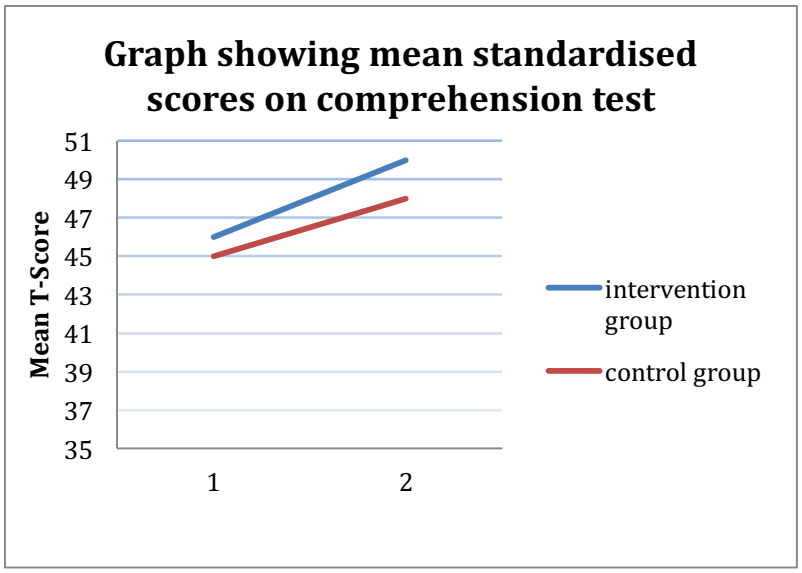


Figure 6.20 Mean standardised scores in the verbal comprehension test, for control and intervention groups where 1= pre-intervention and 2 = post-intervention test

To consider whether this was a significant effect, I carried out a one-way between-subjects ANCOVA. The Levene's test for equality of error variances was >0.05 (p=0.145), so the ANCOVA performed satisfies the homogeneity of variances assumption. The pre-test scores were treated as the covariate. In this case, we cannot reject the null hypothesis that there is no difference between the intervention and control groups on post-intervention scores at the 5% level (F (1,61) = 2.330, p= 0.132).

6.3.5 Reasoning – Picture Similarities

The picture similarities test asks the child to decide which one of the four pictures shown in each question is the odd one out, and tests their non-verbal reasoning skills. Skills such as matching and sequencing are tested - they need to do to be able to use these in order to answer correctly. The results for the pre and post tests for both groups of children are presented below:

	Mean Pre-intervention standardised score	Mean Post-intervention standardised score
Intervention Group	44	49
Control Group	43	45

Table 6.27 The reasoning test mean scores for control and intervention groups, pre and post-intervention

The data shows that both groups of children made progress in the intervention period and their standardised scores improved. Pre-intervention, the control group were performing at a slightly lower level, with a mean pre-intervention T-score of 43. After the intervention period, the control groups' mean T-score had improved to 45, an increase of 2 points. Improvement was also evident in the intervention group, where means T-scores increased from 44 to 49, which was an increase of 5 points. This was a greater increase than in the control group.

The pattern of improvement is shown visually in the following graph:

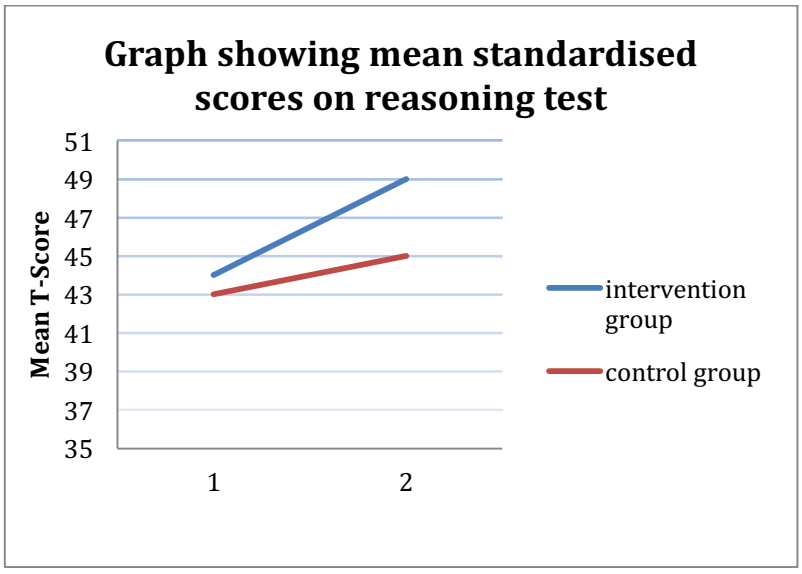


Figure 6.21 Mean standardised scores in the reasoning test, for control and intervention groups where 1= pre-intervention and 2 = post-intervention test

To consider whether this was a significant effect, I carried out a one-way between-subjects ANCOVA. The Levene's test for equality of error variances was >0.05 (p=0.121), so the ANCOVA performed satisfies the homogeneity of variances assumption. The pre-test scores were treated as the covariate. In this case, (F (1,61) = 6.162, p= .016, η^2 = .095) with a medium effect size value (Cohen, 1988). This indicates that in this case we can reject the null hypothesis of there being no difference between groups, and say that there was a difference in reasoning test scores post-intervention beyond the 5% level of significance, depending on whether a child was in the intervention or control group with a medium effect size.

Summary of Section 6.3

To summarise, when considering what the impact of the intervention on children's performance on a limited number of standardised tests was, in three out of four tests – (naming vocabulary, early number concepts and reasoning), the intervention group made more progress than the control group. The effect size of these differences was medium in all three cases. In such a small scale study as this, it is not possible to make generalisations, however it is appropriate to report that involvement in the intervention did have an impact on subsequent performance on the three tests above.

In the verbal comprehension test there was no significant difference between the groups in the post-intervention test scores, although this was the test that children in both intervention and control groups performed best on.

Chapter Summary

This chapter presented findings relating to two questions in my project, namely:

- To what extent did children in the project demonstrate development in their awareness of thinking?
- What was the impact of the intervention on children's performance on a limited number of standardised tests?

Through observing the lessons and talking with the children during VSRD

episodes I generated a great deal of material. I selected those that represented metacognitive behaviour through the use of the framework described in Chapter 3.

The framework proved helpful in allowing me to identify a range of indicators of metacognition in all classes on both visits – which would signal an awareness of different aspects of thinking such as monitoring and evaluation. The presence of such behaviours supported the literature reviewed in Chapter 2 which argued for young children being able to act metacognitively (*eg* Whitebread *et al*, 2007). Generally speaking, these behaviours occurred more often in the second observation compared to the first.

I used quantitative and qualitative data to analyse the nature of the interactions between teachers and children. There appeared to be an increase in opportunity for children to engage in sustained dialogue in the second lesson, and in all cases, a decrease in the number of IRF interactions. This meant that I could identify times where the children explained, justified and elaborated on their ideas more often in the second observation than the first.

The children did demonstrate development in terms of their ability to articulate an awareness of thinking. Discussion with the children indicated that their understanding of thinking changed over the course of the study. They recognised a greater range of behaviours as being 'thinking' by the second visit, and were able to describe what 'good thinkers' do with more reference to strategy and understanding on the second visit. VSRD episodes with the children indicated a growing awareness of, or willingness to articulate, an understanding of thinking. The VSRD process allowed children the opportunity to discuss their thinking and decisions with me, and one another, and in doing so allowed reflection on what went on in each class. The children were able to engage with the process of VSRD, identifying and filming episodes within their lessons, and then discussing these. The choice of episode to film became more closely aligned to behaviours associated with thinking in visit 2, and the children were better able to articulate their reasons

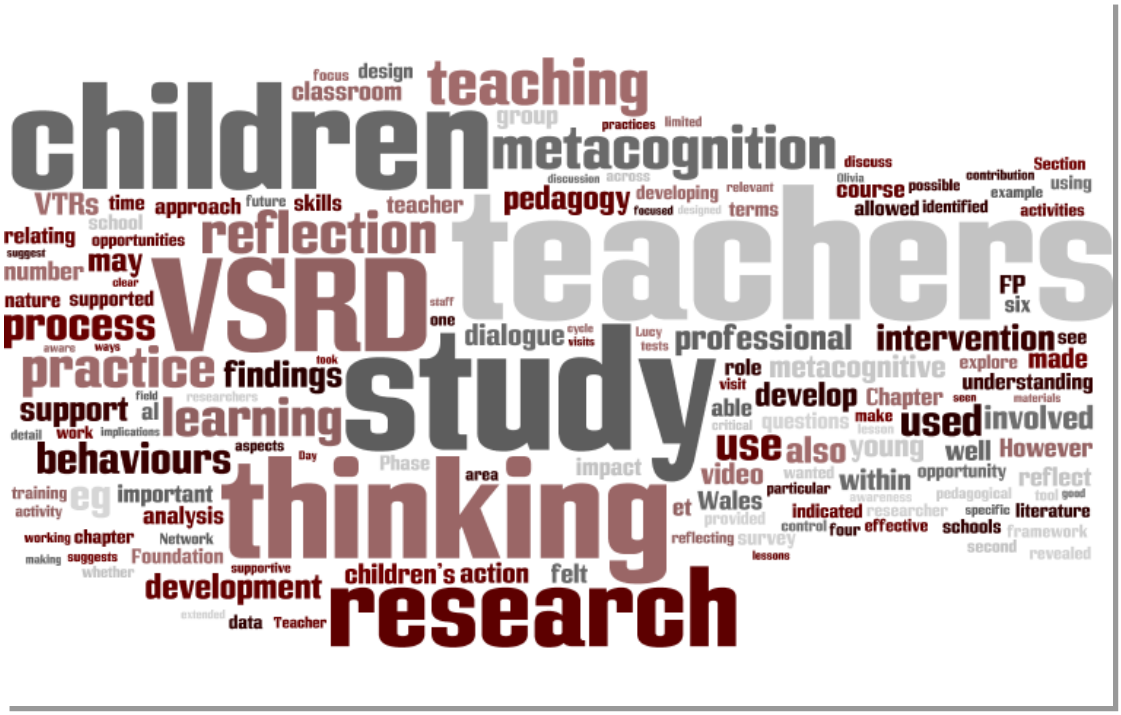
for selection on the second visit.

My role in the VSRD dialogue was important. Several of the transcripts illustrate how children articulated their thinking as a result of the questioning that took place, and may not have done so without the prompting that I gave. This is explored further in the following chapter.

