

**Exploring Metacognitive Development in the Context of Peer
Assisted Writing using On-line and Off-line Methods**

**Maeve Gold
Doctorate in Educational Psychology
Newcastle University
May 2014**

Contents

Contents.....	ii
List of Tables.....	vi
List of Figures	vii
Declaration	viii
Acknowledgements	ix
Abstract	x
Glossary.....	xi
Abbreviations	xiv
CHAPTER 1	1
Introduction	1
1.1 Background	1
1.2 Personal context	3
1.3 Policy context.....	5
1.4 School context.....	6
1.5 Why investigate metacognition?	7
1.6 Context for metacognition.....	12
1.7 Rationale for the programme	14
1.8 Pilot Arrangements.....	15
1.8.1 Pilot PAW programme	16
1.8.2 Review of pilot.....	17
1.8.3 Analysis of the video tapes, PVTs and TAPs	19
1.9 Structure of the PAW programme.....	19
1.10 Training issues	20
1.11 Specific training	21
1.12 Summary	21
CHAPTER 2	23
Literature Review	23
2.1 Introduction	23
2.2 Literacy – metacognition and children’s writing	24
2.2.1 Metacognitive aspects of writing	25
2.3 Development of metacognitive theory	26
2.3.1 Hayes and Flower.....	27
2.3.2 Inclusion of metacognitive processes.....	28
2.3.3 Support for metacognitive processes	28
2.3.4 Notion of agency	29

2.4 Cognition.....	30
2.5 Metacognition	31
2.5.1 Brown’s contributions.....	36
2.5.2 Veenman and colleagues.....	38
2.6 Developmental nature of metacognition	40
2.7 Intellectual ability.....	42
2.8 Generality versus domain specificity of metacognition.....	44
2.9 Peer Assisted Learning.....	45
2.10 Scaffolding	46
2.11 Multiple reviews.....	47
2.12 Research into Peer Assisted Writing.....	49
2.12.1 Sutherland and Topping (1999)	49
2.12.2 Nixon and Topping (2001).....	51
2.12.3 Yarrow and Topping (2001)	53
2.12.4 Duran and Monereo (2005).....	54
2.12.5 Larkin (2009)	56
2.13 Implications of understandings of metacognition for classroom practice	59
2.14 Summary	61
 CHAPTER 3	 65
 Methodology	 65
 3.1 Introduction	 65
3.2 Previous research in the field	66
3.2.1 PAL studies	66
3.2.2 Metacognitive studies.....	68
3.2.3 PAW studies.....	71
3.3 Methodology	74
3.3.1 Action research.....	77
3.3.2 Case study design.....	80
3.4 Issues of quality.....	83
3.4.1 Reliability and validity concerns.....	84
3.4.2 Ethical issues	86
3.4.3 Reflexivity.....	88
3.5 Sample.....	89
3.5.1 Sample selection.....	89
3.5.2 Composition of pairs	90
3.6 Data collection tools.....	91
3.6.1 On-line and off-line approaches.....	92
3.6.2 On-line	96
3.6.3 Think Aloud when Prompted.....	99
3.6.4 Design of TAPs	100
3.6.5 Procedure with TAPs	100
3.6.6 Video recording.....	101
3.6.7 Design of video protocol.....	101
3.6.8 Procedure.....	102
3.6.9 Off-line.....	102

3.6.10 Design of PVTs	104
3.6.11 Procedure with PVTs	106
3.7 Further triangulation.....	107
3.7.1 Writing assessment.....	107
3.7.2 Design	108
3.7.3 Procedure.....	108
3.7.4 Word counts	108
3.7.5 Teacher interview	109
3.7.6 Diary.....	110
3.8 Summary	111
 CHAPTER 4	 112
 Analysis and Results	 112
4.1 Introduction	112
4.2 Demographics	113
4.3 Coding scheme	114
4.3.1 Introduction	114
4.3.2 Developing the coding scheme	115
4.3.3 Familiarisation with the data	115
4.3.4 Unit of analysis	117
4.3.5 Winnowing.....	117
4.3.6 Revised metacognitive codings.....	122
4.3.7 Further development of coding scheme	124
4.3.8 Analysis of case study pair.....	124
4.4 Results of PVTs and TAPs.....	133
4.5 Evaluation of class teacher writing assessments	136
4.8 Teacher interview and diary	147
4.9 Data combination qualitative/quantitative analysis	149
4.10 Summary of key issues.....	152
 CHAPTER 5	 156
 Discussion	 156
5.1 Introduction	156
5.2 PAW as a context for metacognition	159
5.3 Information management	168
5.4 Planning.....	172
5.5 Declarative knowledge of metacognition.....	175
5.6 Development and monitoring progression of metacognition.....	181
5.7 TAPs, PVTs and video recording.....	182
5.8 Review of methods and limitations of the study	187
5.9 Summary	191

CHAPTER 6	195
Conclusion	195
6.1 Introduction	195
6.2 PAW as an essential context for developing metacognition	196
6.3 Implications for classroom practice	201
6.4 Implications for professional practice of an educational psychologist	203
6.5 Implications for future research	207
6.6 Concluding thoughts	208
BIBLIOGRAPHY	211
APPENDICES	234
Appendix 1 PAW flowchart (Topping, 1995).....	235
Appendix 2 My PAW programme	236
Appendix 3 VCOP prompt cards	237
Appendix 4 Main intervention timetable	238
Appendix 5 Parent consent form.....	239
Appendix 6 Pupil progress report	240
Appendix 7 Example of marking criteria.....	241
Appendix 8 Example of pupils' work	242

List of Tables

Table 1.1	Story titles used in the PAW programme	19
Table 2.1	Metacognitive coding scheme based on Brown and Flavell	38
Table 2.2	Veenman and Verheij's (2001) definitions of metacognitive skilfulness	39
Table 2.3	Larkin's (2009) categories and comparisons	58
Table 3.1	Summary of peer assisted learning studies	68
Table 3.2	Summary of metacognitive studies	70
Table 3.3	Peer assisted writing studies	72
Table 3.4	VCOP prompts given to pupils as they were writing their stories	100
Table 4.1	Profiles of the pupils in the PAW group	113
Table 4.2	Development of analysis	118
Table 4.3	Metacognitive definitions based on Brown (1981) and Flavell (1979)	119
Table 4.4	Definitions of monitoring and evaluation	122
Table 4.5	Illustration of difficulties analysing monitoring and evaluation	122
Table 4.6	My revised coding scheme based on Brown's (1981) and Flavell's (1979) components and my additional codes	123
Table 4.7	Definitions and examples of planning and information management	126
Table 4.8	Definitions and examples of revised planning and information management	127
Table 4.9	Refined coding scheme with examples	129
Table 4.10	Examples of comments from the PVTs	134
Table 4.11	Examples of comments from the TAPs	135
Table 4.12	Results of the writing assessments and the word count scores	137
Table 4.13	Quartile results of the writing assessments and the word counts	140
Table 4.14	Results of the writing assessments and the word count scores sorted by pre writing assessment scores	143
Table 4.15	Results of the writing assessments and the word count scores sorted by pre word count scores	144
Table 4.16	Cumulative results of the stronger and weaker pupils sorted by pre writing assessment scores	145
Table 4.17	Cumulative results of the stronger and weaker pupils sorted by pre word count scores	146

Table 4.18	Development of class teacher interview	147
Table 4.19	Examples from class teacher interview	147
Table 4.20	Examples from my diary	148
Table 4.21	Diary ideas for future PAW research	149
Table 5.1	Sharing of roles	159
Table 5.2	Expanding on ideas	160
Table 5.3	Peer feedback	161
Table 5.4	Definitions: Information management	169
Table 5.5	Examples: Scaffolding	170
Table 5.6	Examples: Planning questioning/monitoring	174
Table 5.7	Examples: Planning questioning/information management	174
Table 5.8	Example 1: Declarative knowledge of metacognition – PAW	176
Table 5.9	Example 2: Declarative knowledge of metacognition – videos, TAPs & PVTs	177
Table 5.10	Example 3: Declarative knowledge of metacognition/cognition	178
Table 5.11	Example 4: Declarative knowledge of metacognition	179
Table 5.12	Example 5: Declarative knowledge from Schraw & Dennison (1994)	180
Table 5.13	Example of prompts	184

List of Figures

Figure 2.1	Mutual theory underlying PAW and metacognition	62
Figure 3.1	Data collection tools: how they answer the research questions	91
Figure 3.2	Pupil View Template	105
Figure 3.3	Examples of prompt questions used with the PVTs	106
Figure 4.1	Results - general	131
Figure 4.2	Results - detailed	132
Figure 4.3	Results - PVTs & TAPs	133
Figure 4.4	Box plots of writing assessment	138
Figure 4.5	Box plots of word count scores	139
Figure 4.6	Bar chart of writing assessment median scores	141
Figure 4.7	Bar chart of word count median scores	141
Figure 4.8	Results of methods used to show outcomes of PAW	152

Declaration

I declare that this thesis is my own work and that I have correctly acknowledged the work of others. This submission is in accordance with University guidance on good academic conduct.

I certify that no part of the material offered has been previously submitted by me for a degree or other qualification in this or any other University.

I confirm that the word length is within the prescribed range as advised by my School and Faculty.

Acknowledgements

Thank you to everyone who made this study possible, especially to the School, teaching staff, parents and pupils and all my colleagues at work, and additionally my co-analyst.

I would also like to say thank you to my supervisors Kate Wall and Liz Todd for guiding, supporting and encouraging me during the past years. Their contribution to this incredible journey has meant so much to me.

Finally, I would like to thank my husband and daughter for all their patience and the support they have given me.

Abstract

Exploring Metacognitive Development in the Context of Peer Assisted Writing using On-line and Off-line Methods

The exploration of metacognition in the context of Peer Assisted Writing (PAW) is an under-researched area. This study aims to address this issue in one primary school. A PAW programme that included four pairs of pupils from a composite Primary 6/7 class was timetabled over five weeks. There were three sessions of approximately 45 minutes each week during which each pair of pupils jointly planned and wrote a story. The stories followed the school writing programme. Qualitative and quantitative analysis, collected using action research and case study design, is used to investigate how a PAW programme supports pupils' metacognitive and writing development. The complex issues of metacognition are examined.

On-line and off-line assessment methods tell us about metacognitive outcomes of PAW. The results show that the different assessment methods (Video Recording of the PAW sessions, Think Aloud when Prompted and Pupil View Templates) reveal a range of metacognitive outcomes that together help to complete a fuller picture of pupils' thinking and learning abilities and social emotional well-being.

The results evidenced that PAW fosters metacognition. Qualitative results suggested that writing is a complex, metacognitive process and it was necessary to extend the range of sub-components of *information management*. The results confirmed the views that development of knowledge of metacognition and regulation of metacognition are mutually dependent on each other and also that development of regulation of metacognition can take place in early primary school. Additionally, there was confirmation for research that proposed writing as 'applied metacognition'. Quantitative analysis indicated that pupils engaged in PAW made substantial progress and that PAW particularly benefited pupils with weaker writing skills.

Glossary

Metacognition Flavell (1993, p.150) defined metacognition as ‘as any knowledge or cognitive activity that takes as its cognitive object, or that regulates any aspect of any cognitive activity’. Zhang (2010, p.481) wrote that ‘knowledge of cognition refers to how much learners know about themselves, their strategies and situations under which these strategies are most useful’. On the other hand ‘regulation of cognition refers to how well learners plan, implement strategies, monitor and evaluate their learning’. Knowledge of cognition is further subdivided into three component parts and regulation of cognition is subdivided into five component parts which are defined below (Flavell, 1987).

Metacognitive components and definitions

Knowledge of cognition

Declarative knowledge	Knowledge about one’s skills, intellectual resources and abilities as a learner
Procedural knowledge	Knowledge about how to implement learning procedures (e.g. strategies)
Conditional knowledge	Knowledge about when and why to use learning procedures

Regulation of cognition

Planning question	Seeking information with regard to future arrangements for carrying out task or project
Planning organisation	Arrangements made pertaining to goal execution
Information management	
Organisation	Process of text organisation and arrangement
Summary	Succinctly précising foregoing ideas and strategies
Reasoning	Discussed one’s analysis of approach to further assessment of facts
Instinctive repeat	Indicative of needing further time to assimilate information of facts
Imagination	Development of data for a step change in thought and creation of ideas

Elaboration	Further enhancement or development of ideas and strategies
Questioning	Requesting further information to assist processing of data
Monitoring	Utterance aimed at checking and validating one's comprehension of the task
Debugging	Strategies used to correct comprehension and performance
Evaluation	Activities characterised by a strategic self-assessment of one's reasoning, thought products and task progress
Peer Assisted Learning (PAL)	Process whereby two students work together to achieve a common goal. Typically a pupil will take on the role of tutor and the other that of tutee (Roscoe & Chi, 2007). Topping and Ehly (2001) defined several features of PAL which can vary across programmes such as training method, participant age, duration of study, and curriculum. Roscoe and Chi (2007, p.536) also highlighted that in cross age situations the pairings are likely to remain fixed because younger pupils would struggle to teach older pupils. In same age tutoring situations when tutor and tutee are of a similar age pupils are likely to be peers. Another issue is the ability of the pupils. For example in same age pairings tutor and tutee may possess overlapping or complementary expertise, enabling them to learn from each other. Same age tutoring is often termed reciprocal as pupils may swap roles.
Peer Assisted Writing (PAW)	Process whereby pupils work together in pairs (within a writing context) to plan, compose, write and edit a story.
Reciprocal pairings	In the PAW programme the pairings were reciprocal (the composing, writing and editing of a story was shared between two pupils). The terms of tutor and tutee were substituted for speaker and writer. Whilst the planning of the story was shared, with the pupils sharing writing down the plans when composing the stories, the speaker dictated and the writer was responsible for actually writing the story on paper. The pupils were responsible for decisions concerning change of role.

Unit of analysis	A phrase or expression that conveys sense when considered in context.
On-line methods	In the context of PAW, methods of data collection that take place as the pupils are writing their stories.
Off-line methods	Methods taking place either prior or post the activity. In the context of PAW they took place post the writing activities.
Pupil view templates (off-line)	A data collection method that enables pupils to provide their view and what they perceive other people think about a given situation or learning activity, in written form, on the template provided. Wall <i>et al.</i> (2006, p.42) designed the templates to stimulate reflection on the processes of thinking in different learning contexts and describe the process as ‘a mediated interview about the teaching and learning situation’. The templates mediate pupils’ thinking about cognition and metacognition and support them in expressing their own thoughts and what they perceive others think about their learning (Wall, 2008).
Think Aloud when Prompted (on-line)	In the PAW context, as pupils write a story they are asked by the researcher to give reasons for choosing particular words. In this instance they are chosen by the researcher from ‘vocabulary, connectives, openers or punctuation’ (VCOP).

Abbreviations

ASN	Additional Support Needs
ASP	Additional Support Plan
AVD	Audio Visual Department
CE	Collaboration and Evaluation
IEP	Individual Education Plan
IM	Information Management
IRF	Initiation, Response and Feedback
IRFCE	Initiation, Response, Feedback, Collaboration, Evaluation
Jr. MAI	Junior Metacognitive Assessment Inventory
PAL	Peer Assisted Learning
PAW	Peer Assisted Writing
PVT	Pupil View Template
SaT	Story after Training
SEN	Special Educational Needs
TAP	Think Aloud when Prompted
VCOP	Vocabulary, connectives, openers and punctuation
WOW	Exciting word/mind catching word
ZPD	Zone of Proximal Development

CHAPTER 1

Introduction

1.1 Background

My view of education regards the development of thinking as the central feature of classroom practice. It is the responsibility of practitioners in the field of education to promote it. This study is based on the belief that the explicit development of thinking will create learners who achieve success as part of a class, family and society (Hick *et al.*, 2009; Kuhn, 2005). However, I recognise that the challenge for practitioners is to determine what exactly this entails and which strategies will implement it.

Research in the field over the past decade confirms this centrality. It demonstrates that proficiency and awareness of metacognition, which Flavell (1976, p.232) referred to as ‘one’s knowledge concerning one’s own cognitive processes or anything related to them’, is a predictor of successful learning (Brown, 1987; Georghiades, 2004; Wang *et al.*, 1990). Equally, cognitive psychologists discussed metacognition in terms of ‘executive control’ and as a higher order cognition that supervises a person’s thought processes, knowledge and subsequently actions. Metacognition is a complex entity that will be discussed fully later in the text, but it is apparent that understanding all its dimensions are crucial both to educational achievement and social emotional development (Hick *et al.*, 2009; Kuhn, 2005).

Research has illustrated that development of metacognition is not something that happens independently or in isolation (Flavell, 1979): social aspects are important.

This thinking is embedded in the collaborative and social aspects of learning as advanced by Vygotsky (1978) and the Piagetian notion of conflict and argument (Piaget, 1929). Both Vygotsky (1962) and Piaget (1964) argued that young children begin to develop awareness of their own minds. This awareness increases with age and schooling (Justice, 1986) and with training (Blöte *et al.*, 1999). Formal instruction should be paced so that children receive the appropriate assistance at the requisite stage. The metacognitive element in writing is affirmed by Hacker, Keener *et al.* (2009) and Harris *et al.* (2009). Topping (1995) created ‘paired writing’ as a method of cooperative writing combining metacognitive reflection with social interaction.

Peer Assisted Learning (PAL) and, specific to this study, Peer Assisted Writing (PAW) include both social and collaborative ingredients. The former is when two students work together to achieve a common goal, while the latter is when they work together within a writing context. It is the social and collaborative aspects that provide a context where discussion, debate and argument can promote the appropriate metacognitive skills to enhance learning, social awareness and social skills (Vygotsky, 1962). The social emphasis also helps to promote the rational, active control of one’s own thinking processes. The aims of my research combined these different concepts and aims:

The research questions to be answered were:

1. How does a Peer Assisted Writing programme support pupils’ development in:
 - Metacognition?
 - Writing?

2. What do on-line and off-line assessment methods tell us about the metacognitive outcomes of Peer Assisted Writing?

In order to answer my research questions I developed a Peer Assisted Writing programme based on Topping (1995) that included four pairs of pupils from a composite Primary 6/7 class. Timetabled over five weeks there were three sessions of approximately 45 minutes each week during which each pair of pupils jointly planned and wrote a story. The stories followed the school writing programme adopted by West Dunbartonshire Council and developed by Ros Wilson (Wilson, 2002). The aim was that each pair would write and edit one story each week.

My own background has helped to shape and form my ideas of how education should be approached and is integral to the objectives of this study. I will therefore include a brief personal view before introducing the terms of metacognition and PAL/PAW and show why the area of research I chose for this study is both essential and original.

1.2 Personal context

My background is that of a primary and learning support teacher and, during the last ten years, that of an educational psychologist. I have worked with children with a wide range of Additional Support Needs (ASN) in the Scottish Education system and Special Educational Needs (SEN) in the English system, both in mainstream and specialist provisions. I have seen at first hand that when children are supported within their Zone of Proximal Development (ZPD) (Vygotsky, 1978) they can achieve at a higher level. Increased self-confidence and motivation to attempt more accompany that success. The child who is left to work alone often experiences little success and is therefore loath to attempt further tasks due to fear of failure and loss of self-

confidence, and therefore lack of motivation. How then does a teacher give the requisite support simultaneously to a class of pupils, many of whom struggle to access the curriculum?