When examining whether the intervention had an effect on the children in the intervention group on standardised tests, there was a difference when compared to children not involved in the intervention. In three of the four cognitive tests given at the start and end of the intervention, the children involved in the study made more progress than a matched control group. This was evidenced by the medium effect size in each case.

These findings, and their implications are discussed in the following chapter.

Chapter 7
Conclusions



Word cloud 2

Introduction and review

This study had the overall aims of considering the nature and extent of metacognition in young children, and to better understand the pedagogical practices teachers use to effectively support the teaching of thinking. The word cloud above analyses word frequency within the chapter. It highlights that, in this concluding chapter key themes under discussion will primarily relate to how the teachers and children within my study developed their understanding of thinking, and their reflection upon thinking during the course of the intervention. As explained in Chapter 1, 'Highlighting the important words in a document by using a larger font size allows to get a quick impression of the relevant concepts in a text' (Gottron, 2009:2). The cloud shows words such as VSRD, children, teachers, thinking, research, metacognition, and children as being amongst the important aspects of the study that will be referred to throughout the chapter.

In order to explore my aims, I devised four research questions and the purpose of this chapter is to critically consider the findings of my study in relation to these questions, which are outlined as follows:

Research Aims and Questions	
Research Aim	To explore the nature and extent of metacognition in young learners, and to better understand the pedagogical practices teachers use to effectively support the teaching of thinking.
Research Questions	1. How were Foundation Phase teachers in Wales teaching thinking? 2. How did the teachers involved in the study develop in their teaching of thinking through the course of the intervention? 3. To what extent did children in the study demonstrate development in their awareness of thinking? 4. What was the impact of the intervention on children's performance on a limited number of standardised tests?

The overall findings and analyses were presented in Chapters Four, Five and Six. Throughout the course of my study, I have ensured that I pay appropriate attention to ethical considerations, which I outlined thoroughly in Chapter 3. In each of the following sections of this chapter, I will discuss the implications of the findings for each of my research questions in more depth. Key themes are drawn together, and these are connected to the literature that I discussed in Chapter 2. In this chapter I also outline the strengths and limitations of my study, and identify the potential implications of my findings for students, teachers, other researchers and policy makers and I reflect on how this study has impacted on my personal identity as a researcher.

I will discuss the original contribution of my study to the field and suggest future research that could arise from this work. In particular, there are three specific contributions to knowledge in the field that my research makes. These contributions will be explored in more detail in the chapter, and are summarised as follows:

- The first is methodological and relates to my use of VSRD with young children. Previous studies (*eg* Moyles *et al*, 2003; Tanner and Jones, 2007) had not used VSRD with children as young as those I worked with.

Furthermore, allowing the children the opportunity to make their own videos to discuss had not been tried before – previous research had provided the children with a video that the researcher had made of the lesson (*eg* Rumenapp *et al*, 2015; Valkanova, 2004; Robson, 2016). This approach therefore contributes to the research that suggests that *how* we notice and evidence metacognition is important – and in this study VSRD provided a novel 'how'.

- The second contribution relates to what we know about young children's capabilities in terms of metacognition. This had been contested in the literature (*eg* Flavell,1979), particularly with regard to the age with which metacognition develops. The literature gives a mixed and inconsistent picture – for example when looking at monitoring of learning Schneider *et al* (2000) report that in some studies there are age-related improvements for children in kindergarten to third grade (5 - 8 year olds, whilst in others six-year-olds perform better than 10 year olds. Larkin (2010:14) defines young children broadly, as 'children from infanthood to age 11.' My study allowed analysis of classroom activity that was able to demonstrate metacognitive behaviours in a focused age range - five and six-year-old children. The research design allowed children the opportunity to reflect upon thinking both during activity and retrospectively. The combination of observation, analysis and dialogue, with both teachers and children allowed me to gain a detailed picture of the children's awareness of their thinking.

- The third contribution that the study makes relates to the impact that my research could make to understanding effective models of professional learning. I found that the teachers in this study enjoyed using VSRD to look at their individual practice, the VTRs to teach thinking and Teacher Network Days to discuss and collaborate, and these proved beneficial to these individuals in terms of developing their pedagogy. Both VSRD and VTRs are relatively inexpensive and simple tools for other professionals to implement in their practice.

7.1 Answering the research questions:

As noted, I generated four questions that I wanted to answer in the course of my research. These questions are now discussed in turn.

7.1.1 How were Foundation Phase teachers in Wales teaching thinking?

As discussed in Chapter 4, to answer this question, a survey about how thinking was being taught was conducted across the entire population of Welsh FP settings. The results indicated that across Wales, teachers view teaching thinking in the FP as important, with nearly three-quarters of respondents saying it had a high priority within their schools. Most schools reported that they teach thinking every day, and approach this in a variety of ways, using a variety of materials. Most reported that they are teaching thinking across the curriculum. The most commonly used materials stated were those relating to cognitive acceleration approaches. Class teachers have the most responsibility for teaching thinking, with only around 40% of respondents seeing this as the role of teaching assistants.

The finding relating to who is seen as having responsibility for the teaching of thinking was of interest to me. The survey indicated that respondents saw this responsibility as mainly seen as belonging to the class teacher. Although the survey revealed that teaching thinking has a high priority it was not seen as something that additional staff would be involved with. Analysis indicated that support staff were also less likely to have received training in the teaching of thinking skills than class teachers.

This is of interest because in most FP classes there are additional adults working on a regular basis with children. The initial estimate regarding recruitment of additional adult support during the implementation of the FP in Wales was that an additional 2,800 staff were needed (1:8 adult-to-pupil ratio for three to five-year-olds and 1:15 ratio for five to seven-year-olds) (Siraj, 2014:13). Taylor *et al* (2014:2) reported that 'According to official Welsh Government data there were up to 15,923 practitioners working with children of Foundation Phase age in schools in 2012'.

In an average Reception class of 30 children, as well as the teacher this would mean that there could be another three adults as a minimum. Estyn (2011) and Rhys *et al* (2014) both indicate that support and guidance for schools regarding FP pedagogy varies. The independent Stocktake of the Foundation Phase (Siraj, 2014) recommends training for all staff, and yet my study clearly indicates that training relating to thinking skills is something that was not provided for the majority of support staff in the settings where responses came from.

The survey indicated that teachers have also had limited training relating to thinking. I was interested in the amount of training given to teachers. Analysis of my findings indicated that less than 50% of respondents had had a day or more of training, with over 30% having had less than 3 hours of training in teaching thinking. Respondents who had responsibility for managing thinking were more likely to have received more training, and again I think that this finding has implications for developing training opportunities. This is supported by the fact that Estyn (2011) suggest that most schools were not taking a whole school approach to develop thinking.

One of the implications of my study is to illustrate how the use of VSRD and VTRs, and action research as an approach could be of benefit in terms of professional learning. My study shows that the teaching of thinking can be enhanced through the use of specific materials and structured reflection, and this could inform those involved in developing professional learning opportunities. Because of the design of my study, I cannot be sure whether it was the VTRs or the VSRD – or indeed the combination of both - that had most impact on the teachers in terms of developing their pedagogy, but I can see from the findings, where teachers used both, and when they were given opportunities to come together to discuss their practice there were changes in this over the course of the year. Because the results of the intervention showed development in the teachers and their awareness of how to teach thinking (see Section 2), training using VSRD and VTRs could be implemented for support staff and teaching staff alike.

Both VTRs and VSRD are relatively simple to implement – they do not require the purchase of expensive materials, and the teachers in my study received only two days of support from myself before they were ready to have an initial go at implementation.

Clearly, the role of the facilitator in the VSRD process is crucial, but I believe that the skills to do this effectively could be developed through some well-structured professional learning opportunities. In a survey of over 13,000 teachers (response rate 33%) Poet *et al* (2011) report that nearly all teachers view self-reflection as useful or very useful. My study has shown that, for the teachers involved, the use of VSRD improved the depth and detail of their self-reflection. Schools could use these findings to develop self-sustaining systems of reflection based on the use of video and dialogue, which is explored more in Section 7.2 of this chapter.

I know that the responses given in the questionnaire may not indicate what teachers actually do on a day-to-day basis. This relates to the work of researchers such as Argyris and Schön (1974), who remind us that an espoused theory is not necessarily a theory-in-action. What we say we do, or what we think we do are not necessarily what happens in practice. Therefore, following the initial scoping survey the action research phase of my study was conducted in six schools, with six teachers and a group of six children in each of the teacher's classes. This phase of my study provided more in-depth data relating to the other research questions.

7.1.2 How did the teachers involved in the study develop in their teaching of thinking through the course of the intervention?

The study made particular reference to the use of VTRs (Ritchhart *et al*, 2011) and reflection through the use of VSRD. Chapter 5 of the thesis analysed the findings relating to the six teachers who were involved in the study, and who had the opportunity to develop their understanding and teaching of thinking, through a process of exploring their own pedagogy through an action research approach.

Chapter 5 outlined the journey, in terms of their understanding of teaching thinking, that each individual teacher took during the course of the study. The

chapter was structured around two research cycles. In each, the Teacher Network Day and the teaching actions observed during school visits were examined and VSRD episodes were analysed.

The teachers in the study were keen to develop their own practice – they were 'extended professionals' – ' a teacher for whom teaching was a rational activity, who sought to improve practice through reading and through engaging in continuous professional development, who was happily collegial, and who located classroom practice within a larger social framework' (Hoyle, 2008: 291). The study was designed in order to allow each teacher to focus on a particular aspect of their practice relevant to them. All six teachers remained involved throughout the duration of the study.

At the start of the study, the teachers had varying views about the nature of thinking. For several of the teachers these views were broadly socio-constructivist in nature – valuing communication and social activity as ways to support children to develop their thinking. However, others felt that there was a possibility that thinking was just another 'gimmick'. All of the teachers wanted to develop their pedagogical strategies in relation to the teaching of thinking and as a group, over the course of the study we refined, developed and discussed what we thought this meant. The discussions led to consideration of being an 'intentional teacher' (*eg* Epstein, 2007:4), and as a group the teachers wanted to reflect upon how they could develop intentionality in relation to teaching thinking. A crucial factor that most of the teachers identified was to do with their questioning skills. They wanted to develop their practices to be able to challenge, scaffold and extend the children and their thinking – which are elements that Pianta (2003:5) would describe as crucial in 'directed, designed interactions'. All of the teachers felt that analysing their practice through observation and VSRD would be beneficial – if a little painful at first. None of them had previously seen videos of themselves teaching.