The demands on teachers in a busy classroom are immense. Their challenge is to provide an education for children who will have a range of abilities, difficulties and possibly speak a variety of languages. I have seen that no child wants to be or should be singled out to experience the stigma of 'extra tuition' (Ainscow, 1995; Dyson, 1990). A child neither wants to read from a book deemed by peers to be 'childish', nor work on a task that is overtly different to that of the rest of the class. I have also witnessed the social emotional problems that often accompany failure in the classroom (Frederickson & Cline, 2002).

My experience has shown that many teachers have difficulty differentiating work for their class. I have seen how failure to progress and succeed affects not only academic progress but social emotional development. A priority must be to devise appropriate learning activities that will not cause humiliation, loss of self-esteem or distress to some children because they struggle to cope. Methods and strategies need to allow all members of a class equality of opportunity to promote, advance and reinforce their learning. Peer Assisted Learning is suggested as one such technique (Roscoe & Chi, 2007; Slavin, 1996).

For this study I have selected the context of writing, hence PAW, as many children experience difficulty with the written word and struggle to put their thoughts onto paper (Harris *et al.*, 2009). This inability to plan, compose, write and edit their work can be responsible for failure across the curriculum (Harris *et al.*, 2009). The context

of PAW can provide a non-threatening environment that enables the sharing of tasks and thus delimits the burden on children and young people. It is this interactive component that supports this environment and the resulting success promotes motivation (Yarrow & Topping, 2001). I suggest that PAW provides a context where assessments directly linked to the promotion of metacognitive skills can be implemented and evaluated, in contrast to the formal situation associated with psychometric tests, for example. Recent changes in the Scottish education system have emphasised a much broader spectrum of learning and highlighted the need for schools to develop their own innovative assessments.

1.3 Policy context

A recent change in the Scottish education system has been the introduction of *Curriculum for Excellence* (Scottish Executive, 2004), emphasising in particular the place of literacy, numeracy and emotional and social wellbeing. There has also been a phasing out of 5-14 assessments (Scottish Qualifications Authority 5-14 Assessment Unit, 1997). *Curriculum for Excellence* has given more independence to schools to develop their own assessments. I will now briefly refer to these developments in legislation and policy in Scottish education and suggest that PAL and PAW support the ethos of *Curriculum for Excellence*. I shall also suggest that assessments that are not only directly linked to pedagogy but support the development of metacognitive skills are particularly salient at this time of change within the Scottish education system.

Curriculum for Excellence placed children and young people at the heart of learning and teaching. It stressed the importance of literacy across all learning. It also held that

the development of thinking skills was crucial, stating that, if developed, they support transfer and better equip young people for life.

HMIe (2009, p.2) subsequently identified

- the need for greater clarity around the outcomes of education;
- a stronger focus on essential life skills, particularly literacy and numeracy;
- assessment and qualifications that complement the curriculum but do not drive it;
- space for more imaginative teaching; and
- replacement of the separate concepts of academic and vocational education with that of an appropriate education for all.

I shall now outline the context for this study before I discuss the background and process of development of the PAW Programme.

1.4 School context

The pilot study and the main intervention took place in a primary school (primary age in Scotland is from 5 to 12 years) on the edge of a city in Scotland. As the school educational psychologist, I was anxious to support the literacy skills of pupils who struggled with writing. I felt that PAW was a legitimate vehicle to progress this aim. In addition I wanted to increase my involvement with the school and I felt that working with staff would promote this. The school was keen to be involved for the following reasons:

- the PAW programme would support the local authority policy of promoting the learning of, in particular, the lowest-achieving 20 per cent of pupils;

- the programme would support the learning of a number of pupils before they progressed to high school; and
- it was hoped that working with their school educational psychologist would not only give them more psychologist time but would support the professional development of teaching staff.

The school catchment comprised low- and middle-range income families. Of the 349 pupils, 30 pupils received free school meals, there were 40 pupils with an Additional Support Plan (ASP) and one pupil with an Individual Education Plan (IEP). The eight children selected to be part of this study were chosen from a composite Primary 6/7 class and were 10 to 11 years of age. Within the Scottish education system, pupils progress to high school after Primary 7. At this time of transition it is particularly important that young people are equipped to cope with the heavier written demands of the more complex curriculum that they would meet when entering their secondary school.

1.5 Why investigate metacognition?

The centrality and power of metacognition in advancing achievement in learning has been documented by a range of researchers (Antonietti, 2006; Baker, 1996; Baker & Brown, 1984; Garner & Alexander, 1989; Georghiades, 2006; Hacker, 1998; Metcalfe & Shimamura, 1994; Pressley & Ghatala, 1990; Thomas & Kin Mee, 2005). In addition, metacognitively-aware learners ‘are more strategic and perform better than unaware learners’ (Georghiades, 2004; Wang *et al.*, 1990; Brown, 1987). Pintrich, (1999, 2002) showed that with success comes motivation for learning and Hartman (1998) emphasised that metacognitive influences are far reaching and affect

acquisition, comprehension, retention and application of what is learnt. In addition they impact on learning efficiency, critical thinking and problem solving.

Flavell (1976) was the first to use the term 'metacognition'. Although his words help to bring a sense of reality to the abstract nature of metacognition, I hope to show that they fail to demonstrate the complexity of the term and how it fits into the tapestry of successful learning and behaviour:

Metacognitively sophisticated children or adults are like busy executives, analyzing new problems, judging how far they are from the goal, allocating attention, selecting a strategy, attempting a solution, monitoring the success or failure of current performance and deciding whether to change to a different strategy. (Flavell *et al.*, 2002, p.263)

There is much disagreement on how to define this complex term (see Flavell, 1976, 1979; Nelson & Narens, 1990; Veenman *et al.*, 2006). However, there is agreement that metacognition comprises two major components: knowledge of metacognition and regulation of metacognition (Brown, 1978, 1981; Flavell, 1976, 1979). Knowledge of metacognition refers to how much learners know about themselves as learners. Regulation of metacognition refers to how well learners plan, implement strategies, monitor and evaluate their learning (Schraw & Dennison, 1994; Sperling *et al.*, 2004; Zhang, 2010).

There are differing views on which develops first: knowledge or regulation of metacognition. Brown (1981) suggested that knowledge of metacognition is later to develop, and relies upon reflection of cognitive processes. Reflection is a skill essential to active planning in order to execute task demands. It is reflection that allows pupils to appreciate the complexity of a task. Flavell's (1979) view maintained that knowledge and regulation of metacognition develop simultaneously. However, both

Brown and Flavell stressed that development of knowledge of metacognition is dependent on practice of regulation of cognition.

Veenman *et al.* (2006) took an opposing stance and documented that knowledge of metacognition develops prior to regulation of metacognition. It is also generally accepted that knowledge of cognition comprises three sub-processes: *declarative*, *procedural* and *conditional* knowledge (Brown, 1978; Flavell, 1976; Ku & Ho, 2010; Schraw & Dennison, 1994). I suggest that identification of these categories is complicated by the inconsistency of definitions and the complexity of the definitions. *Declarative*, *procedural* and *conditional* knowledge involve knowledge and processes related to person, task and strategy variables and affect the problem outcome (Tarricone, 2011). Further complexities are apparent when other attributes are considered; Kluwe (1982, p.82) included two forms of declarative knowledge: domain and cognitive knowledge. Domain knowledge is ‘an individual’s stored information about the domains of reality’, while cognitive knowledge refers to their stored assumptions, hypotheses and beliefs about thinking. Tarricone (2011) suggested that Kluwe’s description of declarative knowledge is similar to Jacob and Paris’ (1987, p.259), which they term ‘propositional manner’. Sheull (1990, p.537) further complicated the matter, as his ‘declarative knowledge’ is ‘knowledge about something’.

Paris and Cross (1988), and Schraw and Moshman (1995) suggested that *procedural* and *conditional* knowledge are possibly even more complicated to discern, due to their close links to regulation of metacognition. They suggested that procedural knowledge is developed application and experience that may become unconscious, automatic processes; or refined strategies or skills initiated in a problem-solving situation. I feel

that these definitions and descriptions emphasise the close links between knowledge and regulation of metacognition that are confirmed by Brown (1981, p.67). She also asserted confusions arise in the close relationship between knowledge and regulation of metacognition. Part of the problem is that the foundation of metacognition is knowledge; knowledge informs the regulatory processes and as such is the basis of both knowledge of metacognition and regulation of metacognition (Brown, 1981, p.21).

More debate surrounds whether regulation of metacognition can be partitioned into five sub-processes of *planning, information management, monitoring, debugging* and *evaluation* (Brown, 1978; Flavell, 1987). However, for the purposes of this study I decided to adopt Brown and Flavell's notion of the eight sub-components as the basis of my definition of metacognition. I shall discuss differing views in the next chapter.

I had two reasons, endorsed by Brown (1981) and Flavell (1976, 1979), for my choice of criteria. First, the criteria were specifically developed for educational purposes (Brown, 1981), albeit mainly in the sphere of reading and comprehension. Second, Flavell's background was in metamemory (Flavell & Wellman, 1977). Amongst others, these researchers documented the importance and far-reaching influence of memory (Fabricius, 1997; Flavell *et al.*, 2002) and its relevance to the study of metacognition is specifically documented by Flavell *et al.* (2002, p.274):

Metamemory means knowledge or cognitive activity bearing on anything mnemonic; it is, therefore metacognition that takes memory enterprises as its object.

I felt that criteria developed against these two backgrounds would provide a balance and validity for my PAW study. They allowed me to apply recognised metacognitive

criteria not previously the subject of intensive research. Another influence was the work of Hacker *et al.* (2009) that described writing as applied metacognition; two influential models of writing, by Bereiter and Scardamalia (1987) and Hayes and Flower (1980) endorsed this claim. In addition, the work of Nelson and Narens (1990) had proved a versatile model of metacognition adapted by Hacker, Keener *et al.* (2009, p.162) to illustrate their metacognitive model of writing. Nelson and Narens (1990) expanded on Flavell's model by distinguishing between what they termed the 'object' level of cognition and the metacognitive level. This model is endorsed by Brown (1987). The 'object' level refers to which cognitive activity takes place, whilst the 'meta' level governs the object level. The relationship between the two levels of cognition is reciprocal; the monitoring function provides information used by the control function to guide and regulate learning (Shamir *et al.*, 2009). The importance of metacognition is emphasised by this unique role of regulating cognitive activity, enabling students to be aware of how they think, guiding them in the choice of strategies they need in order to solve problems and support control of their learning.

It is felt that schools do not give enough emphasis to the development of thinking processes (Kuhn, 2005). This could be because they do not understand what metacognition means and involves. Some teachers develop 'thinking skills' programmes, but Kuhn and Pearsall (1998) suggested these often fail to provide pupils with an opportunity to practise and experiment with these new skills and, without the requisite stimulation, they tend to be forgotten. Collaborative contexts, Kuhn (2005) argued, may provide an appropriate context to practise these meta-level cognitive processes.

Lin *et al.* (2005) pointed out that good teachers are highly metacognitive. They reflect on their own expertise and instruction, monitor student understanding and regulate the processes that students adopt in order to learn and solve problems. It was upon this premise that Palinscar and Brown (1984) developed reciprocal teaching; teachers act as models for their pupils before gradually transferring responsibility to them. I suggest that an extension of this idea of instruction is PAL, where peers work together to achieve a desired goal. I shall now argue why PAL and, more specifically, PAW was selected as a vehicle to promote metacognition.

1.6 Context for metacognition

Peer Assisted Learning involves a pair of students working on a single, unified task that represents the shared meaning and conclusions of the pair as a unit (Fawcett & Garton, 2005). Traditionally, their roles are referred to as tutor and tutee (Roscoe & Chi, 2007). Peer Assisted Learning may be used in a range of subject areas including maths, science, reading, comprehension and spelling. Peer Assisted Writing is a variant and uses writing as the context. Peer Assisted Learning/Writing provides a natural interactive on-line context in which metacognitive skills can be progressed and activated, differentiating PAL/PAW from processes demanding mediation by another person. The data is therefore not contaminated by any other agent (Shamir *et al.*, 2009, p.48).

Peer Assisted Writing offers a range of possibilities based on age and the knowledge gap between pupils and also the nature of their roles. In cross age tutoring, older and more advanced students instruct younger pupils and in this situation roles will remain fixed. Alternatively, the tutors and tutees are of the same age and expertise and they

‘may possess overlapping or complementary expertise which enables them to learn from each other’ (Roscoe & Chi, 2007, p.536). In this form of PAL, learning is often reciprocal and pupils switch roles at points during the activity.

Tutor and tutee learning gains have been observed in pupils from a range of backgrounds; for example, the underprivileged in urban areas (Greenwood *et al.*, 1989; Jacobson *et al.*, 2001). Cohen *et al.*’s (1982) research found gains for general education students, whilst Mathes and Fuchs (1994) reported similar gains for special education needs students. Roscoe and Chi (2007), in their multiple review of PAL, concluded that different combinations of features gave rise to a wide range of tutoring programmes with different training methods, tutoring format, participant age, duration of intervention and curriculum.

My scrutiny of PAL studies showed that outcomes, although positive, varied in magnitude. Studies in maths and science provided more significant results than comprehension and reading (Roscoe & Chi, 2007). With PAW there are fewer studies; I only found two that qualitatively analysed the interactions between pairs (Duran & Monereo, 2005; Larkin, 2009), providing me with the impetus for this study.

The research of Harris *et al.* (2009) described the disadvantages faced by students who struggled with writing. It stressed the central importance of skill in writing; that expertise is vital in order to collect, refine, extend, preserve and transmit information and understanding. This particularly applies as pupils progress through school. Students who cannot write struggle to draw on its power to support and extend learning and development. The result is that many fail to achieve their potential across

the curriculum. Harris *et al.* (2009) argued that metacognitive monitoring and control are crucial components of writing; that writing is applied metacognition.

1.7 Rationale for the programme

I have highlighted the foundations on which my PAW programme is based and shall now provide the rationale. Slavin (1996), and later Roscoe and Chi (2007) acknowledged that much research on both PAL and PAW showed positive outcomes. Cognition and academic performance are enhanced and many studies confirmed its value in extending learning (Fuchs *et al.*, 1998; Kramarski & Mevarech, 2003; Shamir *et al.*, 2006; Topping & Ehly, 1998). However, there is still confusion and disagreement concerning why PAL affects achievement and under what conditions. Roscoe and Chi's (2007) meta-analysis revealed a lack of research in the area of writing and showed that the majority of research is conducted in same age rather than cross age settings; moreover, much of this is with older students and based mainly on maths and science programmes.

As higher effect sizes are found in programmes running for a short period of time (Topping & Bryce, 2004), I decided that the PAW programme would last for five weeks, during which the pupils would write four stories. Roscoe and Chi (2007, p.535) also suggested that the benefits found in tutor learning where the tutors are 'more expert or advanced than the tutee' occur early in the process and this could perhaps imply that non-tutor control groups may catch up over time. Their study was mainly concerned with examination of why tutors who were more expert than the tutee progressed as well as the tutee. Their analysis revealed that peer tutors benefited from explaining when they integrated concepts and principles and generated new ideas

through inferences and reasoning. In addition pupils needed to monitor their new understanding and also use debugging strategies to correct mistakes as they occur. These skills and strategies are metacognitive. Questioning was seen to play a particularly important part and Duran and Monereo, (2005) showed how questions appeared to initiate a range of collaborative discussions. Questions could be initiated by both tutee and tutor. I would therefore argue that furthering understanding of metacognition may hold a key to enhancing educational attainment and social emotional wellbeing. A further caveat to add at this point is that the majority of the research had been carried out in maths, science, reading and comprehension which adds to the impetus to investigate the processes involved in PAW. I shall now describe the planning stage of the PAW intervention.

1.8 Pilot Arrangements

The school welcomed the opportunity to take part in a pilot study to support four pupils in a composite Primary 6/7 class who struggled with literacy skills. I felt that it was important to trial the procedures, materials, assessments and video recording techniques. In addition, this represented an opportunity to transcribe and analyse some of the recordings that would form a foundation for subsequent analysis.

It was agreed that the PAW programme would fit in with the school's existing writing programme, Vocabulary, Connectives, Openers and Punctuation (VCOP), adopted by West Dunbartonshire Council and developed by Ros Wilson (Wilson, 2002). Topping (1995) had developed a PAW programme (see Appendix 1) and I incorporated its ideas into my PAW flowchart to provide a structure onto which the school's programme could be hung. Topping's flowchart had been used by Yarrow and Topping (2001),

and Duran and Monereo (2005), thus had been trialled successfully. However, I considered that it was too complicated for children of 10 and 11 years; mine is a simplified version (see Appendix 2) to provide a linear structured guide of the procedures involved and outline the planning, writing and editing stages. It also determined that tutor and tutee would be referred to as ‘speaker’ and ‘writer’, as I felt that this defined more clearly the roles, was simpler for the pupils and made the training procedure easier.

1.8.1 Pilot PAW programme

The pilot was timetabled over five weeks with three sessions of 75 minutes each week during the Summer Term of 2009. Four pupils who struggled with literacy were selected from a composite Primary 6/7 class. At this stage, although the VCOP writing programme was adopted, the programme did not follow the VCOP writing stories. The fairy tale genre was adopted as one with which the pupils were familiar, and *The Princess and the Pea* was selected to demonstrate the procedures to the pilot group of two pairs. My PAW flowchart was explained to the PAW group, who were also given a demonstration of the processes by the support for learning teacher and myself. Training was restricted to this demonstration and a short induction of approximately twenty minutes when the pupils were encouraged to practise the PAW techniques. The remaining three stories followed the same genre and included stories based on traditional, contemporary and futuristic fairy tales. It was a study that aimed to capture metacognition in the context of PAW, and the assessment tools used were Pupil View Templates (PVTs) (Wall & Higgins, 2006), Think Aloud when Prompted (TAP) (Bannert & Mengelkamp, 2008) and video recording of the pairs when engaged in PAW.

In particular, I wanted to pilot the following:

- the nature of the pairings;
- my PAW flowchart;
- the story topics;
- the practicalities of using video recording, and
- assessment tools of video recording of the pupils' interactions, PVTs and TAPs.

1.8.2 Review of pilot

I had decided that the pairings would be of the same ability and the roles would be fixed, since I felt that the use of reciprocal pairings might incorporate elements of peer collaboration that could make it difficult to determine if gains were due to tutoring or being tutored (Roscoe & Chi, 2007, p.538). However, I reversed this decision in the main PAW intervention for the following reasons:

- on reflection, the issue was not pertinent to the research questions;
- when pairings were fixed, the pilot pairs were not as motivated to participate; and
- I wanted to give both pupils the opportunity to experience the roles of speaker and writer and so jointly claim ownership of the writing activities.

In addition the following changes were made, informed by the pilot study:

- the fairy tale genre for the demonstration and Story 1 was followed by VCOP stories (Wilson, 2002), as fairy tales had proved to be too repetitive;

- technicalities regarding video recording and the type of microphones, and how many pupils could be recorded simultaneously;
- which sections of the main intervention would be recorded and analysed and the form of analysis;
- the PVTs were distributed twice during the pilot and I found that, with familiarity, the pupils were able to provide more extensive answers; and
- I also chose to include an extra speech ‘bubble’ on the printed A3 PVT sheet since the pupils were keen to comment further.

In the pilot I had decided that the pupils would carry out the TAP assessment, and had asked them to take it in turns to ask the other why they had selected ten VCOP components. However, this proved to be too difficult and was unsuccessful and so, after consultation with the class teacher, in the main intervention I opted to carry out this assessment myself.

The pilot also helped to inform the following decisions on the actual PAW sessions:

- more structured intensive training, with modelling a priority, to be carried out over three sessions;
- the provision of laminated VCOP prompt cards for each child to support both VCOP and questioning techniques (see Appendix 3);
- a reduction in the length of sessions from 75 minutes to 45 minutes;
- availability of suitable rooms for video recording and where the equipment could be stored safely between sessions; and
- the selection of children to be the decision of the class teacher, giving rise to purposeful selection.

1.8.3 Analysis of the video tapes, PVTs and TAPs

I viewed all the video recordings from the pilot and made notes of my first impressions, using these as a foundation for my analysis when I watched the main PAW intervention tapes. The initial list consisted of *elaboration, questions, rapport, bringing back on task, reflex association, off task, off task-collaboration, division of tasks, imagination, triggers, seeking information* and *repetition*. These informed my decision to use an existing metacognitive framework, into which I could incorporate many of the above; however I was aware that some sections of the video recordings could not be analysed using only these criteria. My findings helped to inform this part of the analysis. At this stage, I realised that I must be precise when defining my terms. The analysis of the PVTs and TAPs also confirmed that the data could be analysed using an existing metacognitive framework as a base.

1.9 Structure of the PAW programme

The main PAW programme was timetabled over five weeks, with three sessions of approximately 45 minutes per week (see Appendix 4 for timetable) in which the pupils were encouraged to produce five pieces of work: *The Princess and the Pond* was the first story, the *Princess and the Pea* was the training story and Stories 2, 3 and 4 followed the VCOP programme (Wilson, 2002).

Table 1.1: Story titles used in the PAW programme

Story 1 (untrained)	<i>The Princess and the Pond</i> (City of Edinburgh Council, 2008)
Training story	<i>The Princess and the Pea</i> (Ladybird, 2008)
Story 2	<i>The Monster</i> (Wilson, 2002)
Story 3	<i>The Elephant Train</i> (West Dunbartonshire Council, 2007)
Story 4	<i>The Beast</i> (West Dunbartonshire Council, 2007)

The decision to use fairy tales initially was to support the pupils by using a familiar genre, while the VCOP stories enabled the sample pairs to be included with the rest of their class. A further important issue involved the training of both teachers and pupils and I shall now provide details of how the pilot provided valuable insights.

1.10 Training issues

At one level the research literature revealed few differences between PAL programmes with or without pupil training and structure (Roscoe & Chi, 2007). However, research findings were unanimous (Fuchs *et al.*, 1997; King *et al.*, 1998; Topping & Ehly, 2001) that training tutors in constructivist theories of learning led to more impressive gains. Chipman *et al.* (1985) detailed the importance of an interactive training programme, endorsed by Palinscar and Brown (1984); moreover, greater learning effects were reported on programmes that gave pupils more autonomy (Fuchs *et al.*, 1997; Roscoe & Chi, 2007). Roscoe and Chi (2007) stressed the importance of the kind, as opposed to the duration, of training.

Fuchs *et al.* (1997) suggested that well designed, structured interventions could fail if participants ignored the outlined tasks. Whilst the children used their planning sheets, the pilot had shown that they did not make consistent use of the flowcharts. Likewise, in the role of speaker the children did not attempt to stimulate thought processes by asking questions, which research showed to be beneficial to learning (Roscoe & Chi, 2007). I therefore decided to include more time for specific training and developed the VCOP prompt cards (see Appendix 3) in an effort to support this aspect. Another issue was training staff in PAW procedures. In the pilot I had felt that this had been rushed

and I sought to rectify this in the main programme by planning two meetings when the techniques could be practised.

1.11 Specific training

The whole class, including the four sample pairs, was taken through the PAW process by myself and the class teacher. We demonstrated the processes using my PAW flowchart and also explained the potential of the VCOP prompt cards to promote both questioning and the use of the VCOP components. All the Primary 6/7 class was given the opportunity to practise the processes. On completion of the first story, the four sample pairs were given three more training sessions. A colleague and I initially provided further modelling of the PAW procedure. The demonstration story was then introduced and the four pairs were taken through the planning, writing and editing stages and supported to write their version of *The Princess and the Pea*.

1.12 Summary

I have outlined the background of the PAW intervention and placed it in the context of Scottish national educational policies, my own professional background and the school setting. The efficacy of implementing PAL interventions has also been illustrated, highlighting research into the importance of metacognition. Whilst its centrality is not in dispute, the on-going debate among researchers as to how to define this complex entity continues. There is a need for research into precisely what metacognition involves, and how to encourage it both in the classroom and the wider community. Peer Assisted Writing provides an on-line context and vehicle by which metacognition can be promoted and this study is my attempt to further understanding of an area that

currently lacks complete coherence and is also under-researched. The lack of qualitative research in PAW remains the main impetus for this study.

I detailed the pilot PAW intervention and outlined its influence on the final planning of the main PAW intervention. I shall now review appropriate literature to provide balanced evidence and support for the central tenet of this study; the importance of metacognition and its promotion within the context of PAW in a busy classroom.

CHAPTER 2

Literature Review

2.1 Introduction

I believe that the skill of thinking is fundamental to all aspects of life, whether in school or enjoying a fulfilling life after school. I shall look at a range of literature to support my argument that thinking should hold a central place in any school curriculum. Flavell *et al.* (2002) specified that this skill is metacognition, so called because its core meaning is ‘cognition about cognition’, and they defined metacognition as:

any knowledge or cognitive activity that takes as its object, or regulates any aspect of any cognitive enterprise. (2002, p.164)

A further dimension, they stressed, is that children not only think when solving a problem but learn to think about thinking about tasks, strategies and the entire process of problem solving. Individuals are the agents of their own thinking and therefore construct their understanding of both self and the world; successful pupils are those able to take charge of their own learning. I believe this is a crucial argument that makes thinking and understanding thinking a central responsibility for education.

My view is that development and understanding of thinking, that is metacognitive awareness (Flavell, 1979), should be supported and extended as part of schools’ curriculum as it incorporates skills that affect both learning and behaviour (Fernandez-Duque *et al.*, 2000; Flavell, 1978). It appears essential that individuals are supported to be in control of their own thoughts and behaviours and monitor the consequences.

Using this literature base, this study can be shown to focus on children's development of writing. I shall argue that the skills needed to attain success in literacy are principally metacognitive, and that writing is applied metacognition (Hacker, Keener *et al.*, 2009).

The literature that stresses the important role of good literacy skills and their relationship to thinking about learning is extensive (Bereiter & Scardamalia, 1987; Hayes & Flower, 1980). Taking first writing, I explore how writing creates an appropriate context in which to observe metacognitive development (Hacker, Keener *et al.*, 2009). I endeavour to demonstrate the important links between metacognition and writing; crucially, the development of metacognition has to be supported, as it does not happen independently (Flavell, 1979). Embedded in the development of both are the social aspects of collaborative learning as advanced by Vygotsky (1978) and the Piagetian notion of conflict and argument (Piaget, 1929). Moreover, formal instruction should be paced so that children receive assistance at the appropriate stage. This leads to social aspects of PAL and, in my case, PAW, being situations where metacognition can be promoted.

2.2 Literacy – metacognition and children's writing

There is wide support for the view that the ability to write coherently in order to put one's thoughts on paper is a crucial skill needed across the curriculum and that the process is difficult and many pupils struggle with the complexities involved (Graham, 2006; Hayes & Flower, 1980; Prior, 2006; Scardamalia & Bereiter, 1986). There is also agreement that those who struggle with literacy skills are at a particular

disadvantage in today's world (Graham, 2006; Hayes & Flower, 1980; Prior, 2006; Scardamalia & Bereiter, 1986).

Nicholls (1989) laid responsibility with schools for a diminution of pupils' natural curiosity, showing that children's fear of not being as good as their peers at certain activities causes dissatisfaction and lack of motivation. Equally, Dweck and Leggett (1998) demonstrated that low self-evaluation on any task will diminish effort. They claimed that there is a tendency to devalue effort and consider that there never will be improvement, so why continue to try? When the skill in question is writing and pertains to most school subjects, then in my experience the end result is disaffection with school. Nicholls prompted a re-evaluation of both the 'what' and the 'how' of teaching in schools.

2.2.1 Metacognitive aspects of writing

Much of the research into metacognition and writing took place in the 1970s and 1980s and concentrated on developing models or stages of writing, mostly of a quantitative nature. Two of the most influential teams were Bereiter and Scardamalia (1987) and Hayes and Flower (1980), whose models addressed the three major metacognitive elements: knowledge about writing; deliberate, conscious regulation; and control of the writing process.

During the writing process, Bereiter and Scardamalia (1987) held that the writer has not only to negotiate the rules and mechanics of writing but concentrate on factors such as organisation, form and features, purposes and goals, audience perspectives and needs, evaluation of communicative intent and efficacy. Much of their work concentrated on explaining the differences between novice and expert writers. They

described the former as engaging in *knowledge telling*, which Harris *et al.* (2009) suggested relates to Hayes and Flower's (1980) *idea generation process*. Knowledge telling consists of three components. The first is understanding the assignment by defining the topic and function of the text to be produced. The second is long-term memory and includes two types of knowledge available to the writer: content knowledge, or what the writer knows and understands about the assignment topic, and discourse knowledge, which includes linguistic knowledge and knowledge about the type of text to be produced. The third is memory, which includes the operations writers use to produce text. Harris *et al.* (2009) wrote that this process involves retrieving content from long-term memory and writing it down.

In contrast, Bereiter and Scardamalia (1987) described more advanced writers as engaging in *knowledge transforming*; a far more complex process focused on developing metacognitive abilities, with an emphasis on content planning, problem solving and a strong element of task analysis, goal setting and deciding how to achieve those goals. Harris *et al.* (2009) argued that many of the difficulties that novice writers encounter relate to metacognitive aspects of writing.

2.3 Development of metacognitive theory

Alongside the development of these writing models arose the metacognitive movement, and Flavell (1971) was the impetus behind much of its early work. Maybe as a result of their concurrent development there are clear links between writing and metacognitive research, and the suggestion is that the memory skills of planning, organising, monitoring and evaluating pertain to both. Flavell (1971, p.277) emphasised that memory development, which he termed 'metamemory', appeared to

include active, intelligent monitoring and knowledge of memory search and storage operations. These skills are essential to both metacognitive and writing development, highlighting their centrality and supporting the argument that they should form part of any school curriculum.

2.3.1 Hayes and Flower

In particular, Hayes and Flower's (1980) model of writing highlighted task, cognitive processes and long-term memory. Task environment concerns those factors external to the writer but influencing the writing task, including attributes of the assignment and the text so far produced. Cognitive processes involve the mental operations employed during writing; the sub-processes are planning, translating and reviewing. A further important aspect is that the writer is seen as monitoring this complex process. With regard to long-term memory, in order to carry out the task the writer has crucially to hold knowledge of the topic, the audience, the genre and the plan.

Hayes and Flower (1980) further divided the cognitive sub-processes of planning into setting goals, generating ideas and organising ideas into writing a plan. The reviewing process is subdivided into evaluating and revising text. An important part of this model is its insistence that the writer is in control of these cognitive processes, and that any process or sub-process could interrupt or incorporate any other sub-process. It was this element that emphasised the recursive and reciprocal nature of the overall writing process. They also held that as new ideas are generated there will be a need to reorganise planning and text. McCormick (2003) noted that planning could occur during editing and that reviewing could help in this organisation. Indeed, the complexity of the writing process involves making and revising plans, drawing knowledge and ideas from memory, developing concepts, imagining and responding to

readers of varied abilities and also managing the mechanics of writing such as spelling, grammar, handwriting or keyboarding. Hayes and Flower (1980) acknowledged that there will be variation among learners due to factors such as age and experience.

2.3.2 Inclusion of metacognitive processes

In 1996 Hayes updated this model. The terms ‘translation’ and ‘reviewing’ became ‘text generation’ and ‘revising’, respectively, and he also highlighted two major elements in the writing process, task environment and individual. The former include the audience and collaborators, and the physical environment that includes text and composing. The latter is divided into motivation, affect, cognitive processes, working memory and long-term memory. This model clearly demonstrates a greater understanding and inclusion of metacognitive processes, particularly when viewed alongside an amalgam of the metacognitive models of Brown (1981) and Flavell (1979). The Brown and Flavell model included *declarative*, *procedural* and *conditional* knowledge, the three components of metacognitive knowledge; there are also five components of regulation of metacognition: *planning*, *information management*, *monitoring*, *debugging* and *evaluation*.

2.3.3 Support for metacognitive processes

Hacker, Keener *et al.* (2009) stressed that effective performance among writers depended upon application of the metacognitive components of *declarative*, *procedural* and *conditional* knowledge. They developed the argument further, suggesting that writing is applied metacognition and that monitoring and control are its essential components. They claimed that their theory of the writing process bridges the gaps between the cognitive, socio-cultural, semiotics and social-interactive camps. It

overtly reconceptualises writing ‘as primarily a metacognitive process’ in which ‘text production is the result of a person’s goal directed monitoring and control of their cognitive and affective states’ (Hacker, Keener *et al.*, 2009, p.155). Ku and Ho (2010) also stressed the importance of *declarative*, *procedural* and *conditional* knowledge as the basis and forerunner to understanding and applying metacognitive strategies. This suggests an element of mutuality between metacognitive knowledge and metacognitive regulation.

Hacker, Keener *et al.* (2009) also discussed writing in terms of ‘the production of thought’ and critically included the three working memory processes of planning, translating and reviewing as being controlled by a monitor. Their thesis is that editing, drafting, idea generation, word production, translation and revision serve as control strategies responsible for the actual production of meaning. Bruer (1993) emphasised the need for a well developed monitor if the complexities of writing are to be fulfilled, and re-reading and reflection to ensure that the text achieves the writer’s goal. Research therefore stresses that it is essential to evaluate the progress of thinking and writing with the use of metacognition.

2.3.4 Notion of agency

Bracewell (1993) raised the important point that, unless control of writing sub-skills is acquired, writers will neither be in a position to master new skills, nor able to solve any problems encountered during the writing process. Hacker, Keener *et al.* (2009) drew attention to the role of on-line monitoring and control of writing, progressing until the writer experiences a breakdown in meaning. At this point, in order to re-establish meaning production the writer must take charge of mistakes so that appropriate production can continue. The strategy of debugging, which is a

metacognitive strategy, will be invoked in these instances (actually detecting the error and attempting to rectify it), reviewing what had been written, generating ideas and finally proceeding with writing text. I look specifically at metacognition to demonstrate that the skills essential to success in writing are essentially metacognitive, supporting Hacker, Keener *et al.*'s (2009) theory that writing is applied metacognition. I shall first compile a summary on cognition. This is included because, as defined by Brown (1978, p.79), 'metacognition is knowledge about one's own cognition rather than the cognitions themselves'. In order to clarify the differences I shall now look at cognition before moving on to discuss metacognition.

2.4 Cognition

In order to discuss the complex issue of cognition I shall first indicate the range of current views and definitions. Flavell *et al.* (2002, p.1) hold that the traditional image of cognition tends to restrict it to the fancier, more unequivocally '*intelligent*' processes and products of the human mind. They itemised the higher mental processes; types of psychological entities such as knowledge, consciousness, intelligence, thinking, imagining, creating, generating plans and strategies, reasoning, inferring, problem solving, conceptualising, classifying and relating, symbolising, fantasising and dreaming. They sought to expand the above mental processes to include components such as perception, motor movements, imagery, memory attention and learning, and also included a range of social cognition such as the social communicative versus private-cognitive uses of language. This broader definition of cognition sees various aspects such as thinking, perceiving and remembering as interwoven, contributing to and affected by the others' development.

This definition of cognition, however, made the distinction between cognition and metacognition unclear. Flavell (1979) and Livingston (1997) documented that they can be mutually dependent, so it is not possible to make a distinction. Ward and Traveek (1993, p.470) suggested that metacognitive knowledge includes knowledge about both cognitive and metacognitive strategies, but cognitive strategies are invoked to make cognitive progress, while metacognitive strategies are invoked to monitor cognitive progress. They argued that, as the same is involved for either purpose, the learner's goal determines whether it is a cognitive or metacognitive strategy. Their work helped to emphasise the complexities involved when trying to tease out cognition and metacognition and to demonstrate why attaining consistency in analysis is so difficult. Without consistency, comparison between studies is impossible. Understanding exactly what is involved is important, particularly as research demonstrated the unique role that metacognition plays in the acquisition of literacy skills (Hacker, Keener *et al.* 2009; Harris *et al.*, 2009). I shall now embrace the challenge of unravelling the complex nature of metacognition and how it fits into the tapestry of cognitive development, thinking and learning. In the process I shall demonstrate the origins of the analysis framework used in my PAW study and show that the conceptual framework of metacognition has its origins in several sources.

2.5 Metacognition

The abstract nature of metacognition makes it difficult to assess and therefore define. I have included the following definition of metacognition by Ku and Ho (2010), as it describes well its complexities.

Metacognition has been conceptualised as comprising of two components: Metacognitive knowledge and metacognitive regulation (Brown, 1981;

Flavell, 1979). (The knowledge component refers to one's cognitive processes, such as oneself as a thinker, characteristics of existing task and about which strategies are required to carry out for effective performance; the regulation component refers to the actual strategies one applies to control cognitive processes such as planning how to approach a task, monitoring understanding and comprehension and evaluating progress and performance.) (Ku & Ho, 2010, p.252)

Metacognition is further complicated by the different terminology used to discuss similar aspects. Deductions and comparisons have to be made from the writings of the various contributors, for example, Brown (1981) discussed cognitive regulation as metacognitive skills, while Flavell (1979) referred to metacognitive experiences. To compound the issue, workers have changed and adapted their terminology in the continual process of achieving a conceptual framework for metacognition as new research has been undertaken, and the result is that there is no consensus on its definition. In the course of this discussion I shall use the following terms for the two main components of metacognition: 'knowledge of metacognition' and 'regulation of metacognition'.

Current metacognitive literature emphasises the centrality of reflective processes, awareness and introspection of thoughts, processes, strategies and knowledge (Brown, 1987; Paris & Winograd, 1990; Schraw & Dennison, 1994). Reflective thinking is therefore held up as an important part of cognitive processes such as awareness, monitoring and regulation (Dewey, 1933; Baker & Brown, 1984), while Nisbet and Shucksmith (1984, p.1) referred to metacognition as the:

'seventh sense... the awareness of one's mental processes, the capacity to reflect on how one learns, how to strengthen memory, how to tackle problems systematically – reflection, awareness, understanding, and perhaps ultimately control'.