Because the study involved analysing classroom practice, and because the teachers were involved as co-researchers, we identified specific actions/ behaviours which we felt could be observed when thinking was being taught

effectively. The teachers all demonstrated more of these behaviours during the second visit. A factor in this was that, through the action research process they became more aware of their own practice, and were able to use the video reflection and set targets for themselves that they wanted to improve.

The literature review indicated that there is a general consensus amongst researchers that reflecting on one's practice is important, and that effective teachers show a desire to improve the quality of their teaching (*eg* Schön, 1983; Moon, 2000). However, the literature also suggested that, in practice much of the reflection that happens is informal, unstructured and does not impact on pedagogy (*eg* Day, 1999; Borko *et al*, 2000). The tool that we used, VSRD, was implemented in a structured manner, with a specific focus on the teaching of thinking. Through the VSRD process teachers had, what they described as the 'luxury' of being able to review their own practice and engage in dialogue about it. It allowed the teachers the chance to 'look back and make sense' (Ghaye and Ghaye, 1998:2) of their practice. This reflection was given time and space, both at an individual level and then with me acting as a 'supportive guide' (*eg* Day, 1999). This process supported an explicit cycle of reflecting, discussing, planning future steps, enacting these and reflecting on them again.

Although initially some showed trepidation about being videoed, all six teachers found value in VSRD. In all cases, aspects of their teaching that the VSRD revealed to them surprised the teachers. The videos revealed aspects of practice that they had been unaware of, and showed them, albeit in a particular context and at a particular time, what worked well. Comparison of their reflections immediately after sessions and those during VSRD revealed that the VSRD encouraged closer examination of pedagogy relating to teaching thinking. To ensure consistency when I analysed the VSRD dialogue, I used the framework of behaviours that the teachers themselves identified during Teacher Network Days.

In the first action research cycle, all of the teachers reflected on a small number of these behaviours immediately after the session, and a greater number during the VSRD dialogue. This was interesting – I had thought that

supporting teachers to develop a framework for effective pedagogy themselves would support them in making more focused reflections. All the teachers agreed that these were important behaviours, and wanted to demonstrate them, and yet did not reflect on them in detail until they were undergoing the VSRD. Mel, Lucy and Olivia showed the greatest difference in reference to these between the immediate reflection and the VSRD.

In cycle 2, the teachers followed a similar pattern with increased reflection on behaviours in the VSRD – and this was increased from cycle 1. In fact, the teachers referred to twice as many behaviours in the second cycle and Olivia in particular was more 'tuned-in' to the behaviours in both the immediate reflection as well as the VSRD. The implication of this is that the VSRD process can support teachers in reflecting upon specific aspects of pedagogy beyond what they reflect on without the VSRD.

Through the viewing of the video and the dialogue with the supportive guide, teachers can reflect on and suggest ways to improve their own practice.
Part of this value is likely to be due to the presence of an external voice (*eg* Day, 1999), and transcripts reveal that during VSRD my role was important in supporting the teachers move from technical to deliberate and critical levels of reflection. Olivia also acknowledged this explicitly during Teacher Network Day 3 (see Chapter 5). Analysis also revealed that the VSRD process supported teachers to reflect specifically on their pedagogy – the intentional aspects of their practice - whilst non-VSRD reflection tended to focus on more general 'how the lesson went' type comments. It was apparent that critical reflection still occurred less frequently than deliberate reflection, indicating that this is challenging even with support.
My study indicates that the use of VSRD, and an action research approach can support teachers in developing their pedagogy and also the level of self-reflection that they undertake (*eg* Muir and Beswick, 2007). This finding was true of all six teachers in my study, regardless of their role, experience or personal beliefs about thinking.
No critical reflection was observed pre-VSRD, but during VSRD there were examples of critical reflection relating to the teachers themselves, their students and their pedagogy. I cannot determine whether or not it was the

VSRD or the overall action research approach that had the greater influence on the teachers as my design did not evaluate these independently. However, I can draw some general conclusions.

For example, each teacher was able to use the VSRD process to identify focused and personal targets to develop in terms of their classroom pedagogy. My study facilitated the group of teachers to enhance their teaching through a cyclical process of reflection, dialogue and the sharing best practice. VSRD seemed to be a simple strategy to support the process of reflection – there were no great physical resource implications other that the need for a recording device, and so schools could embed this process quite easily using existing technology.

However, the VSRD process involved a considerable time commitment from the teachers and for myself as a researcher. Arguably, this was a worthwhile investment, as it resulted in a group of teachers who reflected more critically on their teaching, who felt a sense of ownership of the professional development process and who were able to set clear and focused targets for their own development. This is relevant to policy makers as well as practitioners - for example Siraj (2014) recommended that enhancing the quality of teaching, rather than just making structural changes would increase the achievement of children. The teachers in my study all felt that VSRD supported them to improve the quality of their practice.

Siraj also recommended that there should be ‘A greater emphasis on linking theory and research to adult pedagogy’ (2014:4). The model of Teacher Network Days followed by school visits supported the teachers and helped them develop their personal pedagogy relating to thinking. They were supported in focused reflection and discussion, and all reported that they felt more confident as a result. Also highlighted within Siraj’s (2014) report is the importance of sharing best practice – which the teachers in my study did during the Teacher Network Days.

They agreed that this was beneficial and enjoyable, and all felt that it was a valuable learning process. Two of the teachers were eager to disseminate their work beyond their school community, and shared their experiences at

Local Authority level. One presented at a national conference, and talked about how VSRD in particular had impacted on her practice.

My role was important throughout this process. I acted as an external voice, which supported the process of reflecting on the video. Day (1990) suggests that critical reflection on practice is unlikely to happen without this voice, but I need to acknowledge that I may have guided the teachers in a direction that they may not have taken without me being there. I do not think that this is a limitation however – Fullan (1993) reminds us that the level to which individuals adopt recommended practices is variable.
The presence of a supportive guide may assist in this process. However, I did not discuss the levels of reflection with the teachers specifically – and perhaps explicit consideration of this with them may have supported more frequent critical reflection.

In the second action research cycle the teachers also identified behaviours they felt indicated good thinking on behalf of the children. Once again there was a difference in how many of these were referred to immediately after the lesson when compared to during the VSRD process. During VSRD teachers were able to reflect on the children's behaviours in more detail. During the second visit, all of the teachers were tuned into behaviour such as 'making connections' and 'expressing ideas' even before the VSRD. This reflected the work that we had done during Teacher Network Days to build a shared understanding of the features of a thinking classroom. Once again, during the VSRD this was extended to a greater number of behaviours by all of the teachers. Further discussion relating to the children is continued in the next section.

Each teacher was a co-researcher during the action research phase of the study. They were also made aware at the start of the study that they would be able to read the sections of the thesis that I wrote about their classrooms.
Upon finishing the analysis I was able to send the relevant sections to four of the teachers – Olivia, Lucy, Sam and Mel (Ceri had gone on maternity leave and Lynda had retired) so that they could comment upon how I had reported on their individual journeys. All four felt that the analysis was fair and

accurate and all said that it was interesting to see '*the steps that I made over the course of the year'* (Olivia). Lucy and Mel both said that it was clear to see that they had been fully involved in the project, and that they felt the write up reflected their voices and input. Sam said that '*I feel really confident now- this shows how far I have come – but also I think it shows that it isn't rocket science that is needed. It's just someone to talk to us and help us see what we could try next*.' When asked what improvements could have been made to the study Lucy made an interesting point -she said '*It was good – really good – but I suppose that reading it you don't really know why I decided to do my activities.*'

This is important and is a limitation of my approach – whilst I can analyse the events of lessons I did not ask the teachers in depth about the reasons why certain activities/ tasks were planned. In future, finding out about the context of the session would be something that I would do more thoroughly.

7.1.3 To what extent did children in the study demonstrate development in their awareness of thinking?

Initially, the children viewed good thinking as commensurate with good behaviour – typically good thinkers were identified because they were 'quiet' or 'working hard'. The children could only express limited views about the nature of thinking orally, and drawings tended to conform to societal norms of thinking – such as bubbles coming from the head. By the end of the study, they could expand on what they understood about the nature of thinking – for example referring to being able to 'make connections', and they could suggest strategies to use when thinking was tricky – for instance by visualising a number line in their head.

I was interested in exploring the nature and extent of metacognition in such young learners in more detail. A review of literature revealed that this is contested by some researchers. Notably, whilst some researchers suggest that young children (defined as those in primary school by Larkin, 2010), may not have metacognitive ability (*eg* Georgihades, 2004; Larkin, 2015), others argue that it is the research methods that are used which may not reveal these abilities (*eg* Georgihades, 2004; Whitebread *et al*, 2009). I analysed

the children's responses during activities taught by the teacher which had a specific thinking objective. My study used the literature to inform the development of a framework of metacognitive components for analysing the children's responses. In doing so I synthesised components of metacognitive behaviours into six elements. This was used to analyse young children's metacognitive behaviours during the activities consistently. Some of these behaviours were evident in all lessons on both the first and second visit. They occurred most frequently in Olivia and Lynda's activities, and least frequently in Lucy's. This was interesting because Lucy used 'Let's Think' (Adey *et al,* 2001) activities, which are designed to include metacognitive opportunity.

This suggests that the role of the teacher is crucial – materials can be designed to promote metacognition, but the teacher needs to create the opportunities for this to happen. Lucy's lessons involved many IRF (Sinclair and Coulthart, 1975) interactions that did not seem to allow for the metacognitive behaviours as frequently as the sessions where other activities, including VTRs were used.

The nature of interaction taking place in the classrooms of all six teachers underwent change during the course of the study. Initially, the dominant interactional style in all classes was IRF in nature (Sinclair and Coulthart, *ibid*). There was very little evidence of extended dialogue occurring – even though the teachers all felt that this would be beneficial. During the second visit, in four cases the frequency of IRF had halved, and extended dialogue was more apparent. This was not the case in Lynda's class – but she had limited IRF exchanges on both visits and extended dialogue was often seen during both visits to her classroom.

For Sam, the number of IRF exchanges remained similar on both visits, but closer analysis indicated that the on the second visit, response and feedback were increasingly between children as well as from Sam (when compared to the first visit).