Flavell *et al.* (2002) saw the development of memory skills as crucial. They stressed that memory is central to successful metacognitive development, the attainment of good literacy skills and all aspects of cognition. I shall now draw attention to the role played by memory in all aspects of cognition.

It is beyond the scope of this study to explain in detail the complexity of memory processes. Flavell (1977, p.3) demonstrated that the tapestry of memory is not complete unless it is understood with terms such as, ideas, meanings, logical consistency, inference, knowledge, strategies, problem solving and intelligence. Flavell *et al.* (2002, p.234) further discussed cognition as memory and explained that memory processes are those of encoding, storage and retrieval. It is a complex process as the encoding part happens as the event is taking place. Storage activities involve encoding, studying and memorising. Retrievable activities mean recognising, recalling and reconstructing them, and finally the remembering of what has been stored. This brings me on to metamemory, defined as 'knowledge about memory' (Flavell, 1977, p.208), whose major category is sensitivity, that is, preparation for future retrieval. The other major category is knowledge of which variables or factors interact to affect how well an individual will perform a retrieval problem. The three different types of variables are all memory relevant and include person, task and possible strategies that someone could apply to the memory task. These are the sub-components of metacognitive knowledge and are part of Flavell's (1976, 1979) thesis of metacognition. However, metacognition includes not only what you know about cognition, but how you manage your cognition: this is metacognitive regulation.

Brown (1978) and Flavell (1977) both agreed on the distinction between knowledge and regulation of metacognition and the codes subsequently developed were extremely

useful when I developed my analysis criteria. Although it is problematic to separate metacognitive knowledge and metacognitive regulation, the distinction becomes clearer if knowledge of metacognition is considered a form of self-awareness about cognition and is the primary cluster of metacognition (Brown, 1981; Tarricone, 2011). Schraw (1998) also suggested that metacognitive knowledge provides the basis for metacognitive regulation. Regulation of metacognition is the monitoring and control of the cognitive process and is therefore the secondary cluster of metacognition. However, both work to supplement each other and are essential to achieve sound performance.

Swanson (1990) found that metacognitively aware learners are more strategic and their performance exceeds that of unaware learners. He found that differences in strategy use and performance relate to differences in metacognitive awareness rather than intellectual aptitude. Schraw and Dennison (1994) suggested that metacognitive knowledge plays a compensatory role in cognitive performance by improved strategy use (regulation of cognition). I shall look specifically at Brown and Flavell's criteria and also include a discussion on Veenman and colleagues in order to demonstrate the links between them. I shall also demonstrate the research on which they are based, reviewing issues such as the age at which metacognitive skills may be discerned and thus developed since I feel this could relate well to exploring metacognition in PAW. There is also the relation of metacognition to intelligence, and the generality versus domain-specificity of metacognitive skills to be discussed. These issues are important as they all involve memory, documented as a powerful influence on metacognition (Flavell, 1979).

Flavell's original model includes four metacognitive categories: metacognitive knowledge, metacognitive experiences, cognitive goals or tasks and cognitive actions or strategies. It is based on the metamemory taxonomy of Flavell and Wellman (1977), who claimed that these categories are interactive and central to the monitoring and regulation of tasks and problems. Flavell's (1993) model held that knowledge of cognition (metacognitive knowledge) is informed by metacognitive experiences that are, he argued, the impetus for strategy implementation. Flavell (1979) discussed metacognitive knowledge as long-term knowledge, understandings and beliefs about situations, environments, variables such as person, task and strategies and sensitivities that interact to affect task outcomes.

Flavell (1979) specifically stated that metacognitive knowledge is derived from long-term memory and Nelson *et al.* (1998) suggested that it provided a framework for understanding one's own as well as others' cognition and, as a result, helped to guide the interpretation of situational data so proper control decisions could be made. Flavell (1979) also specified that it could be either *declarative* or *procedural*. Flavell (1981) and Hacker (1998) documented that metacognitive experiences, which include cognitive or affective experiences associated with the task, self, strategies or problem solving, may be derived from metacognitive knowledge. This close association between cognition and metacognition demonstrates the strong links between them and explains why it is so problematic to make distinctions.

Throughout his work, Flavell referred to the importance of reflection and the interplay between monitoring and self-regulation and metacognitive knowledge. He suggested a concurrent development of these, each supporting the other. In the next section I look at Brown's (1981) ideas and it becomes apparent how the picture of metacognition has

developed as, although their terminology differs, Brown and Flavell had ideas in common regarding the essence of metacognition.

2.5.1 Brown's contributions

Brown (1981) stressed that the foundation of metacognition is knowledge; knowledge informed the regulatory processes and is therefore the basis of both metacognitive components - knowledge of metacognition and regulation of metacognition. Knowledge of metacognition relied on self-knowledge, and part of this was a conscious reflection of knowledge and cognitive processes and an awareness of cognitive resources and the demands of the task in question. Brown's model was based on research in meta-comprehension carried out in an educational setting and is particularly suited to my classroom-based research. Brown (1978, p.79) referred to knowledge of cognition (or metacognitive knowledge) 'as a form of self-awareness and knowledge of one's cognitions rather than about cognitions themselves'. This self-knowledge, which she stressed is of central importance, is described as 'stable, storable, fallible and late developing' (Brown, 1981, p.21).

Similar to Flavell (1993), Brown *et al.* (1983) recognised *declarative* and *procedural* knowledge as sub-components of knowledge of metacognition and made a connection with Flavell's person, task and strategy variables. They also recognised an ability to know when to use or not use strategies, termed by Paris *et al.* (1983) *conditional* knowledge. Brown's model also stressed that knowledge of metacognition develops later in childhood and is dependent on reflection of cognitive processes. This is an aspect, however, on which there is not total agreement between researchers. Veenman *et al.* (2006) suggested that knowledge of metacognition develops after 5 years of age and metacognitive skills emerge between 8 to 10 years of age. Wall and Higgins

(2007) determined that exposure to thinking and learning contexts supported pupils to develop both knowledge and regulation of metacognition at a younger age. Wall (2008) found that pupils as young as 4 or 5 years old displayed not only metacognitive knowledge but also metacognitive skilfulness. Flavell was of the opinion that they developed simultaneously.

Included in the Brown (1981) model is the notion of regulation of cognition that Tarricone (2011) suggested is connected to Flavell's metacognitive experiences. However, Brown and colleagues discussed this in terms of metacognitive skills. Brown's metacognitive skills, applied in problem-solving contexts, are relevant to the evaluation and control of one's own cognitive processes. Included are processes such as awareness, planning, checking, monitoring and the conscious deployment of compensatory strategies (Baker & Brown, 1984, p.355). Both complexity of task and strategy knowledge are essential to evoke metacognitive skills and would appear to be relevant to my study where pupils struggled with writing and the situation was challenging. Also within the PAW activity were elements of scaffolding in the form of the programme, VCOP prompt cards and the presence of a partner with whom to discuss the topic and share the writing. The Brown model suggested these processes are age-independent and that the difficulty of the problem-solving context is the issue.

Table 2.1 below shows the coding scheme developed from the ideas of Brown (1981) and Flavell (1977, 1979) and documented in Schraw and Dennison (1994); Schraw and Dennison (1994, p.474) had outlined operational definitions.

Table 2.1 Metacognitive coding scheme based on Brown and Flavell

Metacognitive category	Definition
Declarative	Knowledge about one's skills, intellectual resources and abilities as a learner (Schraw & Dennison, 1994)
Procedural	Knowledge about how to implement learning procedures (e.g. strategies) (Schraw & Dennison, 1994)
Conditional	Knowledge about when and why to use learning procedures (Schraw & Dennison, 1994)
Planning	Planning – goal setting and allocating resources prior to learning (Schraw and Dennison, 1994)
Information management	Skills and strategy sequences used on-line to process information more efficiently (e.g. organising, elaborating, summarising, selective focusing) (Schraw & Dennison, 1994)
Monitoring	Assessment of one's learning or strategy use (Schraw & Dennison, 1994)
Debugging	Strategies used to correct comprehension and performance errors (Schraw & Dennison, 1994)
Evaluation	Analysis of performance and strategy effectiveness after a learning episode (Schraw & Dennison, 1994)

Another view is that of Veenman and colleagues, which I shall now highlight.

2.5.2 Veenman and colleagues

A different perspective can be seen in the work of Veenman and colleagues (Veenman & Verheij, 2001; Veenman & Beishuizen, 2004; Veenman & Spaans, 2005). They recognised the components of 'knowledge of metacognition' and 'regulation of metacognition' – their term for the latter is 'metacognitive skilfulness'. They subdivided this into *orientation activities*, *systematical orderliness*, *accuracy*, *evaluation* and *elaboration* activities (Veenman & Verheij, 2001, p.5). Working with older pupils, they graded the metacognitive components when undertaking analysis. This issue will

be expanded in the next section. In Table 2.2 below I italicise the overt similarities with Brown (1978, 1981) and Flavell (1977, 1979).

Table 2.2 Veenman and Verheij's (2001) definitions of metacognitive skilfulness

Orientation activities	Indications of <i>analysing</i> the problem statement, determining the independent and dependent variable, building a mental model of the task and <i>generating hypotheses</i> and <i>predictions</i> .
Systematical orderliness	Quality of <i>planning</i> activities, <i>the systematic execution of plans</i> , completing an orderly sequence of actions and the avoidance of unsystematic events.
Accuracy	Precision in calculation, correct usage of quantities, tidiness and completeness of note taking and <i>avoidance of negligent mistakes</i> .
Evaluation	<i>Monitoring</i> and <i>checking</i> , both on the local level (e.g. <i>detecting errors</i> and checking calculations as well as on the global level of keeping track of progress being made (detecting errors and checking calculations)).
Elaboration	Indications of <i>recapitulating</i> , drawing conclusions beyond the information given, relating these conclusions to the subject matter, generating explanations and <i>reflecting</i> on the learning process.

I decided that within the range of Veenman and Verheij's (2001) sub-components are elements of the Brown and Flavell sub-components. For example, within *orientation activities* were elements of *information management* and also *evaluation*. Systematical orderliness appeared to correspond to *planning* and there were also elements of *information management* in the 'systematical execution of plans'.

In Veenman and Verheij's evaluation were aspects of *evaluation*, *monitoring* and also *debugging*. Contained within elaboration were elements of *information management*, *evaluation* and *monitoring*. I felt that Veenman and Verheij's (2001) definitions

presented a narrower view of metacognition as they seemed to concentrate on reflection and evaluation elements.

Owing to the different choice of sub-components and terminology, it is impossible to make valid comparisons between studies adopting these different analysis criteria. I was therefore not able to make comparisons between studies carried out by Veenman and colleagues and my own PAW study. An area where there was general agreement was the developmental nature of metacognition.

2.6 Developmental nature of metacognition

The developmental nature of metacognition is important (Brown, 1981; Flavell, 2000); with practice, metacognition can be promoted and thus developed (Doran & Cameron, 1995). Wertsch (1978) showed how interaction with others helped to promote awareness of metacognition and both Schunk (1989) and Kuhn (2005) emphasised that encouraging metacognition helped to develop a positive self-system that they equated with development of self-regulated learning.

Much of the research in metacognition has focused on older children. Veenman *et al.* (2006) reported that metacognition is late developing and that metacognitive skills develop from approximately 8 years of age, although Whitebread *et al.* (2009) and Larkin (2009) fiercely contended that this is not the case. Larkin's (2009) study used observational methods to evidence metacognition in 5 year old pupils, whilst Whitebread *et al.* (2009) argued that difficulties in assessment in the younger age range arise from the paucity of methods available and children's inability to express themselves verbally.

At the heart of Piagetian thought is the notion of the development of logic that culminates in the formal operational logic emerging in early adolescence. However, Moshman's (1995) argument to counterbalance Piaget's claim involved the challenge from research of young children that showed that they are more competent and logical than previously thought. Moshman's question was, if young children are logical, why do we see a tendency for adults to be illogical? Moshman (1998) suggested that it is necessary to separate logic into inference and reasoning and suggested that thinking is a deliberate application and coordination of one's inferences to serve one's purpose. He suggested that it is this skill that is found in problem solving, decision making, judgement, planning and argumentation. Kuhn (2005) suggested that the common ground is metacognition, which she discussed in terms of the achievement of increasing awareness, understanding and control of one's own cognitive function, as well as awareness and understanding of these functions as they occur in others. This notion of control is similar to Hacker, Dunlosky *et al.*'s (2009, p.1) 'sense of agency'. The important issue here is that interaction supports the awareness of metacognition (Wertsch, 1978) and that the development of a positive self-esteem increases confidence and learning (Kuhn, 2005). These inter-connections all appear to emanate from the foundation that is interaction and it is this element which is at the heart of PAW.

Further research documenting the developmental nature of metacognition comes from Ku and Ho (2010). They examined the use of metacognitive strategies during on-going critical thinking processes. Their work with university students revealed that effective use of metacognitive strategies is an important factor for success in learning. Similar to Veenman and Verheij (2001), they differentiated high from low level planning and evaluation. They suggest high level use of these strategies promoted thinking aptitude,

whilst low level strategies demonstrated an awareness of the processes required to execute a task. ‘Mere questioning or paraphrasing of information’ does not include any further execution of the required strategies and indicated confusion rather than solution (Ku & Ho, 2010, p.263). The differentiation of levels or degrees of metacognition is analogous to Bereiter and Scardamalia’s (1987) notion of ‘knowledge telling’ and ‘knowledge transforming’ activities of novice and skilled writers, also acknowledged by Ku and Ho (2010, p.263). It is important to consider that these participants were older than the primary pupils in my PAW study and therefore their metacognitive development would be more advanced. These aspects highlight the developmental nature of metacognition. Particularly relevant are the skills of *planning* and *evaluation*, also important skills in writing, and these too are seen to develop and progress as expertise grows.

There has been considerable debate on the relation of intellectual ability and metacognition on learning (Prins *et al.*, 2006), and on metacognitive skills and general skills versus specific metacognitive skills to further success in learning (Veenman & Verheij, 2001). I shall now refer to both issues.

2.7 Intellectual ability

The literature revealed many definitions and conceptions of intelligence (Carroll, 1993; Sternberg, 1990). Anderson (1996, p.356) defined intelligence as ‘simple accrual and tuning of many small units of knowledge that in total produce complex cognition’. Elshout (1983, p.2) saw intelligence as the ‘magnitude and quality of the human cognitive box which contains basic cognitive operations’. Although hereditary factors or brain damage come into the equation, it is critical what opportunities a person is

able to seek and what the environment can offer to support acquisition of cognitive strategies. This places responsibility on schools and home to provide the appropriate opportunities for pupils to maximise their potential.

A factor behind the design of the PAW writing programme was research undertaken by Veenman and Spaans (2005) who concluded that metacognitive skilfulness develops with, but is not fully dependent on intellectual ability. Indeed, Swanson (1990), and Schraw and Dennison (1994) were of this opinion. Crucially, the skill aspect of metacognition outweighed intelligence as a predictor of learning performance, which lends support to the importance I feel is owing to the promotion of the development of metacognition. They suggested that role play should be introduced as routine in classrooms in order to heighten awareness and appreciation of the different roles required for life. This would be achieved through the metacognitive skills of *monitoring*, *evaluation* and *re-evaluation*. In my experience, either as a result of psychometric assessment or through their own assumptions, teachers can decide that a pupil is in the lower range of intellectual ability with the result that the teachers lower their expectations for the particular child. The implication appears to be that intellectual ability has become the important benchmark in education and I suggest that this has arisen from a lack of knowledge and understanding of the value of metacognitive processes.

Swanson (1990) also found that metacognitive awareness is independent of intellectual ability and that differences in strategy use and performance relate to differences in metacognitive awareness, not differences in intellectual aptitude. The suggestion was that metacognitive knowledge plays a compensatory role in cognitive performance by improving strategy use. In addition, it raises the question of what comprises the best

environment to support the requisite metacognitive skills. A further issue relevant to this discussion is that of generality versus domain-specificity.

2.8 Generality versus domain specificity of metacognition

Schraw and Dennison (1994, p.461) reported that metacognition is separate from other cognitive constraints on learning such as aptitude and domain knowledge. The fact that metacognition can be predicted on the basis of neither cognition nor domain knowledge is significant and should be considered together with research highlighting metacognition's role in educational attainment (Baker, 1996; Nelson & Narens, 1994). Of particular relevance is the fact that metacognition can be enhanced, particularly within a social context (Brown, 1981; Flavell, 1979).

Evidence from Kuhn (2005) suggested that developing inquiry skills in one domain affects progress in another. She deduced that the subject of her case study acquired more than factual information, seemingly a deeper knowledge which she termed the meta-level. When operating at this level of the cognitive system, pupils had to 'select strategies to apply, in relation to task goals and manage and monitor their application' (Kuhn, 2005, p.98). However, Chi and Glaser (1980) and Flavell (1978) emphasised that children's knowledge and problem-solving ability appear to be domain specific and that improvement in problem solving emanates from in-depth knowledge of that domain. This area of metacognition is therefore another continuing debate. However, writing is relevant to the majority of subjects and if programmes based on PAL principles can promote metacognition then their value becomes more apparent.

2.9 Peer Assisted Learning

Peer Assisted Learning is a form of learning based on two pupils assisting each other to work towards a specified goal (Topping & Ehly, 1998). Roscoe and Chi (2007, p.534) suggested that combinations of features give rise to a wide range of tutoring programmes varying in training method, tutoring format, duration of intervention and curriculum, besides participant age, knowledge gap and nature of the roles. Another combination is cross age tutoring with both small and large differences in ages; in these situations more advanced students instruct younger children and the roles remain fixed (Juel, 1996; Jacobson *et al.*, 2001). In same age tutoring the pair is of a similar age or level and in this situation tutoring can be either fixed or reciprocal, where the participants take turns tutoring or supporting each other. This wide range of possible combinations and also differing assessment procedures means comparative evaluations of PAL programmes are rarely carried out.

A further dimension to PAL programmes is the relative ability of the tutors, who can possess overlapping or complementary expertise (Roscoe & Chi, 2007). The literature documents that both tutors and tutees show learning gains, but that shorter programmes produce superior educational outcomes (Roscoe & Chi, 2007; Topping & Ehly, 1998). The implication from their work and my own experiences when carrying out PAL and PAW programmes is that pupils remain motivated to carry out forms of PAL for short periods of time and these are better interspersed with other forms of learning such as individual and group work.

Slavin (1996) and Roscoe and Chi (2007) have undertaken reviews of peer assisted learning. The latter wrote that ‘an intriguing aspect of peer tutoring where a pupil

supports the learning of another is its potential to support learning for both tutees and tutors and it is this belief which had justified the programmes which have been developed' (Roscoe & Chi, 2007, p.532). However, their meta-analysis revealed a lack of research in the area; the majority of research was conducted in same age rather than cross age pairings, and studies were mostly carried out in maths and science programmes. These areas reveal more successful educational outcomes than reading and comprehension.

2.10 Scaffolding

The effect of PAL on cognitive and academic performance has been explored and shown to promote outcome gains (Slavin, 1996; Roscoe & Chi, 2007). Peer Assisted Learning incorporates many of the ideas of Vygotsky (1978) and Piaget (1926), both of whom regarded social interactions between pupils as essential to promote growth. The ideas of Vygotsky (1978) are important, defining a 'zone of proximal development' (ZPD); the distance between the actual developmental level, determined by independent problem solving, and the level of potential development, determined through problem solving under adult guidance or in collaboration with peers. It is this facet of scaffolding that is evident in PAL.