To explore the children's understanding of thinking more closely, I planned for the VSRD process to be supportive and to encourage the children to participate in discussion about their own video clips. Before commencing the

actual study, I piloted the research tools that I intended to use. In the initial pilot phase, I examined the use of VSRD with Foundation Phase aged children. The literature review in Chapter 2 revealed that this tool had not been used with very young children in a context where they took ownership for the filming and selection of clips.

The unique element of this aspect of my study was that the children made the video themselves. This meant that the VSRD had two purposes – it acted as a research tool but it seems possible that it was the very act of undertaking VSRD with a focus on thinking that made the children more aware of their thinking. Robson (2016:190) suggests that when adults and children share the viewing of videos it forms a 'site for joint meaning making' and allows the children the chance to have their thinking made more consciously available to them. This aspect of my study was the only element that I can be sure the children in the control group did not experience.
Analysis of lessons and the VSRD episodes with the children in my study resulted in evidence of metacognitive behaviours in children as young as 4 years old.

The use of VSRD with such young children makes an original contribution to the field, and papers have been published based on the pilot and main study, which outlined how such video reflection can reveal metacognitive awareness in young children (Tanner, Jones and Lewis 2011; Lewis, 2013). Whilst VSRD had been used with older children and adults, the contribution that my study makes is to illustrate that VSRD is a viable and valuable tool when researching with young children. The children in my study were able to manage the technology successfully, and understood the demands of the task. The VSRD engaged even the youngest learners in my sample, who were four years old, and provided a useful scaffold for our discussions. Valkanova (2004:44) suggests that although reflection is a 'crucial issue in learning', motivating children to reflect is a challenge. The VSRD provided a way to do this – all children were keen to share and talk about the film that they had made – and over the course of the study the findings illustrate that their understanding of thinking developed.

As well as being a useful research tool, VSRD was useful from a pedagogical standpoint, and again this is a contribution to the field. VSRD was used to support the children reveal, reflect and consider their thinking in a manner not evident at the start of the intervention. The use of the video reflection may assist deeper reflection and assist the metacognitive development of the children. Whilst undertaking my study, Robson (2016), published a report comparing children's metacognitive and self-regulatory behaviours during naturalistic observation and Reflective Dialogue. There were similarities between her work and my study. For example, she used video as the tool for reflection, conducted one to one dialogues with the children about the lesson. The children were of a similar age to the children in my study – four to five years old. However there were differences in her research design compared to mine. In Robson's study, the video that children watched was of a lesson that they were involved with, but the video had been made by the researcher. They had no ownership over what was filmed.

They watched the video a week later with the researcher, and the focus for Robson was to see whether the dialogue revealed different aspects of metacognition compared to the observations that she made. My study gave children ownership of the videoing and we reflected on the session on the same day. Both of our studies revealed how video helped children to demonstrate their understanding of thinking in a clear and focused manner. The findings in Chapter 6 demonstrated that the children moved from a view of thinking as compliance and behaving well, towards a view of thinking as an active, varied and specific activity. This was shown by the things that they chose to film as well as their comments, because I was aware that young children may have found expressing their thinking orally challenging.
They were better able to select children to video and to articulate their understanding of thinking by the end of the study.

7.1.4 What was the impact of the intervention on children's performance on a limited number of standardised tests?

The results of the statistical analysis indicated that the intervention group outperformed the control group in three of the four standardised tests used at the end of the intervention. These were the naming vocabulary test, the early

number concepts test and the reasoning test. In each case, the effect size was a medium one. There was no significant difference between groups in the verbal comprehension test.

Clearly, this is a small-scale study with a small control and intervention group of children. Yet, the implications for practice are important. The intervention group saw improvements in scores in a range of cognitive tests when compared to the control group. The use of approaches related to developing thinking – such as VTRs, and reflection using VSRD seemed to therefore be successful in developing certain aspects of pupils' cognitive skills as assessed by the written tests. I cannot distinguish whether one or other of these had a greater impact as my design did not allow me to do this.

It is possible that the increase in extended dialogue that took place in the intervention children's classrooms, the opportunity to talk to me about thinking and an emphasis on metacognitive awareness in the classrooms in general during the project impacted on these scores. The design of the VTRs involves discussion and exploration. The use of these over the course of the study could have supported the children in the development of reasoning, vocabulary and mathematical problem solving. My findings concur with those of Pramling (1988), who suggests that metacognitive dialogues can improve children's awareness of their thinking when compared to similar aged children who do not undertake such dialogue.

Robson (2016:192) suggests why this might be the case – indicating that 'the kinds of talk that occurred in RDs (reflective dialogues), focusing on what children were thinking about rather than just recall of an activity, may be particularly supportive of young children's self –regulation and metacognition'. My findings would support this. However, it is also possible that the intervention children were more relaxed with me on the final test than the control group – I had formed a relationship during my school visits with the intervention children and had met them five times prior to the final testing. I had only met the intervention group once before my final visit (although by then I was a familiar face in school), and it is possible that this had a small

impact on how they performed in the tests. This is an area that could be further explored in future research projects.

7.2 Strengths and limitations of the study

The study was an ambitious one – as it sought to survey the whole of the sector in Wales, and then focus on an area which is identified within the literature as being 'fuzzy' and elusive (*eg* Brown, 1987; Tanner and Jones, 2000:597). By using a mixed methods approach I generated a large amount of raw data which had implications in terms of time taken to analyse.

The initial scoping survey was conducted via postal questionnaire, and had a 33% response rate. There were benefits of carrying out a postal survey, although this did mean that I was tasked with then inputting every response into SPSS. In future, I would explore electronic survey methods for such a large-scale survey.

Because the questionnaire responses were anonymous, I cannot draw any detailed conclusions about the background of the respondents, and, as in any survey, it is possible that some voices may be under-represented. However, because of the design of the questionnaire, and as demonstrated in Chapter 4 I know that in general, responses came from a broadly representative sample of FP settings across Wales. Headteachers or those with responsibility for developing thinking across the school generally completed them.
Whilst this may mean that the voices of teachers in classes are less well represented, those who did respond should have had an overview of the whole school approach in their given context.

The action research approach was appropriate in working within a pragmatic framework as I was able to generate a variety of data to respond appropriately to the research questions and classroom contexts. However, it did mean that I was limited in terms of the number of teachers and children that it was possible to work with – and so the study's overall 'generalisability' is limited. I use this term loosely since within a largely qualitative research design such as this study, there is argument to suggest that 'Generalizability

will thus be based on the way things are and will lead to “expectability” rather than the predictability that characterizes quantitative research’ (Delmar, 2010:117). I can only comment on the lessons that I observed, and have no way of knowing whether these were typical of the teachers’ day-to-day practices or not. I was also working with teachers who were already committed to improving their teaching of thinking.

However, I believe that my study has comparability and translatability. LeCompte and Goetz (1982) indicate that the results of qualitative studies can be used as a basis for comparison with other situations through:

a) comparability (how well-described and well-defined the components of a study are *eg* the unit of analysis; the framework within which the research is conducted), and
b) translatability (*ie* the study gives a clear description of its theoretical position and the techniques or methods applied).

My design used clearly designed frameworks (*eg* the action research cycle) and units of analysis (*eg* the metacognitive behaviour framework) that could be used in other research projects and Chapter 3 outlines the theoretical position and methods applied. This means that my study is ‘sufficiently detailed to enable the reader to assess whether the results are applicable to similar settings’ (Mays and Pope 2000:51).

Being able to revisit classroom practice using the videoed material was invaluable in analysing the data. However, I acknowledge that there is an element of subjectivity involved on my part – in terms of selecting which episodes to report. Personal interpretation can play a role in the collection and analysis of qualitative data and so it was important that I designed a study that allowed systematic analysis. Research Questions 2 and 3 were both answered through analysis of data using systematic strategies. I made sure that subjectivity on my part was further minimised since for the VSRD with both children and teachers, they had ownership of the clips that we would discuss – I was not responsible for selecting them. This is different to other studies (*eg* Morgan, 2007; Robson, 2016) where the researcher selects the clip, or chooses what to video from the outset.

The VSRD with teachers and children was conducted in an informal, supportive manner. Any dialogue is a 'managed verbal exchange' (*eg* Newton, 2010:1), and I know that my communication skills were very important in this aspect of the study. I needed to listen attentively, establish a rapport, and probe and question appropriately. I acknowledge that I wanted to maintain a supportive and trusting relationship with both teachers and children – and so there were times when I did not ask certain questions about practice – perhaps I would have seen more evidence of the critical level of reflection from the teachers if I had asked different questions. I knew teachers and children better by the time I made my second visit to school – and in my role as researcher I had also grown in confidence and experience - so I may have asked better questions, probed more deeply or supported the professional dialogue more effectively on that visit.

One limitation of the study is that I could not mitigate fully against the control and intervention children experiencing some similarities in the teaching across the course of the year. In Lucy and Ceri's school, numbers were such that the control and intervention groups came from the same class, and so Lucy and Ceri taught all of the children. In the other four schools the control children came from other classes in the school. Other teachers in the schools did not use VTRs, although all of the teachers in my study used them as part of their normal classroom practice. This was a practical decision – most of the teachers operated their FP classes on a carousel of activities and the VTRs were sometimes embedded as one of these – but also an ethical decision – as Olivia said '*I can see that these are good – they are doing what they say on the tin and so it wouldn't be fair to only do them with six children*.' So, regular use of VTRs and the way in which the teachers' pedagogy of teaching thinking may have altered during the course of the study as their awareness of thinking changed. However, no children in any of the control groups undertook VSRD with me when I visited. None of the other teachers in the schools undertook the VSRD process with me. Therefore, the VSRD process itself was the unique factor in the study for both the intervention children and the teachers.

I am also aware that the nature of the area of learning and task set may have impacted on what I observed, and what took place. For example, Lucy's second lesson was based on recalling mathematical facts and so it is not surprising that there were still a high number of IRF exchanges, and it would be a mistake to think that these are not useful in certain contexts. Since rapid recall of mental mathematics was the intended outcome of the session, quick closed questioning may have been the most appropriate questioning style to adopt. However, my discussion is limited by the questions that I asked - I could have discussed with Lucy is whether she thought that this activity would promote metacognition and how, and whether on reflection she felt that the lesson had achieved its aims – and I did not ask this.

In terms of the standardised cognitive tests, I only used a small number from the BASII battery, and am aware that there are many other cognitive tests that I could have used in place of these. However, these were quick to administer, involved practical and engaging tasks, and I had been trained to use these by an experienced researcher to minimise subjectivity.