Slavin (1996, p.48) suggested that collaborative activity amongst peers promoted growth because pupils of similar ages are likely to be operating within one another's ZPDs, modelling collaborative behaviours more advanced than they could perform on their own. Kuhn (1972) stressed that a small difference in cognitive level between a pupil and a social model is more conducive to cognitive growth than a larger difference. Equally, Piaget (1926) held that language, values, rules, morality and

symbol systems could only be learnt in interactions with others. In addition, Bell (1985) has shown that when conservers and non-conservers (Piaget, 1926) of approximately the same age work in collaboration on tasks that require conservation, the non-conservers develop and maintain conservation concepts. It is this element of modelling and problem solving that arises in the peer assisted learning context and discussions give rise to conflicts that promote reasoning and disequilibrium (Slavin, 1996). I feel that the salient issue is the promotion of this range of skills, which are essentially metacognitive.

2.11 Multiple reviews

As a starting point to my PAL literature review I studied the multiple reviews carried out by Slavin (1996) and Roscoe and Chi (2007). Points of general agreement were that both acknowledged that much research on peer assisted learning showed positive outcomes in learning for both tutor and tutee. They shared the concern that the majority of studies were quantitative and called for further qualitative research into the processes involved during pupils' interactions.

Points of difference are that Roscoe and Chi (2007) concentrated on examining the role of the tutor in terms of knowledge building and knowledge telling in peer tutors' explanations and questions. Slavin (1996) identified the four major perspectives responsible for successful outcomes: motivation; social cohesion; cognitive; and developmental.

Roscoe and Chi's (2007) review revealed concerns, including

- a general lack of research in the area;

- the majority of research was conducted in same age rather than cross age settings;
- tutors may learn more in cross age rather than same age pairings;
- the majority of studies took place in high schools and were mainly based on maths and science programmes;
- the effect sizes in elementary school, although positive, were smaller than for older students;
- there was a distinct lack of research in peer assisted writing; and
- it was not possible to compare studies across the curriculum, owing to lack of consistency in data analysis.

On the other hand, Slavin (1996, p.43) asserted without reservation that ‘cooperative learning was one of the greatest success stories in the history of education’ and that research had ‘taken place in every major subject, at all grades and in all types of schools in many countries’. He found that most studies observe equal benefits for high, average and low achievers in comparison to control groups. Moody and Gifford (1990) detected no difference in achievement gains of homogeneous and heterogeneous pairs.

Training of tutors was another issue and research undertaken by Fantuzzo *et al.* (1992) revealed that it is neither the amount of training nor its structure that influences tutor learning, but the type of training or structure. King (1994, p.338) suggested that training in asking questions which probed prior knowledge/experience was more effective in enhancing learning. Topping (1995) developed his own structured training schedule for peer assisted writing that he claimed incorporated metacognitive prompting, and my PAW programme is based on his training schedule (see Section 1.11). Fuchs *et al.* (1997) and King *et al.* (1998) documented that more training for

tutors in the use of strategies based on constructivist theories of learning promoted positive learning outcomes compared to less training.

2.12 Research into Peer Assisted Writing

I only found five comparatively recent PAW studies. I shall include short critiques of these and will discuss their methodological aspects in detail in the next chapter. Larkin's (2009) was the only study to attempt a qualitative metacognitive analysis of the pupils' interactions. Duran and Monereo (2005) carried out a qualitative analysis concentrating on the basic exchange structure of pupil interactions, while Keith Topping was involved in three quantitative studies (Nixon & Topping, 2001; Sutherland & Topping, 1999; Yarrow & Topping, 2001).

Topping suggested that his term 'paired writing' (Topping, 1995) incorporated the ideas of Vygotsky (1978) and targeted writing tasks a little beyond the current independent writing competence of the less able partner, following Vygotsky (1978). The method was originally devised as a cross-ability method, but Topping advised that it could also operate on a same ability basis where roles were reciprocated. This PAW method was used in all three Topping studies, all of which reported that children found it easy to use and were motivated to use it. All studies involved some form of peer assisted writing in primary classes.

2.12.1 Sutherland and Topping (1999)

This was the first of the Topping studies. This eight week project was a controlled study of same age tutoring in two classes of 8 year old children, comparing fixed role cross-ability with reciprocal role same-ability tutoring. Analyses were carried out on

the quality of individual writing, pre and post the project and of collaborative writing during the project. Pre–post gains in individual writing were statistically significant for the cross-ability experimentals, but not for the controls. Pre–post scores for same-ability pairs are not significantly different, nor are their controls. However the same-ability pairs improved while their controls deteriorated, and the difference in gain between the paired writing group and control is significant. The collaborative writing of same-ability pairs scored significantly higher than their pre project individual writing but this is not the case for the cross-ability pairings. They concluded that both types of PAW are successful, but ensuring short term gains for the more able ‘helpers’ in cross-ability pairs was problematic.

Sutherland and Topping (1999) acknowledged that their study had limitations. Some of which were addressed in subsequent work, including non-random assignment of treatments to classes; lack of control for the effects of different participating teachers; insufficient time allocated for participants to complete the steps of each weekly writing task; and over-emphasis among participants on spelling and punctuation, rather than meaning and order. The authors also acknowledged a lack of engagement by the class teachers in the process; no clear specification of their role and function; and an insensitivity in the writing scale used in the assessments. Only a random sample of the writing produced was analysed, and none from the control group’s writing. Because of these deficiencies, although the results of the their PAW group showed ‘significant’ improvement for same-ability pairings on samples of work submitted pre and post the PAW programme, no comparisons could be made with the control group. In this study, Scottish 5-14 National Curriculum guidelines for the assessment of writing (Scottish Office Education Department, 1991) were used.

The authors acknowledged the shortcomings of this form of assessment, which is no longer used in Scottish schools. These deficiencies included no published reliability scale and the five levels of the assessment ‘constitute only an ordinal scale’, which means that differences between levels are not necessarily equal. In addition, they acknowledged that the lack of engagement by the teachers in the programme was a disturbing feature. In my PAW pilot, it was the potential bias present in the support offered by teachers and the school that could arguably present a problem. In terms of my PAW programme, this study helped to illustrate the importance of assessment criteria for writing. The next study to be discussed, Nixon and Topping (2001), aimed to rectify some of these shortcomings.

2.12.2 Nixon and Topping (2001)

Nixon and Topping’s PAW study (2001, p.44) involved ten pupils from a Primary 1 class (tutees) and ten pupils from a Primary 7 year (tutors) who ‘had been slow to develop literacy skills and had suffered low self-esteem in their earlier primary years’. The sample of ten children was randomly selected, taking every fifth child from the alphabetical class attendance registers. This writing programme had four major strands: development of a writing centre; creation of a literate play area; teacher valuing; and encouragement of writing and structured peer interaction. Their idea was to provide resources and modelling to which all pupils in the class had access. Pre–post assessment of independent writing showed improvement for all emergent writers but ‘significantly’ greater for those who experienced the structured peer interaction.

In this PAW programme the ‘tutors’ received two training sessions and the ‘tutees’ one, before engaging in two 30-minute writing sessions per week over a six week period. This study used the paired writing method described in Topping (1995) (see

Section 1.8). The researchers documented many of the shortcomings in this research, including the small number of participants and the need for replication in a randomised controlled study. This meant that it is not possible to know whether the gains were due to the intervention rather than simply a result of maturation. Another problem is that the assessment scale had been constructed specifically for the intervention. The authors claimed that inter-rater reliability checks were 'relatively reassuring' (Nixon & Topping, 2001, p.53), but there is no evidence of data to support these claims. I feel that the development of a new assessment scale not before published or used makes comparison with other studies impossible and therefore hinders validity. The study acknowledged that the obvious enthusiasm of the teachers working on the study could have resulted in bias, and there was significant bias in the language used in the report.

I was particularly interested in the training given in this study. The PAW flowchart (Topping, 1995) was explained to the sample group. The researcher and a volunteer from the class modelled the procedures in which role play and questions were particularly modelled and encouraged. The sample group were then supported to engage in similar activities. The pairings were left to the class teachers as it was felt they knew the children and understood their personalities. This issue was also relevant to my PAW study when I came to consider the PAW sample group.

Another interesting feature of this study was the pre and post intervention questionnaire which was designed and included in the paper (Nixon & Topping, 2001, pp.57, 58). It was completed pre and post intervention by the class teachers for every child in their class. Desoete (2008) had also created a Teacher Rating questionnaire for her study which included seven items on metacognitive prediction, four planning items, six monitoring items and three evaluation items. Although the results from both

the Teacher Rating questionnaires were positive, both questionnaires had been created for the particular study and had not undergone any tests of reliability.

2.12.3 Yarrow and Topping (2001)

This project was more ambitious and attempted to eliminate the failings of the two previous studies. Yarrow and Topping's focus was on evaluating the metacognitive prompting component and scaffolding with regard to pupil gain in both quality and attitudes to writing during 'collaborative writing', extended to subsequent writing while controlling for amount of writing practice. A precise definition of metacognition was not included in this study and it is arguable if the study achieved what it set out to do, as there is no evidence of data on metacognitive prompting and scaffolding.

Yarrow and Topping's (2001) research design matched pupils by gender, and pre test writing scores were used to randomly assign pupils to interaction or non-interaction conditions. In the interaction condition, the more able writers became the tutors for the less able. In the non-interaction condition, the more able writers acted as controls for the tutors and the less able as controls for the tutee. Over six weeks the paired writers produced five pieces of personal writing collaboratively, while pupils in the non-interaction condition did so alone. The project involved same age cross-ability tutoring with a behaviourally difficult class and consisted of the PAW interaction group and non-interaction group. The results from pre and post analysis of the quality of individual writing showed that all groups improved statistically significantly in writing outcomes, but that the pre/post gains of the pupils who wrote interactively are significantly greater than those who wrote alone.

The study reported that views of both pupils and teachers were sought during the project. However, no examples are included in the study. The Writer Self-Perception Scale (Bottomley *et al.*, 1997) was used to measure the pupils' perception of themselves at the end of the programme, and this scale had undergone validation and is therefore available for future projects, so in this case comparisons can be made. However, the scale was developed in the United States and Yarrow and Topping (2001) acknowledged that the mean low average range results could have been due to cultural differences and any interpretation must be cautious. The authors referred to their observations of the interaction in the pairs, but again no examples of the discourse are included.

This study improved on the previous two studies. The presence of randomly assigned control groups ensured that comparisons could be made and the outcome gains measured. However, without clear definitions of metacognition, any replication in future studies is not possible. In addition, the lack of examples meant that readers cannot appreciate exactly to what the authors were referring. The language used in the paper suggests a degree of bias on the part of the authors.

2.12.4 Duran and Monereo (2005)

I felt Duran and Monereo's (2005) study had considerable relevance to my PAW programme. Styles and sequences of cooperative interaction in fixed and reciprocal peer tutoring were examined. Sessions were recorded and interaction analysis was used to gain a better understanding of the processes that underlie tutorial writing. The authors claimed that, unlike the IRF, the three-part discourse of Initiation, Response and Feedback noted between pupil and teacher (Sinclair & Coulthard, 1975), peer interactions included the additional steps of collaboration (C) and evaluation (E) of

comprehension. This result supported the theories of Brown and Flavell and affirmed that PAW supports development of metacognition. Contained within the analysis is evidence of evaluation strategies, and within cooperation and collaboration are the subcomponents of questioning, initiation of problem solving, adapting new information and considering that of a partner. In addition, there are examples of scaffolding. The pattern of skills that has emerged from this particular work may be identified to support the views of learning as identified by Brown (1981, 1984) and Flavell (1978, 1979) and also Vygotsky (1978). These components, which are essentially metacognitive, include many of the skills associated with successful writing emphasised by Bereiter and Scardamalia (1987); Hayes and Flower (1980); Hacker *et al.* (2009).

Graesser *et al.* (1997), in particular, supported this extension and suggested that it is the fourth step of collaboration that is central to the tutoring process. Furthermore, they maintained that it is the pedagogical strategies implemented during this phase of interaction that are responsible for the advantages of this method over other forms of learning. They concluded that the one-to-one relationship ensured practice in interactive communication skills. They emphasised that, in the context of a busy classroom, the teacher would not be able to give a similar amount of attention on an individual basis with any frequency. This view is supported by Veenman *et al.* (2005) who suggested that metacognitive skilfulness comprises reflecting on the nature of the problem, predicting consequences of an action, checking the results of one's actions, testing for plausibility and reflecting on one's learning performances. It is these skills for which PAW provides a context and opportunities in which to practise.

2.12.5 Larkin (2009)

Larkin's (2009) study is complex and investigates not only the metacognitive content of pupil interactions but the influence of their social relationships, aiming to derive their social metacognitive profiles. It investigated the peer construction of metacognition in 5 to 7 year old pupils engaged on collaborative writing tasks. Other than Whitebread *et al.*'s (2007) observational work there has hitherto been little metacognitive research in this age group. Larkin's is a longitudinal study reporting on the qualitative analysis of observational data and reflections collected over a two year period. Both are important as the results repudiate the assertion of Veenman and colleagues that metacognitive skills are not apparent until late primary age. Like my PAW study, Whitbread and Larkin did not feel it was appropriate to undertake any form of grounded theory from their informed position. They viewed video tapes in order to identify 'observable' incidents of metacognition; they defined these as shifts in cognition from a focus on the task or social interaction at a cognitive level, to a focus on an aspect of cognition itself, or a focus on regulation and control of thinking.

A challenge with this form of analysis, which took the writing partnership as the unit, is achieving consistency. Further criteria stipulated that the incidents needed to be both acknowledged by the partnership and also to influence the collaborative task. Larkin (2009) recognised that it was only after much discussion that agreement between the two researchers could be reached, and only those incidents upon which there was agreement are included in the sample; unfortunately she does not reveal the percentage. Of interest to me are that her codes are similar to Brown's (1981) and Flavell's (1979) criteria that I discussed earlier, but she did not include detailed definitions and I had to make informed assumptions as to the similarities.

Another level of analysis focused on the social relationships within partnerships. In all instances examples of the criteria are provided, comprising task-oriented interaction; collaborative talk; supportive behaviour; cooperation; and on-task behaviour. These are labelled as high, medium or low. The dual nature of this study is impressive and provides valuable detail. For instance, because the metacognitive incidents are graded, pairs with a high frequency count of observed metacognitive behaviours are not simply coded as being more metacognitive than other pairs – their metacognitive behaviours may be rated as ‘low’. Similarly, pairs with the highest number of metacognitive incidents did not necessarily produce the best written work. Other considerations are that the social relationships between the pairs added another dimension to the profiles of metacognition and attainment and it is apparent that high achievers did not always score highly on social relationship factors.

Table 2.3 below shows Larkin’s (2009) criteria, derived from an ‘informed’ analysis of grounded theory. I have added impressions of correspondence to Brown (1981) and Flavell (1979) but, as Larkin (2009) does not include any definitions of the analysis criteria, these are based on my own deductions from Larkin’s examples. I felt that within knowledge of metacognition there is evidence of *declarative* knowledge and within regulation of metacognition there is *planning*. In addition, *information management questioning and organisation, planning questioning and organisation debugging* and *monitoring* were also present.

Table 2.3 Larkin's (2009) categories and comparisons

Metacognitive knowledge categories	Similar categories by Brown (1981) and Flavell (1979)
Selves as writers	Knowledge of metacognition declarative
Own thinking	Knowledge of metacognition declarative
Knowledge of task strategy	Knowledge of metacognition procedural
Refers to talk as a strategy	Knowledge of metacognition procedural
Influence of the environment	Knowledge of metacognition declarative
Joint knowledge	Knowledge of metacognition declarative
Monitoring, control and theory of mind	
Planning (between teacher and child)	Planning question and organisation
Planning (between pupil and pupil)	Planning question and organisation
Constructing ideas to meet task goal	Information management organisation
Error correction (verbal)	Debugging
Error correction (non-verbal)	Debugging
Monitors thinking	Monitoring
Child ask child what he thinks questioning	Could pertain to planning questioning or information management questioning
Child shows that they can take another perspective (theory of mind)	N/A

Further interesting observations from this study include:

- in spite of the struggles demonstrated by some pairs they continued to support each other with spelling and acted as monitors for each other's writing;
- the partnerships that revealed good metacognitive behaviour appeared motivated to carry out the task;
- the pupils also engaged in general talk about the overall goal of the task, and their non-verbal communication showed them to be attentive;

- these good metacognitive partnerships also had spells of silence in their collaborative talk; it was reported that in these periods the pupils appeared to be thinking before moving on to the next part of the assignment;
- there were many instances of scaffolding; in the turn-taking which helps to delimit the working load; throughout all the processes of planning and organisation; and
- variations in teacher contributions revealed that the non-directive teacher who gave time to her pupils to think for themselves revealed higher incidents of metacognition.

2.13 Implications of understandings of metacognition for classroom practice

In this section I am going to highlight arguments emphasising the importance of metacognition in educational achievement in writing and social and emotional development. There is general acknowledgement that metacognition is a fundamental cognitive process that supports educational progress and social emotional development (Hick *et al.*, 2009; Kuhn, 2005). Crucially there is agreement that metacognition is best developed within a social context. The classroom therefore can be seen as an ideal context in which to develop the full range of metacognitive skills. The work of Vygotsky (1978) and Piaget (1929) both support this thesis.

Hacker *et al.* (2009) worked towards obtaining a definition of writing and concluded that writing is indeed a metacognitive skill. Scardamalia and Bereiter (1982, p.165) found similarly when they referred to the skills associated with expert writers as 'knowledge transforming'. They identified the skills of planning, problem analysis and

goal setting. The important point here is that the difference between novice and expert writers is the presence of metacognitive skills in the experts.

The developmental nature of metacognition is therefore particularly important for teachers to understand as research has shown that metacognition can be promoted with practice (Doran & Cameron, 1995; Flavell, 1979). I see PAL/PAW as containing a concrete and consistent structure in which pupils have the opportunity to practise metacognitive skills. The literature has highlighted the skills of evaluation, control, prediction, monitoring and questioning with particular relevance to PAL in maths and science. Crucially it is the context of PAL where these skills can be promoted (Desoete, 2008).

The issue of intelligence is also important to consider. I have seen the importance some teachers attach to 'intelligence' and how their attitude towards pupils they perceive as 'bright' is different to less able pupils. However, more recent research has shown that it is metacognition which is the most reliable predictor of educational progress and social and emotional development and not intelligence (Swanson, 1990; Schraw & Dennison, 1994). Their conclusion is that although hereditary factors must be considered, it is the opportunities which pupils are able to seek, that most affect cognitive strategies. To my knowledge metacognition is not routinely assessed or overtly promoted in the classroom so many teachers are unaware both of its potential and what it entails. PAL has been shown to be a context where the requisite metacognitive skills (Desoete, 2009) can be promoted and therefore should be considered when planning curricula activities.