Another strength of the research lies in the use of VSRD to engage young children in the study. In fact, other researchers in the early years may be interested in the pragmatic approach that I took to data collection during the action research. FP classrooms are busy places to carry out observations, and I found that the combination of video, field notes, lesson transcripts, quantitative data (*eg* standardised scores), drawings and dialogue resulted in rich data. I went beyond drawing conclusions only from observation, and also used the VSRD process to gain a fuller picture of the classroom practices and to ensure that all participants were involved. This data was time consuming to collect and analyse but was worth the investment of time as it provided a detailed account of each teacher's journey through the study, as well as helping me to hear the voices of the children in different ways.

7.3 Reflections on my research experience

Undertaking a PhD has been a process of learning to be a researcher, and in this process there are a number of key features that I will refine and consider in future. For me, the opportunity to undertake research into an area

that I am excited and enthusiastic about has allowed me to explore, reflect upon and deepen my understanding. In terms of my own professional learning and development, it is clear that undertaking a PhD is a process that has benefited me in many ways. I detailed this in a paper (Lewis, 2017), and from this I have summarised some of the benefits below. Luff and Aaronricks (2016) suggest that effective professional development has nine elements, and Table 7.1 indicates how I have tried to address these elements::

Element **(after Luff and Aaronricks, 2016)**	Personal experience
Aspirational	Professional development has allowed me to see myself as a 'researcher', moving from novice to more experienced. It has developed my expertise and enthusiasm in an area of interest and has had impact on my own teaching.
Proactive	I had to take the initiative and seek out teachers to form key subjects of my research. I had to identify and prioritise time to undertake the enquiry. I identified conferences and journals in which to disseminate my work.
Individualised	This project focused on an area of my work that I was passionate about, and about which I wanted to learn more. The enquiry was tailored to questions I wanted to find answers to, and which impact on my role in the university.
Collaborative	I worked with six early years professionals as co-researchers, sharing and shaping our understanding.
Ongoing	The research took an academic year, the dissemination has been ongoing, and the focus remains an area of my research interest.
Well-led and managed	I had to set timelines and work schedules. I had to meet deadlines and design and evaluate the project. I had to maintain communication with the teachers throughout the project.
Reflective	I have learnt from reflecting on my own knowledge, beliefs and values through my research. Discussing individual understandings with others and reflecting on my own understandings has been invaluable.
Praxaelogical	My project centred on classroom-based action research, and allowed me to connect theory and practice more powerfully than I would have done without the opportunity to undertake research.

Table 7.1 Elements of effective professional development and my own experiences. Source: Lewis (2017:166)

My study was framed within a socio-constructivist framework, and this is reflected in how I have experienced the process of undertaking this degree. For example, my supervision tutorials and taught seminars I have attended have provided the opportunity to discuss, question and challenge thinking.

My supervisors have provided me with opportunity to reflect upon and clarify my thinking throughout the study. The design of my study meant that I worked with a collaborative community of like-minded teachers, and I spent sustained periods of time back in schools. This was a privilege. Because my study involved working with the same group of teachers and pupils over the course of an academic year, I did form professional relationships with these individuals. This is not uncommon (*eg* Hammersley and Atkinson, 2007), but I was careful not to let this become a source of bias. I became increasingly aware that what I thought I might see was not always evident – for example in Teacher Network Day 1, Mel indicated that she felt she had 'a lot to learn' in terms of developing thinking.

Yet during the classroom observations, the analysis revealed that Mel frequently encouraged extended dialogue and there was evidence of several metacognitive behaviours on both visits. Using the frameworks of teacher behavior and metacognition that were designed during the study allowed me to make my analysis transparent, and consistent, and removed subjectivity as much as possible.

The impact of undertaking this study has gone beyond my own knowledge, and has had an effect on my professional practices in my role as a senior lecturer. My own experience has allowed me to gather and disseminate findings to students, colleagues and the wider academic and professional community in a number of ways. These include developing lecture content, writing peer-reviewed and professional articles, giving conference presentations and delivering school-based seminars. Clearly these are all valuable professional development opportunities for me, but also contribute to the wider knowledge base relating to teaching thinking skills in the Foundation Phase. My students have used some of the thinking materials that I explored in my research successfully, and one of the key research tools

– VSRD - is now being used to support my own trainee teachers in their own development, and new colleagues in their induction. Furthermore, I can act as a role model for my students – Lunenberg *et al* (2007) suggests this is crucial – we send important messages about lifelong learning and the value we place on for example, enquiry, through our actions. Subsequently I have presented at a number of conferences (*eg* Lewis, 2016a; Lewis, 2016b) to disseminate these materials and approaches more widely.

7.4 Suggestions for further research

There are a number of areas of further research that could develop from my findings, and in this section I outline six possible opportunities that would allow me to build upon this study and contribute further to this field.

1. There is scope to continue to explore strategies to develop teachers' reflective practices.

   Whilst my study indicates that VSRD was, for the teachers involved, perceived to be a valuable tool for their development, the small scale of my study, and the lack of a quasi-experimental approach means that further research could be undertaken to compare VSRD with other reflection techniques for teacher development.

2. There is no doubt from the review of literature that metacognition is a much researched area – however, because of the complexities of metacognition there remains scope to research this further. There is room for instance to explore in greater detail the impact of VSRD on metacognitive development. Another possible direction could be in considering the extent of metacognitive behaviours in different aspects of FP provision. Although the children did choose to make videos of children thinking in the enhanced and continuous provision as well as during adult-led tasks, systematic exploration of children's behaviour in child-led as well as adult-led activity could be undertaken.

3. Whether VSRD could also support ongoing assessment and documentation of children's learning (since the process of VSRD may

reveal ideas, knowledge and understanding not apparent from observation alone) could be explored. Within the FP ongoing assessment and strategies to make learning visible are important elements of classroom practice – research could explore the contribution VSRD could make to this.

4. I did not attempt to measure the effectiveness or quality of the teachers' lessons. Although there are numerous checklists available to researchers (*eg* the Quality Learning Instrument, [QLI], Walsh and Gardner, 2005; Sustained Shared Thinking and Emotional Wellbeing Scale,[SSTEW], Siraj *et al*, 2015), I felt that as I wanted to establish a co-research framework using these would not be appropriate. I did not want to appear to be making judgements on the lessons as I felt that this would alter how the teachers viewed my role, and possibly how they behaved.

   However – in the future it would be interesting to explore whether VSRD and VTRs make an impact on the quality of teaching, perhaps with the teachers using such scales to self-reflect on their perceptions of the quality and nature of their provision.

5. The teachers did not observe one another in the classroom. This might be a future direction to take, because of the recognised impact of professional learning communities and models of joint teacher learning (*eg* Hargreaves, 2012). My study relied on teachers discussing their ideas and sharing practice during Teacher Network Days, which happened away from the classroom. This was valuable, but further research could extend to in-school collaboration - for instance research design could involve Lesson Study (*eg* Dudley, 2014), exploring the impact of VTRs on learners with teachers working in triads observing teaching and learning.

6. Furthermore, although researchers such as Walsh and Gardner (2005) and Malaguzzi (1998) emphasise the importance of the learning environment on learning as well as children's actions and pedagogy, I did not examine the physical classroom learning

environments in great detail as part of my research. I did notice changes in the nature of displays, however this is an area that could be further researched. The use of an instrument such as the QLI (Walsh and Gardner, 2005) could be used to examine the learning environment in more detail, and to explore how teachers may alter this during an intervention such as the one undertaken in this study.

7.5 Education in Wales: the current situation

Although not linked to a research question specifically, I would like to conclude this chapter by outlining how, given the recent changes to the education system in Wales during the time I have spent completing my study, the findings are relevant to policy makers.

As discussed in Chapter 1 the education system in Wales is under considerable review, and the publication of '*Successful Futures: Independent Review of Curriculum and Assessment Arrangements in Wales'* ('The Donaldson Review', Donaldson, 2015) and subsequent WG Curriculum for Wales (2015) gives a clear indication of the direction of travel. Within this document, whilst there are only four specific mentions of 'thinking skills' (p37; 51; 91), metacognition is highlighted specifically in the information provided about pedagogy – in particular the importance of encouraging children to take responsibility for their own learning is referred to explicitly (p69 – 70). The report also refers to 'wider skills', which include:

- critical thinking and problem solving
- planning and organising
- creativity and innovation and
- personal effectiveness – reflecting on and understanding oneself and others, behaving in effective and appropriate ways; being an effective learner (Donaldson, 2015:42).

These wider skills clearly relate to the thinking skills and metacognitive behaviours that I synthesised from the literature, and which formed my framework for analysis in Chapter 5 and 6. The fact that my intervention saw increases in these behaviours, as well as an indication of some significant cognitive developments, shows how the content area of my study has

relevance to the recommendations and key messages within the Donaldson Review. Other connections between the Review and the themes underpinning this study include the relationship to the statement that:

> 'In order to fully engage with learning, children and young people require rich, stimulating environments where they can explore and experiment with ideas and resources, collaborate actively with their peers and make dynamic connections with a clear sense of purpose to construct meaning' (Donaldson, 2015:66).

The behaviours identified within the action research phase of the study (see Table 5.3) included collaboration, making connections, expressing ideas, reflecting on their thinking and decision making. The teachers identified these at the start of the study, and later, on reflection refined them further. These behaviours, and explicit reflection on them became more prevalent as the study progressed.

As such, I believe that the findings from my study are timely and relevant – they offer suggestions for professional development, which has direct links to the aspects of pedagogy teachers will be expected to develop in the future. The action research element of my study took place in six different Foundation Phase settings.

As mentioned in Chapter 1, despite significant financial (and practitioner) support for the establishment and principles of the Foundation Phase in Wales, there is significant variation in how effectively this is implemented (*eg* Davies *et al*, 2013). The Independent Stocktake of the Foundation Phase (Siraj, 2014) recommended that the Welsh Government set up a Foundation Phase Expert Group, tasked with developing a ten-year plan. This Expert Group, drawing upon the Stocktake and the WISERD Evaluation of the Foundation Phase (*eg* Davies *et al,* 2013), identified professional learning as one of the areas of FP provision requiring attention. My study presents findings directly relating to how my intervention supported a group of FP teachers in their own professional learning and so has direct relevance to this recommendation.

In November 2016, the Foundation Phase Action Plan was published (Welsh Government, 2016). Within this plan pedagogical principles that are seen as essential for underpinning effective provision are outlined (p8). These principles are also relevant to the findings of my study. The following table indicates how these principles can be mapped against the elements of my study.

FP Action Plan (2016): pedagogical principles should focus on:	My Study: offered opportunity for:
The child:	
exercising choice, participating, being involved, initiating and directing their own learning over a period of time	VSRD offered opportunities for children to choose episodes to film; offered them ownership of which episodes to discuss and which allowed them to direct the focus of discussion.
being appropriately challenged and supported by the adults	VTRs offered open ended, challenging activities within a context of intentional pedagogical activity.
The learning environment:	
which enables children to apply, use, consolidate and extend their skills across Areas of Learning and Experience	VTRs and VSRD allowed children to apply their thinking skills across the FP curriculum.
that includes opportunities for children to be physically and cognitively active as well as having 'quiet time' for contemplation and thought	VTRs and VSRD offered opportunity to develop behaviours relating to thinking (see Table 5.3), as well as offering chance to reflect on the activities.
Practitioners:	
who prompt the child to think about and reflect upon their learning experiences in order to extend their learning when appropriate	VSRD encouraged both the teachers and the children to reflect on their learning
who look to continuously develop themselves professionally, sharing and learning from excellent and effective practice and working with other practitioners across Wales and further afield.	The structure of the action research phase encouraged the teachers to share and develop their practice within a constructive and supportive development context. Whilst they were co-researchers, my role enabled them to learn from effective practice that they were previously unaware of.

Table 7.2 Mapping FP pedagogical principles against opportunities offered by my study

As such, I feel that the findings from my study are timely and relevant to current developments within the education system in Wales.

Conclusions

In this chapter, I have outlined the overall findings from my research, indicated the limitations of my study, the relevance to the current educational landscape within Wales, and made suggestions regarding further research that could now be undertaken to build upon my findings. I have commented on the three main contributions that I feel my work has made to the existing body of knowledge within this field. In particular these have related to how VSRD has had significant contribution as a research tool, as a pedagogical tool and as a support for professional learning.

The following summarises this contribution:

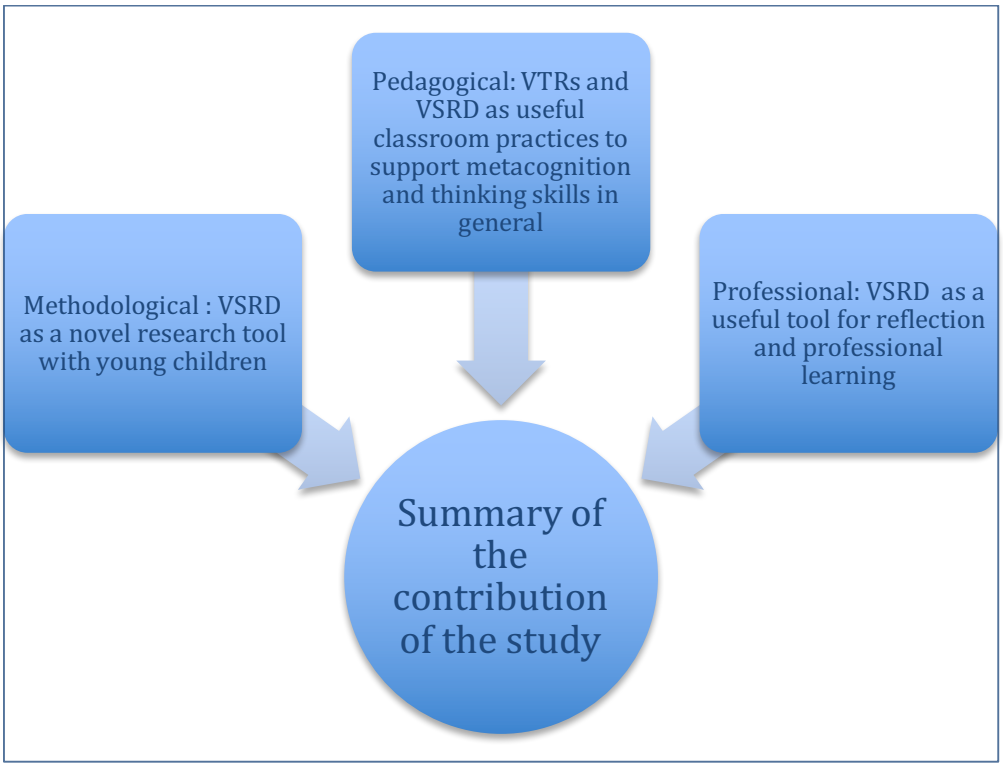


Figure 7.1 Summary of the contributions of this study

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Appendix 1

Copy of University Ethical approval form for my study:

RC 44108-09

SWANSEA METROPOLITAN UNIVERSITY
PRIFYSGOL FETROPOLITAN ABERTAWE

MPhil PhD
FT PT
For Office Use only

APPLICATION TO REGISTER FOR A RESEARCH DEGREE OF THE UNIVERSITY OF WALES

Form RD1

This form should be wordprocessed or typewritten.

REGISTRATION SOUGHT: * Doctor of Philosophy (PhD)
* PT

THE STUDENT

1 SURNAME LEWIS FIRST NAME(S) HELEN ELIZABETH

3 PRESENT POST AND PLACE OF WORK
Senior Lecturer, School ITET, Faculty of Education and Training, Trinity College, Carmarthen

4 SOURCE OF FUNDING
Employer will fund this degree.

STUDENT BACKGROUND

5 QUALIFICATIONS GAINED

Name of Institution	Degree Title	Main Subjects	Class of award	Date	Awarding Body
London Guildhall University	BSc (Hons)	Psychology	1st	1993	London University
Institute of Education, London	PGCE	Primary Teaching		1994	London University
University of Wales, UWIC	MA Ed			2002	University of Wales

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6 **REFEREES** (Name, address, post, place of work, relationship to candidate)

1) Dr D V Jones
Head of School of ITET, Trinity College, current line manager.

2) Dr M R Jones

7 **TRAINING AND EXPERIENCE** (Please provide details of any work experience or other activities (with dates) relevant to this application, and of any research papers, written reports, publications, etc)

PREVIOUS EMPLOYMENT:
Primary school teacher, Lewisham London, 1994 -1999
Numeracy Consultant, ESIS 1999 – 2006

VISITING LECTURERSHIPS:
Institute of Education, University of London; Primary PGCE, Mathematics Module 2000-2002
Bridgend College, School of Education Certificate in HE (Early Years) Mathematical Development Module 2001 – 2004

ADDITIONAL TRAINING:
Study Visit – Reggio Emilia Institute and preschools, Stockholm, Sweden October 2008
King's College London *Let's Think/ Let's Think Through Maths Provider Training* 2005
British Computer Society *European Computer Driving Licence* 2004
King's College London *Professional Development Programme for Primary Cognitive Acceleration in Mathematics Education* 2004
Certificate in Professional Development in Education *Strategic Planning and School Improvement*. SIHE 2002
Certificate in Professional Development in Education *Developing Leadership* SIHE 2002

PUBLICATIONS
Lewis, H. (2003) *'Using an interactive whiteboard in the daily mathematics lesson: implications for teaching and learning.'* UWIC Education Papers 2003 (2) 41-53

ADDITIONAL DOCUMENTS
'Our School Our Council' Working party ESIS 2006
'Progress in Learning Mathematics: Assessment Materials KS1 to KS3' Editor ESIS/CCBC 2005
'Developing Key Skills Across the Primary Curriculum' Co-contributor ESIS 2004

VIDEO / MEDIA RESOURCES
'Numeracy In Action' 1998 Exemplar lesson filmed and included on video.
Oxford:Hamilton Mathematics/ London: National Numeracy Strategy
'The Learning Zone: Numeracy Hour' 1999 Featured as an exemplar teacher for this BBC programme.
'The Effective Teaching of Numeracy in Primary Schools' 2001 Four County Boroughs, edited and produced video training material.

PREVIOUS ACTION RESEARCH
2002 –2003 Network Manager *'Let's Think in Key Stage 1'* awarded General Teaching Council Wales network grant (£11,000)
2003 –2004 Network manager *'Developing P-CAME materials in Key Stage 2'* Awarded GTCW grant (£11,000)
2003 –2004 Network Manager *'Numicon in Early Years and KS1'* Awarded GTCW grant (£5,000)

CURRENT RESEARCH INTERESTS
2008 ongoing Welsh Education Research Network Group Bursary *'An investigation of the affordances of ICT for the development of effective pedagogy in mathematics and science classrooms.'*
2008 ongoing Becta funded project *'Improving pedagogy with ICT, by using technology to support practitioners' professional development.'*
2008 awarded WERN Group Bursary award.

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THE RESEARCH PROPOSAL

8 TITLE OF THE RESEARCH

An investigation of thinking skills and emergent metacognition in children in the Foundation Phase in Wales.

9 AIM OF THE PROPOSED INVESTIGATION

The investigation would be an exploration of young children's thinking, and of how thinking is being taught in the Foundation Phase in Wales.

The proposed research aims would include:

- to explore how the teaching of thinking is being approached in the Foundation Phase in Wales;
- to analyse the extent and character of young children's metacognition;
- to investigate to what extent young children are aware of their own thinking;
- to investigate the affordances of Video Stimulated Reflective Dialogue (VSRD) as a research tool to explore young children's thinking in the Foundation phase;
- to investigate whether VSRD would reveal emergent, underlying metacognitive processes;
- to make recommendations about how thinking can be taught effectively in the Foundation Phase.

2008 saw some major changes to the curriculum in Primary schools in Wales, in both Key Stage 1 and 2. Over the next three years the Key Stage 1 curriculum will be replaced by the Foundation Phase curriculum. This is based upon seven Areas of Learning. 'Thinking' is generally recognised as an important part of the education process, and is referred to within these seven areas of learning. Additionally, 2008 saw the publication of the non-statutory 'Skills Framework for 3 to 19 year olds' by the Welsh Assembly Government. This framework underpins the Foundation Phase, and identifies thinking as one of the four essential skills to be addressed. Practitioners are required to provide opportunity for children to acquire, develop and refine these skills, across the curriculum, and in a variety of contexts.