There is more debate surrounding the generality versus domain specificity of metacognition. Kuhn suggested that developing inquiry skills (questioning, predicting, evaluating and monitoring) in one domain affects progression in other domains. Her study also revealed that metacognition accompanied the acquisition of knowledge. Veenman and Verheiji (2001, p.1) found that there was a ‘generality of metacognitive skills across tasks and domains’. However, Chi and Glaser (1980) and Flavell (1978) determined that metacognition was domain specific.

Peer Assisted Writing is a natural setting where a range of metacognitive skills can be developed. It is the context of PAL/PAW which provides pupils with the opportunity to take control of their own learning and thus become independent learners. It is the purpose of this study to identify the metacognitive skills pertaining to PAW.

2.14 Summary

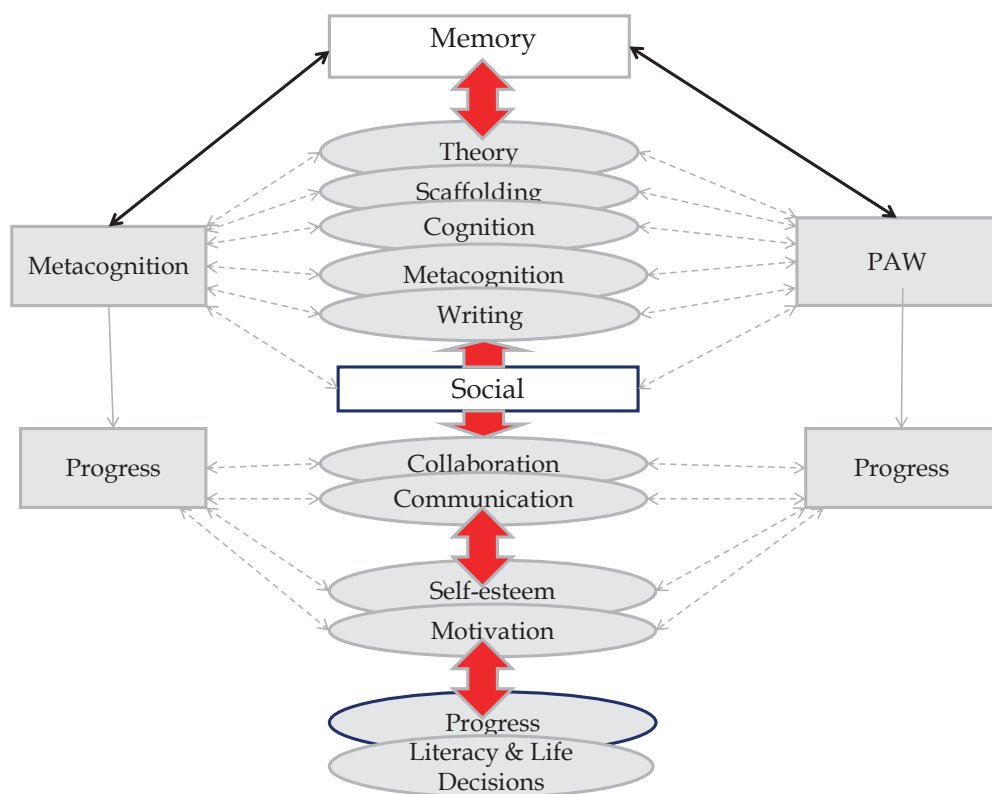
The impetus for this study came from the lack of studies in PAW in particular. I found three quantitative studies (Nixon & Topping, 2001; Sutherland & Topping, 1999; Yarrow & Topping, 2001). The two qualitative studies were Duran and Monereo (2005) and Larkin (2009).

The diagram below (Figure 2.1) encapsulates the essence of what I have discovered during my investigations of PAL/PAW. This includes the underlying theory, metacognition and cognition, writing and also where the role of memory fits into this complex tapestry. Important features are the two-way arrows demonstrating the interactive nature of theory, metacognition and peer assisted writing. I have placed memory as the central tenet as I believe that research has shown it to be fundamental in

the development of both metacognition and PAW (Brown, 1981; Flavell, 1979, 2002; Tarricone, 2011).

The importance of memory in all aspects of learning was discussed (Flavell *et al.*, 2002) and that memory processes are the fundamental processes of encoding, storage and retrieval. Consideration of these components has contributed to my understanding of how subsequent metacognitive coding schemes have evolved. The two heavy black interactive arrows leading to both metacognition and PAW emphasise the mutual influences that they play in supporting memory devices.

Figure 2.1 Mutual theory underlying PAW and metacognition



I have placed ‘Social’ centrally as it is the notion of socio-communication that plays a unique role in the underlying theory (Piaget, 1969; Vygotsky, 1978), PAW (Shamir *et*

al., 2008; Yarrow & Topping, 2001) and metacognition (Brown, 1987; Flavell, 1979; Shamir & Lazerovitz, 2007). The interlinking cells of theory, scaffolding, cognition, metacognition and writing have been so placed to demonstrate that they are the foundation of the intricate tapestry of PAW learning. The interlinking cells of collaboration and communication are the social aspects and in particular help to give rise to improved self-esteem and motivation that support development of metacognition and PAW and thus progress in literacy and life skills.

This study is immersed in the theories of Vygotsky (1978) and Piaget (1969) who confirmed that interactions with others increased pupils' awareness of their own cognition. Peer Assisted Writing is embedded in Vygotsky's (1978) ideas that learning is a social activity. It is through the communicative and interactive process of working with another pupil that the potential of the ZPD (Vygotsky, 1979) is activated and achieved. Importantly, language is seen as a mediating tool (Vygotsky, 1978) and the interaction with thinking is crucial. Peer Assisted Writing, whereby two pupils work together to achieve a predetermined goal, is therefore a context where discussion and thinking can be developed (Shamir *et al.*, 2008). The work of Duran and Monereo (2005) helped to explain why PAL/PAW has the potential to be successful. Their study cited collaboration and evaluation as prominent features of peer interaction not observed in interactions between adults and pupils.

The foundations of metacognitive study (Brown, 1981; Flavell, 1976, 1979) have been explored. The close links between cognition and metacognition have also been discussed, together with the possibility that they are not separable (Flavell *et al.*, 2002; Veenman *et al.*, 2006). Although the original work of both Brown and Flavell used different terminology, the researchers discussed the same principles of knowledge and

regulation of metacognition. However, there is not complete agreement as to the progression of knowledge and regulation of metacognition. Brown (1981) suggested that knowledge of metacognition develops during adolescence, whilst Flavell (1979) considered that development of both components takes place simultaneously. More recently, Wall and Higgins (2007) suggested if pupils had access to a thinking and learning environment that this would support them to develop both knowledge and regulation of metacognition at a younger age.

The complexities involved in writing were emphasised (Hayes & Flower, 1980; Scardamalia & Bereiter, 1987). It is significant that the skills involved in writing are metacognitive (Hacker, Keener *et al.*, 2009; Hayes & Flower, 1980; Scardamalia & Bereiter, 1987).

The next chapter will feature critiques of the methodologies of PAL, PAW and individual studies and discuss why I have chosen to investigate metacognition in the context of PAW as the focus of my research. It will also provide reasoned arguments for my choice of research design, methodology and the methods adopted for this study.

CHAPTER 3

Methodology

3.1 Introduction

Metacognition has been given a prominent role in progressing educational attainment (Baker, 1996; Metcalfe & Shimamura, 1994; Nelson & Narens, 1994) and in furthering understanding of behaviour (Barkley, 1998; Bush *et al.*, 1998). The difficulty has always been to determine the exact nature of these metacognitive skills and under what conditions they can be developed and promoted. I wished to further understanding of metacognitive development within the context of PAW and evaluate and compare outcomes from on-line and off-line methodologies when assessing metacognition, and thus developed the following research questions.

- How does a Peer Assisted Writing programme support pupils' development in:
 - Metacognition?
 - Writing?
- What do on-line and off-line assessment methods tell us about the metacognitive outcomes of Peer Assisted Writing?

To decide not only on methodologies but methods of data collection and analysis, I reviewed a wide range of studies in the field.

3.2 Previous research in the field

I shall first consider studies in PAL before moving on to discuss individual metacognitive studies. I will then consider studies in PAW. I shall look specifically into methods of data collection techniques and analysis.

3.2.1 PAL studies

I noted a wide range of aims and purposes of research in PAL studies; the methodologies, data collection methods and analysis differed considerably. I looked into training methods; Fuchs *et al.* (1996) and, in particular, Palinscar and Brown (1984) where both teachers and pupils underwent specific training. The latter (1984, p.122) emphasised active participation of the trainee and stressed that the more difficulties experienced initially by pupils, the poorer the results on completion of the task. In my pilot, I had demonstrated the processes of PAW only via an overhead projector and this experience, together with these studies, influenced my decision to devote more time to active participatory training in my PAW programme. I therefore spent time with the class teacher and colleagues so they were well versed in the processes.

The studies adopting mixed methodologies vary in their aims and objectives and the following researchers use both quantitative and qualitative methodologies:

- Palinscar and Brown's (1984) study used comprehension as the context, but their pairings were reciprocal with a teacher forming one of the pairs.
- Fuchs *et al.* (1996) in their maths study concentrated on data collection of both tutor and tutee explanations.

- Shamir *et al.*'s (2008) study in multimedia problem-based learning explored the effect on young children's critical thinking of peer tutoring training, embedded with the metacognitive process required for problem-based learning and critical thinking.
- Shamir *et al.* (2009) looked at the assessment of metacognition in different contexts: individualised vs. peer assisted learning. Their focus was on tutor explanations.

Of interest to my study is the use of control groups so comparisons can be made between groups. Peer Assisted Learning studies featured data collection methods including interviews (Shamir *et al.*, 2009) and video recording (Fuchs *et al.*, 1996; Palinscar & Brown, 1984; Shamir *et al.*, 2008). In the primary age range video recording is frequently used, and this is true also for individual metacognitive studies. Table 3.1 provides descriptions of some of the studies I found on PAL and indicates the age ranges of the pupils, curriculum areas, methods and descriptions of the coding schemes selected.

Table 3.1 Summary of peer assisted learning studies

Study	Age range	Quantitative/ qualitative	Curriculum	Method	Coding description
Palinscar & Brown (1984)	12-13	Quantitative/ qualitative	Comprehension	Video	Summarising; predicting; questioning; clarifying.
Fuchs <i>et al.</i> (1994)	8-11	Quantitative/ qualitative	Maths	Video: Observation	Explanatory prompt/question; work on problem; explanatory statement/demonstration; check/correct; verbalisation
Fuchs <i>et al.</i> (1996)	7-10	Quantitative/ qualitative	Maths	Video	Rating tutors' help and explanations; characterisation of tutors' help and explanations; identification of high achieving students; account of tutees' performance.
Shamir <i>et al.</i> (2008)	6-7	Quantitative/ qualitative	Critical thinking	Video	Use of Newman <i>et al.</i> (1995) which included a range of critical thinking indicators: relevance of importance; novelty and outside knowledge; linking ideas and interpretation; practical utility; thinking reflectively; width of understanding.
Shamir <i>et al.</i> (2009)	4-5	Quantitative/ qualitative	Recall of pictures	Observation	Cognitive performance; theory of mind; language ability; declarative metacognition (self-report); procedural metacognition in individualised learning; procedural metacognition in PAL.

3.2.2 Metacognitive studies

Studies that investigated metacognitive issues mainly concerned individual learners in the older age range, but I wanted to look specifically at methodologies, data collection

methods and methods of analysis in primary age pupils, so my choices were again limited. Again the aims and objectives varied, as did the formats and subject areas, for example:

- Sperling *et al.* (2002) adopted a quantitative methodology to investigate measures of children's knowledge and regulation of learning.
- Wall and Higgins (2006) discussed studies where they had used Pupil View Templates to investigate metacognitive skills in a range of studies. These studies included Wall *et al.* in 2004, investigating how information and communication technology could be used to facilitate talking and learning and the process of compiling digital portfolios in primary schools (Higgins *et al.*, 2004).
- Desoete (2008) studied metacognitive skills in Flanders with pupils of an average age of 8^{1/2} years with and without mathematical disabilities and used quantitative methodology. This study was a multi-method assessment comparing a range of methods including Think Aloud Protocols, prospective and retrospective child ratings, teacher questionnaires, calibration techniques and EPA2000 (De Clercq *et al.*, 2000).
- Whitebread *et al.* (2009) developed an observational approach for the identification of metacognition in young children, and their two observational tools assessed metacognition and self-regulated learning.

Table 3.2 below provides further details of these metacognitive studies.

Table 3.2 Summary of metacognitive studies

Study	Age range	Quantitative /qualitative	Curriculum	Method	Coding description
Sperling <i>et al.</i> (2002)	Grades 3-9	Quantitative	Normal class procedures	Jr. MAI (based on Schraw & Dennison, 1994) and metacognitive problem solving inventories: Fortunato <i>et al.</i> (1991) Jacobs & Paris (1987) Teacher ratings and Student achievement scores	Metacognitive knowledge and regulation inventories using the Brown (1978) framework.
Wall <i>et al.</i> (2006)	Primary	Quantitative/ qualitative	ICT and compiling digital portfolios	PVTs	Information gathering, building information, productive thinking, strategic and reflective thinking.
Desoete (2008)	Average age 8 ¹ / ₂ years	Quantitative/ qualitative	Maths	Video: Think Aloud Protocols: Perspective and retrospective child ratings: Teacher questionnaires: Calibration measures: EPA2000	Prediction, planning, monitoring and evaluation.
Whitebread <i>et al.</i> (2009)	3-5	Quantitative/ qualitative	Group and individual play activities	Video observational - development of coding scheme	Metacognitive knowledge – declarative, procedural, conditional. Regulation of metacognition – planning, monitoring, control and evaluation. Emotional and motivational regulation.

The only research that used the full range of metacognitive codings, that is, knowledge of metacognition including *declarative* knowledge, *procedural* knowledge, *conditional* knowledge and regulation of metacognition; *planning*; *information management*; *monitoring*; *debugging* and *evaluation* (Brown, 1981; Flavell, 1979), was by Sperling *et al.* (2002, p.57) who used the Jr. MAI (based on Schraw & Dennison, 1994) in a range of normal classes. However, this was a self-report inventory that the pupils are requested to complete by indicating how often (Never, Sometimes or Always) they participate in a range of activities. I considered that this off-line method was prescriptive and the danger is that the statements could influence those completing the forms. I felt this would be particularly so with primary age pupils.

3.2.3 PAW studies

The paucity of studies with qualitative metacognitive data collection techniques on the interactions between children had been noted in the literature review. Table 3.3 provides an indication of the scarcity of PAW studies undertaken since 1999, in particular the lack of qualitative metacognitive research, and shows the variety of formats, pupil ages, methodologies and methods of analysis.

Table 3.3 Peer Assisted Writing studies

Study	Format/ Pupils	Data collection tools	Subject	Method- ology	Analysis
Sutherland & Topping (1999)	Same and cross age 10-11 years	Pre-post individual writing assessments, Pupil feedback	PAW writing	Quantitative and qualitative (writing samples)	N/A Not metacognitive
Nixon & Topping (2001)	Fixed 5 and 11 years	Pre-post individual writing assessments, observation, teacher and pupil questionnaire	PAW writing	Quantitative and qualitative (writing samples)	N/A Not metacognitive
Yarrow & Topping (2001)	Fixed 10-11 years	Pre-post individual and interactive writing assessments, teacher feedback, writer self-perception scale	PAW writing	Quantitative and qualitative (writing samples and self-esteem scale)	N/A Not metacognitive
Duran & Monereo (2005)	Fixed and reciprocal secondary (14 years)	Audio recording, observation and post recording report for each pupil	PAW writing	Qualitative (pupil interactions)	Sequential (metacognition not the issue)
Larkin (2009)	Peer construction 5-7 years	Observation, video and teacher reflections	Collaborative writing activities	Qualitative (pupil interactions)	ATLAS i software (metacognitive)

Yarrow and Topping (2001, p.261) claimed that their flowchart ‘incorporated both metacognitive prompting and scaffolding for the interactive process’. However, despite these claims, there is no evidence of any definition of metacognition and it is not assessed in any way. I felt that their flowchart was too complex for 10-11 year old

pupils, which was why in collaboration with the class teacher I amended it for both the pilot and my main PAW programme (see Appendix 2). In this study I increased the number of training sessions to two. This decision was based on my experience in my pilot study.

Duran and Monereo's (2005) qualitative analysis of fixed and reciprocal peer tutoring, whilst not specifically metacognitive and also just out-with the primary age range, is relevant to my study as it used audio recording of interactions in pairs of students. Moreover, the study's identification of 'collaboration, tutorial and the prototypical initiation-response-feedback sequence' is crucial to metacognitive development (Vygotsky, 1978). Also analysis of the tutorial exchanges between the pairs identified two extra categories of collaboration and evaluation. These add to those of initiation, response and feedback, identified by Person and Graesser (1999) as accepted exchanges between teacher and pupil. I considered that their inclusion would support positive metacognitive experiences (Efklides, 2006) and contribute to positive self-image and hence self-esteem. This view is supported by Larkin (2006, p.23), who found that the collaboration apparent in group work promoted self-confidence, thus metacognitive processing became overt and was also supported and influenced by peers.

Another issue I wanted to investigate was that of the unit of analysis. Although as described they were not primarily concerned with metacognitive analysis, Duran and Monereo (2005) took the message as the basic unit. Another option would have been to take the unit as indicating 'a unit of joint activity', as did Larkin in 2009. I felt the former to be more suited to my study, as it fitted better with a recognised metacognitive framework (Brown, 1981; Flavell, 1979). This framework demanded a

concrete unit providing detail and precision and this would not be possible using a more open-ended unit of analysis. Larkin (2009) acknowledged problems experienced in determining what exactly constituted a unit of joint activity. This, together with an appreciation of the difficulties involved in metacognitive analysis, influenced my decision to consider other alternatives. Larkin's (2009) study investigated the peer construction of metacognition in 5-7 year old pupils engaged in collaborative writing tasks, and of relevance to me was its use of video recording and qualitative methodology.

The few PAW studies using qualitative methodology and targeting metacognition meant there were a limited range of previously used data collection methods, and no template to act as a model for my study to form the basis for comparison. I felt that my wider search of PAL studies and metacognitive studies was important; not only to see the age ranges and curriculum areas researched but also to look into details of analysis and methodology which had been used.

3.3 Methodology

A recent paper by Hodkinson and Macleod (2010) argued that different research methodologies have strong affinities with particular conceptualisations of learning. As already acknowledged, my background is in language studies, psychology and teaching and I believe learning is socially mediated, thus I am rooted in Vygotskian, socio-cultural and social constructivist theories. The PAW context of collaborative learning regarding social, communication, interaction skills and scaffolding is of key importance to learning and is another strand of the same belief system.

Bryman (1984) suggested that the interpretivist stances of socio-cultural and social constructivism could be seen to be directly opposed to the quantitative or empirical stance. However, he further documented that one of the main difficulties with this view is that philosophical and technical issues are often treated simultaneously and could therefore be confused. This, he stressed was a result of viewing the former as a question of epistemology and the latter as relating to appropriateness of methods; and that much methodological literature emphasised that the latter derives from the former. Bryman (1984, p.89) also argued that there is 'no necessary 1:1 relationship between methodology and technique in the practice of social science'. Part of the problem is that method and methodology were considered together and it is therefore essential to document that methodology refers to quantitative or qualitative, and method the chosen technique. Indeed, there is a case for suggesting that techniques were neutral in respect of epistemological issues and debates (Symonds & Gorard, 2010).