However, defining thinking may not be easy – Burden (1998) believes that the term can have a 'multitude of meanings'. Thinking can be creative, or logical or critical, and can happen in varied contexts for varied purposes. Certain authors suggest that thinking may be different in different subject areas, for example Carre (in Burden op cit) suggests 'scientifically savvy citizens' need to develop particular problem solving skills. However, it is possible that certain key qualities are features of effective thinking regardless of what the context or subject may be. One aspect of thinking generally considered important is that of 'metacognition'. One definition of this term is made by Flavell who regards it as 'that thinking about your own cognition that might help you learn something' (in Shaughnessy et al 2008).

The development of metacognition is of major significance for learning – meta-studies of interventions based on metacognition, report improved learning with large effect sizes (Haller et al, 1988; Hattie et al, 1996). Different learning contexts may all support meta-cognition, allowing children to have opportunity to experience and practise metacognitive skills (Whitebread et al, 2007).

The association between some aspects of metacognition and reflected abstraction has led to debate about whether young children are able to think metacognitively (Georghiades, 2004). Flavell (1999) argues that even children as young as 3 years old have awareness of self, although it may be the case that this ability to think and act independently is underestimated by practitioners. This could be due to difficulties associated in investigating such processes with young children. Although many researchers accept the view that metacognition does not emerge until around 8 years of age, Winnie and Perry (in Whitebread et al, 2007) suggest that there may be reasons why it is difficult to demonstrate such skills, although they may be occurring. Such difficulties include young children's inability to self -report, and the crucial role that the social context may play. It may be that there are different types of meta-cognitive awareness, (Kuhn, 2000) or that more sensitive methods would reveal such abilities in young children (Whitebread et al 2007).

It is possible that young children may demonstrate emergent metacognitive events, but perhaps not be capable of demonstrating them through speech. Whitebread (op cit) developed a rating scale for observing both verbal and non-verbal metacognitive events. Such a scale would enable researchers to analyse episodes of classroom behaviour to provide a consistent data set of metacognitive events. The study would be informed by scales such as this, and would seek to develop a strategy for classroom practitioners to be able to recognise emergent metacognition.

An additional strategy that would be used is Video-stimulated Reflective Dialogue (VSRD). When used as a research tool this has shown that children can offer important insights into learning processes (Tanner & Jones 2007).

VSRD facilitated access to pupils' metacognitive processes by providing a focus for collective reflection between children and researchers. However, the video episodes had been selected by the teacher and further research is needed into whether asking children to select episodes for themselves would enable them to reflect more deeply on their thinking. Furthermore, would using such a technique offer children opportunity to explore their own thinking, and possibly to improve metacognitive processes?

Thus this project would investigate whether VSRD used by young children would reveal emergent metacognitive processes, and whether being aware of these processes can facilitate thinking amongst young pupils. Whitebread et al (2007) suggest that children between the age of 3 and 5 years are capable of metacognitive behaviour. These behaviours are supported and facilitated in peer-assisted learning contexts. Additionally, it may be that providing pupils with a meaningful context in which to work will support them in their thinking (Blote et al, in Whitebread op cit). Indeed, Goswami and Bryant (2007) suggest that whilst children do think and reason like adults, it is the metacognitive aspects that they need to develop. A variety of diverse experiences will allow these processes to emerge.

Howe and Mercer (2007) suggest that talk and social interaction among children is crucial – these play a key role in development and learning. Learning is assisted if children are encouraged to pursue goals together, to explain their understanding and if they have opportunity to attempt to reach an agreement. By providing a novel context, where children are working collaboratively with peers to identify thinking in their own learning events, VSRD may prove to be a useful tool.

The issue of how to teach thinking is not easy to address, and there is not one clearly defined strategy. Alternative theoretical approaches to the teaching of thinking have been identified, for example, enrichment, infusion or subject based (McGuinness 2005). Despite theoretical differences, several projects have demonstrated improved learning, eg: Philosophy for Children (P4C) (Lipman, 1991; Trickey and Topping, 2004), Cognitive Acceleration in Science Education (Adey and Shayer, 1994), The Mathematical thinking Skills Project (Tanner and Jones, 2000). Significantly, these interventions all included metacognition as major feature of their pedagogy, and may be suitable for use with Foundation Phase aged children. P4C is focused at primary level and Adey et al (2002) have reported the success of a cognitive acceleration programme with 5-6 year old pupils. However, the evaluation of approaches to teaching thinking is an area generally perceived to be under-researched (Taggart et al, 2005).

This investigation would aim to consider how schools in Wales are attempting to teach thinking in Foundation Phase classes. What strategies or materials are being used, and how are these being used – across the curriculum or discretely, inside the classroom or in the outdoor environment as well? Are teachers confident in their ability to 'teach thinking', and are young children aware of their own cognitive processes? Can strategies such as VSRD contribute to the development and identification of thinking when used with young children?

10. PROPOSED PROGRAMME OF WORK

Methodology

Spradley (in Hitchcock,1995) refers to two predominant modes of social research – the positivist and the interpretive (or naturalistic). The positivist view is frequently associated with a quantitative approach to research. The positivist researcher may makes assumptions about the predictablility of human behaviour, and about how such behaviour can be observed and measured. This view may hold that social sciences can be considered in the same way as natural sciences – and that through research universal laws regarding behaviour can be determined (Cohen et al 2008). However, education is a complex theme to research, and human behaviour is often elusive and irregular, influenced by factors such as historical, cultural and political environments. Education deals with people, and people are very different from the natural inanimate phenomena which positivist research approaches may better suit. When applied to educational contexts a naturalistic research strategy recognises that what happens in schools is 'made up of complex layers of meanings, interpretations, values and attitudes.' (Hitchcock, op cit).

Given that the nature of research into thinking and metacognition highlights difficulties in defining and observing such behaviour in young children, it would appear that for this study a naturalistic approach is most appropriate. Knowledge and behaviour are viewed as personal, subjective and shaped by socio-cultural factors. In this study, it would be impossible to control all variables or to devise randomly allocated control groups. Baseline data sets will be collected and analysed, but analysis will generally be interpretive. Furthermore, an action research model is also a feature of this study, and again, this approach also tends to fit better with more qualitative methods (Hitchcock op cit). Action research is about collaboration between researcher and the other parties involved, and seeks to contibute to practitioner relevant knowledge. In this study, the values, opinions and feelings of the individuals involved will all be considered and valued.

Method.
Phase 1.
Initial 7month period:
In order to investigate how thinking is being taught by schools and settings in Wales, a questionnaire would be designed to investigate the range of approaches in use. It would be piloted in England, modified and translated for large-scale use in Wales. The questionnaire would be sent to all Foundation Phase settings and schools in Wales. Approaches to the teaching of thinking skills in Foundation Phase settings would be analysed. This would provide the baseline data set for the project.

VSRD, thinking and metacognition.
The VSRD technique would be piloted with groups of Foundation Phase pupils, providing a novel application of VSRD, which has been used with adults in previous studies.

Two schools would be identified from the questionnaire analysis, ideally these would be those that were teaching thinking across the curriculum, and ideally through different methods. In each school, over the course of a week, a small group of children would be chosen to be the camera team each day and instructed to collect a total of ten minutes of video of children who were demonstrating thinking skills. Researchers would support the camera team and observe the forms of thinking that were occurring. At the end of each day, the video would be shown to the whole class in a plenary session for reflection and discussion. These VSRD episodes would be audio-recorded and transcribed for later analysis. Teachers and Learning Support Assistants would be interviewed to contextualise and triangulate any emergent themes.

A framework for analysing metacognitive events will also be devised, based upon rating scales such as Whitebread (2007) and others, and drawing upon the WAG 'plan, do and reflect' progression criteria (Skills Framework 2008).
The aim of the pilot would be to develop, trial and refine this technique of VSRD with young children.

Phase 2
Autumn and Spring terms 2009-2010.
An action research group of teachers would be set up to investigate how best to teach thinking skills in the Foundation Phase. Following on from the pilot it is anticipated that the VSRD technique and the rating scale will have been modified for use in Phase 2. The size of the group would be between 4 and 6 teachers, working in Foundation Phase settings, and all interested in the question of finding effective strategies to teach thinking. One twilight meeting would be held each half term, with teachers and the researcher collecting data via classroom observation and VSRD throughout the time period. An application would be made to the General Teaching Council of Wales for Network funding, which if approved would allow for further meetings. Teachers, pupils and the researcher would be seen as co-researchers in the project, with their opinions valuable to the study.

Phase 3
Summer 2010 onwards
Data would be analysed, written up and reviewed, with ongoing literature review.

The project would follow the ethical guidelines of the British Educational Research Association. Written, informed consent would be gained from parents and schools at the start of the project, and participants would be free to withdraw at any time in the proceedings. Video material would only be viewed by the children and teachers directly involved in the study, the researcher and her supervisors.

Proposed Timeline
Phase 1
February 2009 – September 2009

- Questionnaire design, pilot, modification.
- Modified questionnaire to be sent to all schools and settings working with 3-7 year old pupils in Wales.
- Identification of schools in which to pilot VSRD technique.
- Pilot VSRD study.
- Refinement of VSRD technique and rating scale.
- Ongoing reading of relevant literature.

Phase 2
September 2009 – May 2010

- Action research group identified to investigate research questions.
- Action research to occur in schools
- Ongoing reading of relevant literature.

Phase 3
June 2010 – thesis completion

- Analysis of data, discussion of data, write up of thesis.