One of my aims in carrying out my PAW research was to get to the root of the processes involved. The literature demonstrated this gap in research. I therefore needed to adopt a qualitative stance on this issue. However, as a practising teacher I believed I had a duty to both pupils and parents to measure the efficacy of implementing a programme of PAW. I decided to develop a mixed methods approach aimed, as documented by Feilzer (2009), at both the problem to be researched, that is, the investigation of pupils' interactions, and the consequences, that is, their learning outcomes. By taking this stance I felt that the appropriate methodology should combine both qualitative and quantitative elements, the former to elicit the nature of the interactions between the pupil pairs and the latter to measure the efficacy of the PAW programme. Symonds and Gorard (2010, p.126) suggested that it is arguable that all data gathered by open-ended methods began as word, visual, audio or kinaesthetic

data. They also discussed what Tashakkori and Teddlie (1998) referred to as 'quantitising', which is the transformation of qualitative data into quantitative data. In this way they suggested that any type of data can be construed as numerical and at the same time retain elements of its original qualitative qualities. On-line and off-line methods lent themselves to both qualitative and quantitative investigation and, with regard to my PAW programme, can be seen as complementary. Furthermore, Vygotsky's work was to support literacy in the underprivileged in Russia and he, too, took the line that a combination of both qualitative and quantitative research is the way forward (John-Steiner & Mahn, 1996).

Roscoe and Chi (2007) noted that most PAL studies are quantitative and emphasise educational gains for both tutee and tutor. My searches revealed that qualitative research in PAL is scarce, and both quantitative and qualitative studies are especially limited with regard to PAW. As noted elsewhere, this has provided impetus for my study, as did the fact that it is located in a real-life setting. It meant the relationship between context and educational policies and pedagogies could be explored, focusing on what takes place when two young people work together to explore a specified goal. Only when these different influences are accepted may a full investigation be made.

Punch (2005) expressed the view that a qualitative study aims to look at something holistically and comprehensively, investigating the phenomenon with all its complexities. To do the opposite and employ only a quantitative approach would arguably fail to reveal the processes involved (Duran & Monereo, 2005) and therefore not answer my first research question. The knowledge gained from this study needed to inform practice and support development of strategies to promote metacognitive thinking skills within a busy classroom. My choice of research design was therefore

that of a mixed methodology employed within a real-life case study, using a formative action research framework. The underlying decisions will be discussed in the next section.

3.3.1 Action research

The decision on research design was promoted by Bell (1985, p.181) who championed the notion of a ‘practitioner case study’. Incorporated into this view is the ‘study of cases, the study of change (action research), and the study of samples’ that he argued should form an evenly integrated approach. One of my concerns in using action research was the traditional view that saw this as teacher research (Elliot, 1991). In my PAW programme, although I was a qualified teacher, my role in the school was that of educational psychologist. Bell’s (1985) variant of ‘school based inquiry’, which he termed ‘action inquiry’, incorporated action research, case study and action learning.

An important part of his thinking is that, to improve practice, teachers should have access to the knowledge and ideas of colleagues rather than concentrate solely on investigating their own practice. In addition he suggested that the term ‘case study’ for the means of reporting action research was detrimental; he argued for a distinction between investigation of practical problems through a study of planned and evaluated change (action research) and an investigation of an educational situation where case study is used to gain unobtrusive insight.

Bell (1985) also suggested that the presentation of school-based action research should comprise a report founded on a database. Equally, the appropriate format for reporting practice by case study is a practitioner case study founded on a case record. Bell’s further thinking is that adherence to this structure would result in a tighter research

approach whereby comparisons could be drawn. Hitherto this had not been possible due to the independent teacher approach and development of a more collaborative approach in action research that poses additional problems of how to present a report.

The benefits of action research have been documented (Baumfield *et al.*, 2008; Crabtree & Miller, 1999; Denscombe, 2003), but definitions of action research vary (Bell, 1985; Elliott, 1990; Hammersley, 2004; Stenhouse, 1975). In my study the processes incorporated into my framework included the processes identified by Elliott (1990): collaboration with school, staff, children and parents, sharing of ideas, elements of reflection, evaluation and feedback. Meetings with the class teacher informed the selection of pupils, their pairings, choice of story titles and details of the PAW flowchart such as approaches to editing. This cyclical process started with the pilot PAW study and informed the main study. Elliott (1990, p.49) also emphasised that activities such as teaching, educational research, curriculum development and evaluation are integral aspects of an action research process.

My role seemed to me analogous to that of a class teacher and fitted well with the ethos of action research that saw development and change as central (Baumfield *et al.*, 2008; Crabtree & Miller, 1999; Denscombe, 2003). It seemed inevitable that development and research were intertwined and allowed practising teachers to reflect critically upon their practice. Further arguments came from McNiff (1988) who claimed that the social basis of action research is involvement, the educational basis is improvement, and that in many cases it will demand change. Indeed she saw the participatory procedure as more effective in solving problems than an imposed, structured process into which people are expected to fit (McNiff, 1988).

For my purposes, the element of action research involved introducing the PAW programme. This part included planned change and involved the collaborative development of the PAW programme; planning, reflection and evaluation of all stages of the programme through meetings with school staff. The notion of a continuous spiral of planning, reflection and evaluation was present, starting with the pilot study and proceeding through all stages of planning the main programme to its actual implementation. Development through a process where each stage informed the next was also evident during the process of analysis, when analysis of the video and the categories identified helped to inform analysis of the PVTs and TAPs.

The egalitarian approach of collaboration prevalent in action research contrasted to any conception of myself, the researcher, as the expert. I was determined to remove myself from this image in my PAW study as I considered that it would work against progress, change and development and hinder my relations with the school. The collaborative aspect promoted respect and an appreciation of the knowledge of others. I noted openness on the part of the teachers both to learn and to investigate learning, but I was aware of the potential for tensions and difficulties to arise when groups worked together. The priority was the centrality of the pupils and I recognised that marked teacher motivation would stem from a blend of personal interest, a desire to promote educational progress and the opportunity to promote professional standing. These aspects should be acknowledged since they raise questions of validity.

Bell (1985), and Groundwater-Smith and Mockler (2007) suggested that, woven into the action research spiral, should be consideration of values, quality and ethics. This fitted with the epistemological underpinnings of my study and Bell's (1985, p.180) view that questions of value are the heartland of educational inquiry and cannot be

‘gazed’ upon, in the way that science depends upon observation. He therefore placed emphasis on critical rigour and validity, both of which will be discussed more fully in Sections 3.4.1 and 3.4.2. I was always aware of the importance of upholding high standards and professionalism, considering it to be essential to the tight and explicit research framework and structure necessary for replication and comparison with future case studies.

Besides my decision for action research, I felt that the inclusion of an embedded case study would allow in-depth and intensive study. The promotion of change is prevalent in both (Robson, 2002), and together they acted as a base for my PAW programme.

3.3.2 Case study design

Case study design is recognised to be problematic (Yin, 2009). The main criticism is that case study design offers no opportunity for generalisation (Punch, 2005). The literature reveals a number of views and issues surrounding this issue. Punch (2005) and Yin (1984) both recognised that there are problems of generalisability from one case study. Punch (2005, p.146) found that there are two types where generalisability is not the objective; a case so interesting or misunderstood that it merits study in its own right; and one that is unique and therefore worthy of study. In both instances, the point is not to generalise but to gain understanding of the individual case. However they also suggested that there are many instances where a broader view is sought. They considered that generalisation is dependent on the purposes of the case study and the way the data is analysed; that conceptualisations and the development of propositions can be put forward which have the potential to be applicable to other cases. Larson (2009, p.28) made a succinct case for the credibility of taking a pluralist view of generalisation in qualitative research. Of particular relevance to my research design

was his identification of generalisation through context similarity of case studies. Larsson's argument gave attention to context and similarity between contexts and also stressed explanatory power as a replacement for generalisability. The implication is that the value of this reasoning lies in the strength of a thick data description and thorough descriptions of contexts which would put the researcher and audience in a position to make similarity judgements possible.

In turn Flyvberg (2006) argued for the place of case study design in qualitative research and refuted the view which undermines the value of case studies in favour of large scale research. He supported Kuhn (1987) who suggested that any discipline without large numbers of well constructed case studies is a discipline without systematic production of exemplars and that a discipline without exemplars is an ineffective one; that in social science a great number of good case studies could help remedy this situation. Flyvbjerg (2006, p.241) also advocated that the benefit of large samples is breadth, whereas their problem is one of depth. For case studies the situation is the reverse.

Further support for case study design came from Pring (2000, 2006) who discussed the uniqueness fallacy (Pring, 2000, p.258) which refers to the false entailment from every event being unique in some respect to every event being unique in every respect. Pring's thesis is that uniqueness in one respect does not entail uniqueness in every respect. Embedded in his approach is the notion that full understanding of an educational practice requires the careful analysis of the social situation; that in-depth qualitative research is essential in order to avoid gross generalisations.

I was also aware of criticisms by Punch (2005, p.148) that too much research had preferred to take a quantitative stance and go straight to measurement and quantitative mapping, without complete understanding of the processes involved. A principle aim of my study was to gain an in-depth understanding of the processes involved in PAW through examination of the interactions between pupils. The current literature on PAW and metacognitive data collection methods and analysis is sparse and an in-depth study would form a basis for further exploration.

I believed that the inclusion of case study design would ensure provision of an accurate, clearly defined, in-depth description of the pupil interactions which would be dependable and replicable. Case study design would be a complement to action learning, which required my engagement in the processes. I considered that the clearly defined boundaries and in-depth investigation associated with good case study design and the element of feedback and reflection associated with action research would contribute to answering my research questions.

Another decision I had to make concerned my choice of case study. Theodorson and Theodorson (1969) suggested that the case may be a person, a group, an episode, a process, community, or the intensive analysis of many specific details that tend to be overlooked by other methods. My case study consisted of four pairs of pupils who had been selected by their teacher as the lower achievers in literacy in their class. However, I decided that, embedded within my case study, another case study would consist of a single pair. I made this decision after twice viewing all the video tapes of the four sample pairs and considering observations and diary records compiled throughout the programme; in addition, the pilot study supported the idea. From a list compiled whilst observing the video I developed the additional criteria for analysis. Similarities

between the four pairs were apparent, and this was reinforced when I transcribed and analysed a tape of another pair of pupils. To transcribe all 40 tapes of 45 minutes duration would have been prohibitively time-consuming. This was due to the numerous rewinds necessary to ensure I heard correctly every exclamation and spoken or muttered word from the pupils (the variability of sound volume caused by the pupils' head movements towards and away from the fixed microphones added to the repeat auditions). In addition, time was spent documenting the pupils' behaviour. I argue that my case was chosen as representative of other cases; that no two cases will be the same; and that the aim was to investigate in detail what occurs when two children work together to a defined objective. The in-depth investigation of a single case would be a starting point for subsequent larger scale studies.

Further support for my decision came from Robson (2002) who drew attention to the importance of thorough analysis and assessment in order to determine transferability to other situations. He pointed out that this contrasts with traditional views of quantitative research where the starting point was a hypothesis. Here, the starting point is the outcome; when it is ascertained that further investigation can take place and strategies implemented, there is a basis for further exploration. This is complementary to action research's cyclical reflective practice, the central ethos of which is to support teaching and learning. Rigour is important in all research, but particularly so in 'systematic enquiry made public' (Stenhouse, 1981).

3.4 Issues of quality

Issues such as reliability and validity are crucial and my knowledge and interest, together with the motivation of an enthusiastic staff, raised the question of quality that I will now discuss.

3.4.1 Reliability and validity concerns

My PAW study adopted a mixed methodology and, as such, issues such as reliability and validity were equally important (Hayes, 2000). I saw rigour as central to both the qualitative and quantitative areas. My aim for a tight structure and defined boundaries informed my decision to use case study design and ensured that the study could not only be replicated but supported claims to validity. I shall now outline areas of concern and efforts to ensure that these were minimised.

Traditional action research (Elliott, 1991) has been criticised due to difficulties of generalising results from projects beyond their specific context (Baumfield *et al.*, 2008). Baumfield *et al.* (2008) held the role of partnerships to be crucial and, in my PAW programme, the partnership was myself as the knowledge base, working with a class teacher and other school staff to implement change. This represented a collaborative balance of knowledge working and supporting teachers in a school-based enquiry that I felt would add rigour, and therefore transferability, to the outcomes.

The numbers in both the pilot and main PAW project were small (two pairs in the pilot and four pairs in the main PAW programme), but I believed they were representative of pupils who experienced difficulty with writing, be they able, less able or with specific learning difficulties. I felt that leaving to the class teacher the selection of pupils, who were from the lowest achieving in literacy, prevented any bias on my part. Also, providing detailed accounts of each pupil meant that other researchers saw the complete picture (see Sections 3.5.1 and 4.2).

Equally, stringent measures of reviewing the data and subsequent analysis and re-analysis helped to secure rigour and validity. This was an important issue, particularly

as the construct of metacognition is subject to debate regarding its definition and there are issues of analysis. I hoped that data collection methods of video recording, TAPs and PVTs would provide triangulation and enable metacognition to be viewed in a constant context yet assessed in different ways. Whilst I recognised that they were conceptually different approaches and could not be compared, I hoped that three different data collection tools would contribute in their own way to furthering understanding of metacognition in a natural school setting. In addition I wanted to investigate assessment tools that could be directly linked to pedagogy.

The quantitative approach would be demonstrated by the class teacher writing assessments pre and post the PAW programme. The rest of the class would form the control group. In addition, word counts as a further measure were planned, based on the pupils' writing assessments. A further issue included the presence of cameras, as this could have altered the interaction and communication between pairs. Had this been the case, the ecological validity of the study would have been at risk (Hayes, 2000).

I was also anxious to demonstrate a high degree of trustworthiness. This form of naturalistic research was in contrast to the positivistic criteria of internal and external validity, reliability and objectivity and should include a thick description of phenomena, an audit trail and member checks (Denzin & Lincoln, 2000; Hayes, 2000; Robson, 2002). In Chapter 4 I shall show how I tried to attain this and, as Denzin and Lincoln (2000) suggested, make the process of theory development visible and verifiable. I kept a diary record by writing notes immediately after each writing session. I also carried out a non-structured interview with the class teacher on completion of the PAW programme. I saw these as two further measures of triangulation.

The issue of trustworthiness also raised the question of achieving a high standard of ethics, which I will now discuss.

3.4.2 Ethical issues

Consideration of high ethical standards pre, during and post the research study was crucial (Alderson, 2005) and I therefore referred to the Code of Ethics set by the British Psychological Society (1990). I gained informed consent from the parents of the pupils concerned. All parents received a letter outlining what was involved in the project and data collection and I asked them to sign and return a consent form (see Appendix 5). In addition they were offered an individual meeting with the researcher in case there were any outstanding queries, but none took up the offer. The pupils viewed a presentation of the PAW flowchart (based on Topping, 1995, see Appendix 2) using an overhead projector and they, too, were offered individual sessions in order to clarify any issues. Again, none requested a session. They were also given the choice of participating in the programme and were told that they had the right to withdraw at any stage.

Whilst all these procedures were essential, I was aware that in highlighting and placing emphasis on the programme I was singling it out as a special issue, and the result might be greater specific parental interest and support for pupils than otherwise. This is an important point and should be considered together with the enthusiastic support given by the school and staff.

The complex ethical considerations when using video recording were carefully weighed (Elderkin-Thompson & Waitzkin, 1999), as I was anxious that everyone

participating in the project understood exactly what was required and that they appreciated how the data was to be used.

I saw feedback as crucial and at the mid-point and end of the PAW programme I wrote reports on the pupils' progress, which the class teacher reported to all the parents at a parent-teacher evening (see Appendix 6). I later met all but one pupil's parents to give a first-hand report of the PAW project and their child's progress and provided specific details of the data analysis. Illness had prevented one set of parents from attending, but they discussed their child's progress on the telephone. At both the face-to-face meetings and on the telephone I reaffirmed that the children's anonymity would be respected and that the identity of the school would not be disclosed in any subsequent report or thesis. I also asked parents to sign a further form consenting to photographs of the children being included in the thesis if I felt it necessary and also for a poster summarising the PAW programme to be designed and displayed in the school and Education Department. All parents agreed and signed the form. I was aware that young people can be trusting of adults and this can have a tendency to undermine their competency to give true informed consent. Prosser (1992) suggested that consent using visual methodologies should be viewed as a continual process and not as a one-off episode.

There were further ethical considerations raised by the research design. Withholding treatment for selected pupils and associated arguments put forward by Zohar and David (2008) meant links with the field of medical ethics were relevant to this project. The original plan was for the research design to include an entire class but, although this was the preferred choice, practical issues such as the use of videos, microphones and the implementation of the TAP procedures rendered this neither feasible nor

practical. However, I felt that ethically it was appropriate to explain to the rest of the class what was involved in the PAW programme. A practical advantage of working with the class teacher meant that when the TAP assessments were taking place with a sample pair, the other three pairs in the selected group could work in their class. Although the PAW intervention was exploratory, my aim if the PAW was successful was to extend the project throughout the school and to other schools in the Education Authority.

I stressed to both parents and children that only myself, colleagues and University staff would have access to the tapes and these would be destroyed after five years. I recognised that if permission were not given, the videos could never be viewed by other researchers to satisfy questions of validity and that secondary analysis could be carried out at a future date only if further permissions were obtained. Crabtree and Miller (1999) pointed out that, although transcription represented an anonymous method circumventing this difficulty, non-verbal features are lost. Another concern I addressed was storage of data under locks when not being used. A final issue relating to quality was that of my own interest and knowledge base, and I now address this point.

3.4.3 Reflexivity

I recognised that there was a risk of bias; my own interest in this area has been documented. Prior knowledge, personal biases, values, beliefs and experiences – all had the potential to influence choices including methodology, decisions with data collection and analysis. A balanced rational approach was called for; however it would be unrealistic to suggest that this research could be carried out as if starting with a clean slate.

A colleague agreed to be my second analyst in order to provide inter-rater reliability. He did not possess in-depth knowledge of metacognition, but was informed by reading appropriate articles. In the process of analysis, coding was the result of agreement. My aim throughout was to strive for balanced, collaborative thinking and also to attain 'critical rigour' (Bell, 1985) with the provision of a grounded, articulate and structured report. I also had to consider the marked support given by the school, head teacher and class teachers. Whilst the over-riding influence was undoubtedly to promote literacy, I was also aware that issues such as school development plans and school inspections were a motivation.

3.5 Sample

The impetus from the school for the study was its concern with poor literacy and this in itself was a powerful motive for success. However, during all stages of the programme the children played a central role, and I now provide details about how my sample group was chosen.

3.5.1 Sample selection

In order to achieve impartiality I asked the class teacher to identify eight pupils from the lower achieving in literacy in her composite Primary 6/7 class. The ages of the selected pupils ranged from 10-11 years. One was dyslexic, three were weak across the curriculum, two were able but with poor literacy attainment, one had a diagnosis of Aspergers syndrome, and one was in middle groups apart from literacy (further details are included in Section 4.2).