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SUPERVISION ARRANGEMENTS

11 **DIRECTOR OF STUDIES (Name, qualifications, post held, place of work)**

Dr Howard Tanner Cert ED Mathematics and Physics (Durham)
BA (Hons) i, Mathematics (Open), M.Ed., (Bristol) PhD (Wales)

Director of Centre for Research in Education,
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Tel: 01792 482019

email howard.tanner@smu.ac.uk

Average teaching load (hours per week): 18

Currently supervising	M.Res. P/T 7 MPhil: P/T 0	F/T 0	PhD: P/T 6	F/T 0
Successfully completed supervisions	M.Phil 0		PhD 5	

12 **SECOND SUPERVISOR (Name, qualifications, post held, place of work)**

Dr Sonia Jones
Senior Lecturer
School of Education
Swansea Metropolitan University
Townhill Road
Swansea SA2 0UT

e-mail: Sonia.jones@smu.ac.uk

Average teaching load (18 hours per week)

Currently supervising	MPhil: P/T 1	F/T	PhD: P/T 1	F/T .....
Successfully completed supervisions	MPhil 0		PhD 0	

CONTEXT FOR RESEARCH PROGRAMME

13 **NAME OF ANY COLLABORATING ESTABLISHMENT if any (Please attach a supporting letter to this application)**

n/a

14 **RELATIONSHIP BETWEEN WORK TO BE UNDERTAKEN AT THE COLLABORATING ESTABLISHMENT AND AT THE UNIVERSITY OR ELSEWHERE**

n/a

15 **DETAILS OF FACILITIES AVAILABLE FOR THE INVESTIGATION (eg laboratory space, specialist equipment)**

n/a

16 ADVISER(S) if any (Name, qualifications, post held, place of work, research interests, previous supervisory experience)

n/a

17 DETAILS OF PROGRAMME OF RELATED STUDIES AND/OR INTEGRATED PROGRAMME OF WORK TO BE UNDERTAKEN

n/a

18 PERIOD OF TIME FOR COMPLETION OF WORK

18.1 EXPECTED START DATE OF REGISTRATION

January 2009

18.2 MODE OF STUDY: FULL-TIME OR PART-TIME

Part Time

18.3 AMOUNT OF TIME ALLOWED FOR THE PROGRAMME (hours per week average)

5 hours

18.4 EXPECTED DURATION OF PROGRAMME (in months)

84 months

19 STATEMENT BY THE APPLICANT

I wish to apply for registration for Ph.D. on the basis of the proposals given in this application. I confirm that to the best of my knowledge the information I have given is correct.

I have read and understood the University's Regulations relating to Programmes of Research.

Signed ..... Date 17/2/09

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20 RECOMMENDATION OF THE SUPERVISORY TEAM

We support this application and believe that the candidate has the potential to complete successfully the programme of work proposed.

We recommend that the applicant be registered as a candidate for the University's research degree.

Signed ..... Date 17/2/09

Name DR. HOWARD TANNER

Signed Sonia Jones Date 17-2-09

Name Dr Sonia Jones

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21 RECOMMENDATION OF THE DEAN OF FACULTY

I confirm that this application has been submitted to independent scrutiny by the Faculty Research & Postgraduate Committee and the following requirements have been met (**please tick**):

- ✓ a the student is currently enrolled as a student of the Institute;
- ✓ b any referee(s) required by the regulations has/have been consulted and the reference(s) is/are attached;
- ✓ c the proposed supervision is satisfactory;
- ✓ d the supervisors have been closely involved in the preparation of the application and the clarification of the structure of the proposed project;
- ✓ e where collaboration has been arranged, a letter from the collaborating establishment is provided;
- ✓ f the conditions of work are satisfactory and the necessary resources are available;
- ✓ g an adequate programme of formal study or course of reading has been proposed;
- ✓ h thought has been given to any possible need for confidentiality, and a topic chosen which is not likely to pose problems with the collaborating establishment; +
- ✓ i any financial support from the faculty detailed in Section 4 is available;
- ✓ j ethical issues have been considered and any necessary ethical approval is being sought;
- ✓ k any questions regarding the candidate's competence in the English language have been considered and, where appropriate, dealt with.

I support this application and recommend that the applicant be registered as a candidate for the University's research degree.

Signed ..... Date 24/2/09

Name K JONES Date 24/2/09

\+ Where the need for confidentiality has been identified, a letter of explanation is required.

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22 RECOMMENDATION OF THE INSTITUTE RESEARCH & POSTGRADUATE COMMITTEE

* Approved
* Referred back to Faculty

Signed ..... Date 17/3/9

Name K. REDI Date 17/3/9

Appendix 2

Associated Publications

Academic Articles:

Lewis, H. (2017) 'Professional development for teacher educators: the missing link? *Wales Journal of Education* 18(3)

Lewis, H. (2013) *Developing a shared culture of thinking in early years settings* The Welsh Journal of Education (16) 37-54

Tanner, H., Jones, S, Lewis, H. (2011) *Metacognition in the Foundation phase: Using VSRD to help young children talk about their thinking,* The Welsh Journal of Education 15 (1) 66-80

Book reviews:

Lewis, H. (2017) Review of Video Enhanced Reflective Practice: Professional Development through Attuned Interaction Edited by Kennedy, H., Landor, M., Todd, L. *Wales Journal of Education* vol 18.3

Conference papers:

Lewis, H. *'Lights, cameras and INTER-action: using video reflection to develop early years pedagogy'* Paper presented at Early Childhood Education Research Association (EECERA) 26th Annual Conference 'Happiness, Relationships, Emotion and Deep Level Learning', Dublin: Eire August 2016

Lewis, H. "*Mindset and metacognition: simple and effective strategies to develop thinking in your classroom'* Seminar presented at the 8th annual Thinking Schools International conference Swindon: England 2016

Lewis, H. '*Simple and effective strategies for embedding metacognition in the classroom'* Seminar presented at the Thinking Schools International inaugural Welsh conference, Cardiff: Wales, 2016

Lewis, H. ' *'What's worked well – strategies to develop thinking in your classroom'* Seminar presented at the 7th Annual Thinking Schools International conference, Swindon: England 2015

Lewis, H. '*Teacher education for thinking. Developing positive dispositions to learn: a problem-based learning approach in teacher education.* Paper presented at the TA Teachers Conference Creativity and Thinking Skills in Learning, Teaching and Management Riga, Latvia: Sept 2014

Lewis, H '*Thinking Ahead: the use of Visible Thinking Routines to promote young learners' thinking*' Paper at 16th International Conference on Thinking, Wellington,NZ 2012.

Lewis, H. '*Exploring Young Children's Thinking* ' BERA (Early Career Researcher) Conference, London, September, 2011.

Lewis, H. *'Using Video Stimulated Reflective Dialogue in the Foundation Phase'* 15th International Conference on Thinking, Belfast, 2011.

Lewis, H. '*Exploring Young Children's Thinking Skills: Feedback on a small scale project*' Welsh Education Research Network Colloquium, Cardiff, 2009

Lewis, H. '*Personal Reflections on the CAME approach'* King's College Cognitive Acceleration in Mathematics Education Annual Conference, Cardiff, 2004

Professional Papers include:

Grigg, R. and Lewis, H. (2015) 'Fostering Deep Thinking in the Primary Classroom' School Leadership Today, Issue 6:6.

Lewis, H., Grigg, R. (2015) 'See, Think and Wonder: making thinking visible in the primary classroom' Creative Teaching and Learning 5.3 9-13.

Grigg,R., Lewis,H. (2014) 'Order Your Thoughts' Teach Primary 7(8) 57-8.

Appendix 3

Copy of Questionnaire discussed in Chapter 3 and 4.

Thinking Skills in the Foundation Phase - Questionnaire

Thank you for taking the time to complete this questionnaire.
The results will be used to gain a picture of how thinking skills are being taught across schools and settings in Wales. This information will help to form part of an action research project into how thinking skills can be taught most successfully. Please feel free to add any relevant comments under each question if you wish.

1. Please tick which best describes your school or setting:

Private pre-school	Nursery	Nursery and Infant	Infant no nursery	Junior	Primary (N, I, J)	Primary (I, J)	Special	Voluntary Aided (please state N,I etc)	Independ. (please state N,I etc)	Other (please specify

2a. Are you responsible for co-ordinating/ managing Thinking Skills in your school? *Yes/ No*

2b My role in the school is (please tick ONE):

Class teacher	Middle manager eg FP co-ordinator	Deputy or Assistant Head	Head teacher	Other (please specify)

3. Please tick approximate pupil numbers in your school or setting:

Less than 50	51 – 100	101 – 150	151 – 200	201-250	251+

*4. Please tick which **one** document **most** influences planning in **each** year group:*

	Foundation Phase Framework	National Curriculum	Other (Please specify)
Nursery			
Reception			
Year 1			
Year 2			
Year 3			

5. Please rate the priority which your school places on the teaching of thinking skills:

No priority	Low priority	Neither high nor low priority	Some priority	High priority

6. Please tell us how frequently thinking skills are taught in your school.

	Daily	Weekly	Once a half term	Once a term	In an intensive block (please elaborate)
Nursery					
Reception					
Y1					
Y2					
Y3					

7. Please tick the box which best describes how thinking skills are taught in your school

We don't teach thinking skills at all	In specific thinking skills lessons	In all or nearly all subjects across the curriculum	In specific subject lessons (please state which subjects)	In a combination of ways

8. Please tell us who teaches thinking skills – tick as many as appropriate

	Class teacher	Another teacher	Higher Level Teaching Assistant	LSA or equivalent	Visiting teacher	Other (please specify)
Nursery						
Reception						
Year 1						
Year 2						
Year 3						

9a. Please tick the number of hours of thinking skills training your school has received?

Type of training	3 hours or less	4-6 hours	7-20 hours	More than 20 hours
In-school led by other staff members				
In-school led by LEA adviser				
In-school led by external consultant				
Out of school LEA INSET				
Out of school external consultant INSET				
University/HE course or module				

9b Roughly how many hours training in thinking skills have you personally received? _____ *hours*

10. Who has received training on thinking skills in your school? Tick as many boxes as apply.

All class teachers	Class teachers and other teaching staff	Governors	Specific members of staff (please specify)	Other (please specify whom)	No-one

11. Do you follow a particular thinking skills programme?
Please tick all that are used in school.

Name of materials		Year groups used in				
		N	R	Y1	Y2	Y3
	Welsh Assembly Government documentation					
	Philosophy for Children/ P4C					
	'Let's think' Early Years					
	'Let's Think'					
	'Let's think through maths' 5 – 6/6-9					
	CASE					
	CAME					
	Learning to Learn /L2L					
	Activating Children's Thinking Skills / ACTS					
	School designed (please specify)					
	Other (please specify)					
	None					

12. What factors influenced this choice? Please rank up to 3, with 1being the most important factor.

School development plan	LEA initiative	Personal interest	Word of mouth	Budget	External advice	Ease of use	Training available	Seeing it used	Other

13. What has been the impact of teaching of thinking skills in your school?

Very negative impact	Some negative impact	No difference	Some positive impact	Very positive impact

14. How effective do you think teaching thinking skills in the Early Years Foundation Phase is?

Very ineffective - wastes time	Ineffective	It makes no difference	Effective	Highly effective

15. Are there any other comments that you would like to make about the teaching of thinking skills in your school or setting, or about the teaching of thinking skills in general? Your comments are very valuable to us.

Thank you for your time, it is greatly appreciated.

Please return your completed questionnaire in the envelope provided by 1st March 2011

If you would like further information regarding this project, please contact:
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h.e.lewis@trinity-cm.ac.uk