The sampling was therefore purposeful (Hayes, 2000) and similar to the approach used by Palinscar and Brown (1984). This complemented advice from the Audio Visual Department (AVD) that four pairs was the maximum number that could be recorded simultaneously. Again on their advice, the sessions took place in a separate room. There was no doubt that the pupils selected felt special. This was apparent from their discussions and enthusiastic participation, and could have had a positive impact on their efforts; I recognised a risk of advantage that might bias the findings. However, I felt that these pupils had experienced difficulties and if their selection supported them to embrace learning, it was justified. As discussed in the previous section, I had concerns about the ethical implications of withholding a resource from some pupils, and I decided that if, in the future, PAW could be used throughout the school, some of the ethical implications would be resolved. I shall now provide a rationale for the composition of the pairs of pupils.

3.5.2 Composition of pairs

Tutoring formats can vary, based on age and the knowledge gap between participants, and also the nature of the roles. These may remain fixed, when pupils retain their roles of either tutor or tutee, whilst in a reciprocal pairing the roles change during the activity (Roscoe & Chi, 2007). Daiute and Dalton (1993), in line with Vygotsky (1978), suggested that pupils of similar skills and age are able to support each other if they are provided with an appropriate structure; that it is the opportunity to exchange views and produce dialogue that is responsible for successful learning outcomes.

The selected pupils were paired by the class teacher on the basis of who worked well together. Observations gained from the pilot study were that the pupils preferred to switch roles throughout the PAW sessions and, since the pupils were of similar age

and ability, I adopted the reciprocal arrangement. The pupils therefore took it in turns to compose and write their stories.

3.6 Data collection tools

Figure 3.1 Data collection tools: how they answer the research questions

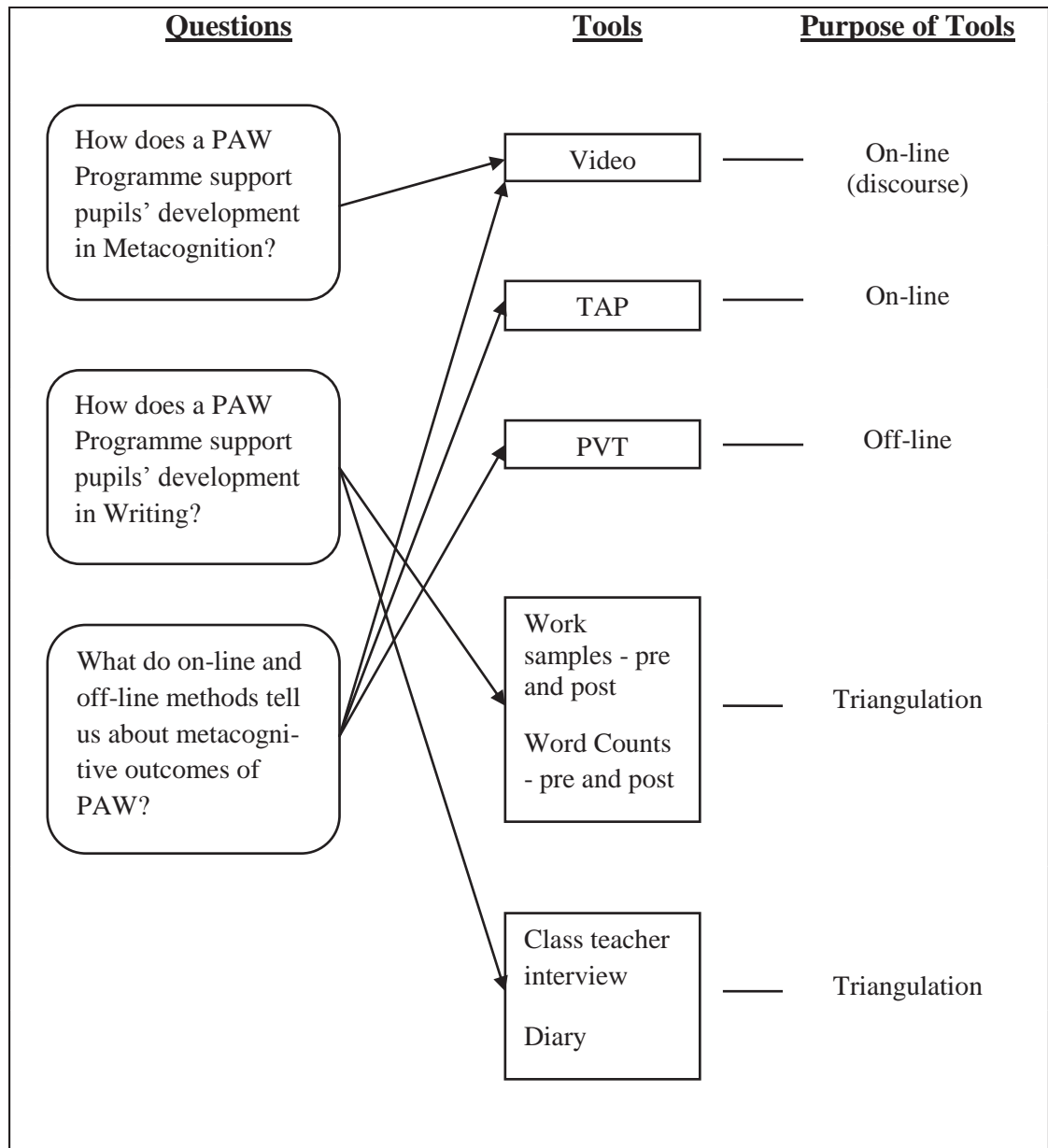


Figure 3.1 above illustrates my data collection methods and how these tools answer my research questions. In the following discussion I provide reasons for my choices.

3.6.1 On-line and off-line approaches

Veenman and Spaans (2005) termed the assessment of metacognitive skills either on-line or off-line and advocated that on-line is the most appropriate method. In their definition, on-line is concurrent assessment taking place during the task, whereas off-line could be conducted pre or post task. Questionnaires, interview techniques, self-reports and PVTs are termed off-line, whilst verbal methods such as video recording and Think Aloud, Talk Aloud and Think Aloud when Prompted (TAP) are referred to as on-line.

My PAW study required both on-line and off-line methods. I wanted to research methods in this under-researched field and also to compare results and thus identify which tools would best assess metacognitive skills in PAW. I have therefore listed below some PAW, PAL and individual studies that investigated metacognitive processes using on-line methods in the primary age range. I have included details of these studies as I felt it important to ascertain how previous metacognitive studies had collected data and also to compare results. I have previously discussed Larkin's (2009) study, but shall include further details of the differing methods below.

Larkin's (2009) project with 5-7 year olds was the only PAW study I could find that used qualitative methods to investigate metacognition. Observation, video and teacher reflections were used. The writing partnership was used as the unit of analysis and an interesting outcome of this study was the small amount of metacognitive talk found in this age range, which I felt lent credence to the developmental nature of metacognition. I outlined the codes Larkin used in Table 2.3 and suggested their similarity to Brown (1981) and Flavell (1979). Larkin (2009) used a form of informed grounded theory for

her two levels of analysis, but acknowledged the undoubted influence of Brown (1981) and Flavell (1979). Her analysis included metacognitive knowledge centred on the idea of person, task and strategy level (Flavell, 1979) and what she termed child codes of monitoring, control and theory of mind. These include *planning*, *constructing ideas*, *constructing ideas to meet task goal*, *error detection* (verbal and non-verbal), *monitors thinking* and *questions* to elicit thought. Although there are similarities with my PAW coding scheme, there was no overt reference to *information management* and *evaluation* codes. I could see that, subsumed within *constructing ideas to meet task goal*, were elements of my *IM organisation*. However, although Larkin (2009) included examples, she did not include detailed definitions. Her sample consisted of 5-7 year olds, which made comparisons with my PAW study difficult as her examples were predictably more simplistic than those found with my older age group.

I outline below the salient results from this study:

- Good metacognitive partnerships evidenced more motivation.
- Scaffolding was more prominent in good metacognitive partnerships.
- There was more metacognition in classes with non-directive teachers who gave pupils time to think.

Fuchs *et al.* (1994) used video recording in their PAL maths study. The nature of student interactions during peer tutoring with and without prior training and experience was examined. In this study the pupils' ages ranged from 8-11 years. Video recordings were analysed at three different levels: micro-level quantifications, global ratings, and transcripts of representative dyads. The results showed that the trained peer tutor supported more interactions with his partner and also provided more opportunities for

his partner to respond. The tutor without training tended to complete verbally entire problems for his partner. He also spent more time in 'explanatory monologues' and demonstrations than the trained tutor (Fuchs *et al.*, 1994, p.92).

Fuchs *et al.* (1996) looked at the relationship between student ability and the quality and effectiveness of students' mathematical explanations as a function of the ability of the tutor in their PAL maths study. The pupils' ages ranged from 7-10 years. They also used video recording. Results showed that high-achieving tutors' explanations scored higher on conceptual, procedural and overall quality. They also incorporated more variety of explanations and strategies that seemed to result in their tutees' better performance.

Desoete (2008), in an individual maths study with pupils with an average age of $8\frac{1}{2}$ years also used a range of approaches including Think Aloud, prospective and retrospective child ratings, teacher questionnaires, calibration measures and EPA2000 (De Clercq *et al.*, 2000). The work confirmed the value of ratings by an experienced teacher and suggested convergent validity for prospective and retrospective child ratings. However there was no significant relationship with the other metacognitive measures.

Shamir *et al.* (2009), in an individual study of 4-5 year old pupils used self-reports (on completion of the task) and on-line observations. They documented that significant differences were found not only between off-line (self-reports) and on-line methods but between responses obtained in the two on-line contexts of individual learning and

PAL. This study did not use video recording and all observations were recorded by the interviewer at the time of the assessment.

The lack of PAL/PAW literature is obvious. I felt that no consensus could be reached as the studies used a variety of methodologies, methods and forms of analysis. A further complication was the varying ages of the pupils and the developmental nature of metacognition (Brown, 1981; Flavell, 1979), which meant that it was not possible to compare results. The general impression I gained was that the method adopted dictated the results. This was also documented by Desoete (2008) who, as illustrated, used a range of methods.

Regarding on-line methods, the choice is limited and particularly so in the context of PAW where the pupils are engaged in verbal interaction. I noted video recording was the most frequent form of data recording. I considered that video would provide me with in depth information of the processes involved in PAW. I could see the advantages and include an outline in the next section. Furthermore I could see that Think Aloud when Prompted would allow the actual voice of the pupil to be the basis of the analysis. I have provided reasons for both my choices in the next section. However, initially I had reservations that TAPs, despite their adherence to Veenman's (2006, p.9) definition, 'that in order to be on-line assessments they needed to be obtained during the task performance' were in fact obtained post task. The specific task requested the pupils to provide reasons for their choice of VCOP component.

The proposal in my PAW context was that TAPs would be administered during the course of the writing activity. However I felt that it was arguable that in the PAW programme the assessments would take place after the individual VCOP components

had been chosen and expanded upon by the pupils. As a result they could perhaps be termed off-line. On reflection I resolved this dilemma with arguments taken from Ericsson and Simon (1993) who suggested that the time delay was the crucial factor; if it were too long then memory loss and distortions could arise. Also that ‘even in the case of retrospective verbalisation, the subjects performance may depend heavily on how much incidental memorising he does while performing the task’ (Ericsson and Simon, p.218). I considered that the time delay I was proposing would be minimal compared to a TAP implemented after an entire activity. In the context of PAW, TAPs were requested immediately after the pupils had selected the various VCOP components.

3.6.2 On-line

On-line options were more limited as, in order to capture a concurrent element or moment, they must be either verbal and immediate, or observable (Veenman, 2005). I decided against observational data as I considered it would be too subjective and rely on the interpretative skills of the researcher, which could hinder validity and reliability. Systematic observation as an approach to quantify behaviour meant that before the event or events various forms of behaviour would have to be prescribed and defined so that a behaviour code could be developed, for example in Whitebread *et al.*'s study in 2009. Extra researchers would have been needed to act as observers, who would not have been in a position to teach at the same time as collecting data. Larkin (2006) warned against having a non-teaching observer in class, especially when working with young children as they tended to view all adults as potential teachers. However, Whitebread *et al.* (2009) argued for the use of observational methods despite these difficulties as it allows for the assessment of children with limited language

comprehension in the early years. This, however, was not an issue in my PAW study of 10-11 year olds without language comprehension difficulties and I considered that the disadvantages outweighed the positives and I needed to look elsewhere.

Further possibilities were Think Aloud, Talk Aloud and Think Aloud when Prompted (for a full outline, see Ericsson & Simon, 1993). I was able to discount Think Aloud and Talk Aloud as, in the PAW context, the pupils were engaged in dictating their stories to their partner and it would not be possible to engage in the two activities simultaneously. However, in an individual problem-solving context when pupils are asked to verbalise their thoughts in attempting to arrive at a solution to a set task, all three forms of 'think aloud' could be used.

I wanted to be objective in my evaluation of TAPs. I felt that Veenman and Spaans (2005, p.42) made a pertinent observation when they argued that the three 'Think Aloud' protocols allowed 'a glimpse into the pupil's mind' and contrasted with observation techniques (on-line) that required the researcher to use interpretative skills and thus introduce an additional subjective element. Another important issue was raised by Prins *et al.* (2006) who argued that TAPs are suitable to assess metacognitive skills of novice and advanced learners, provided the task is sufficiently complex to prevent automatic problem-solving activities. This emphasises the importance of developing appropriately challenging tasks and, since my group experienced difficulty with writing skills, I felt that the task of story writing would come into this category.

I noted the criticism by Ericsson and Simon (1993) that TAPs are disruptive to the learning process; however, PAW was not the context for their studies and owing to the discursive nature of PAW I felt any disruption would be minimal. Although Ericsson

and Simon (1993) documented that TAPs were time consuming to implement, I had not found this to be an issue in the pilot.

I considered that the VCOP prompts (Table 3.4) would help the pupils to focus on aspects of the learning task and result in enhanced learning outcomes. I wanted an assessment that would promote the requisite skills and improve writing standards, and also be a metacognitive assessment to promote metacognitive skills. In order to minimise any disruption that might arise if I tried to transcribe the pupils' reasons, I decided to use video recording during the TAP process.

Video recording has been used in a range of studies (Fuchs *et al.*, 1996; Larkin, 2009; Shamir *et al.*, 2008) and audio recording in Duran and Monereo's, (2005) study. Initially I was concerned that the camera might influence the children, but the pilot study showed this not to be an issue as the children were quick to accept its presence. Another possible concern was the risk of exposing children to public scrutiny, but the ethical implications of this study and the steps I took have already been discussed in Section 3.4.2. I felt video recording would be unobtrusive and all stages of the PAW programme could be recorded. Once transcribed, analysis and re-analysis could take place over a period of time. The tapes provided a grounded, reliable source of data. Particularly important was the fact that data collection could be carried out with the minimum of disruption which allowed the researcher to concentrate on teaching and implementing the TAP approach.

After consideration, as my on-line methods I decided to use TAPs with the benefit of video recording and video recordings of the interaction of the pupils engaged in PAW. The former would provide an on-line method to be compared and contrasted with the

selected off-line method. Transcriptions of video recording implemented throughout all stages of the PAW programme would have a dual role; as an on-line method to ascertain metacognition, and so contribute to answering the first part of my first research question. Its second role would be to act as an on-line method to be used to answer my second research question.

3.6.3 Think Aloud when Prompted

Using TAP as an on-line procedure helped to ensure that pupils were thinking and reflecting as they wrote. I hoped that this method would increase awareness of metacognitive skills and strategies and also provide assessment of metacognition. The VCOP components were chosen for several reasons:

- they provided a language in which to discuss issues;
- children were aware of and understood their function; and
- they had direct relevance to classroom procedures.

I had initially thought that this method might disrupt the children's thought processes and flow of writing. However, I subsequently realised that instead of being a hindrance it helped the pupils to focus on salient aspects in the process of story writing. The questions were centred on the VCOP components and the subsequent discussion helped to reinforce their significance and value to the writing process. The impact was therefore positive regarding both pedagogy and in order to progress research. Bannert and Mengelkamp (2008) and Cromley and Azevedo (2006) also considered TAPs to be a valid method of documenting the thoughts of the pupils. I decided that it would be disruptive if I attempted to document the responses at the time, which affirmed my decision to use video recording. I believed that the reciprocal nature of the pairings

helped to lend equality to this part of the assessment, as I was able to distribute the questions evenly between the pupils.

3.6.4 Design of TAPs

The design was based on ‘Think Aloud when Prompted’, as outlined by Bannert and Mengelkamp (2008). I devised verbal prompts (see Table 3.4) in order to achieve a degree of consistency: this would allow future research both to evaluate and to follow, if desired, my procedures.

Table 3.4 VCOP prompts given to pupils as they were writing their stories

- I am looking at this word/phrase
- I am looking (for example) at ‘stunning’
- Talk me through the decisions you were making when you chose ‘stunning’
- If the pupil is reluctant to talk, ask if he is happy with his choice and then if he would like to change it.
- Finally, can the pupil think of a better word/phrase?

3.6.5 Procedure with TAPs

In the pilot study, during the final piece of writing I had asked the pupils to take it in turns to ask each other for reasons to support their choice of at least ten of the VCOP words or phrases they had chosen. However, the pilot revealed that children’s understanding of the VCOP components was insufficient to undertake this task without support. As a result, in the main PAW programme I asked the questions as the pupils were writing their stories. To obtain data from all pairs of pupils, I carried out this assessment during either Story 3 or 4. I tried to keep a balance between the four choices, which included vocabulary, connectives, openers and punctuation. I dispersed my questions throughout the story and waited until the pupils had finished the requisite

sentence so their flow of thought would not be disrupted. A video recording of the proceedings made it possible to transcribe this stage at a later date.

3.6.6 Video recording

The obvious advantage of video recording is that all stages of the PAW intervention can be recorded, transcribed and subsequently analysed. Geertz (1973, p.73) suggested that the ‘thick description elicited by video recording provided a multiplicity of complex conceptual structures, many of them superimposed upon or knotted to one another’. I felt that video gave access to structures that would hitherto not have been available. Collier and Collier’s (1986) argument is particularly apt in suggesting that visual images help to capture the context, as well as the action, of an event. The rich source of data available included transcriptions that provided on-line data within a natural context of the pairs, both untrained and trained in PAW procedures. The former provided a baseline and the latter had the potential to demonstrate metacognitive progression. Visual evidence of non-verbal behaviour such as facial expressions, motivation and time on task was also available for additional analysis without interference from observers (Crabtree & Miller, 1999), leaving the teacher free to concentrate on teaching.

3.6.7 Design of video protocol

Discussions had been on-going with the Audio Visual Department and the advice for the pilot had been to use boom stands and microphones placed centrally between the pupils. However, for the main intervention they advised that microphones attached to the cameras were a simpler option producing greater clarity. The four pairs of pupils were placed in the corners of a large room. It was agreed that a member of the AVD

would assemble and set up the video cameras and microphones during the first week of the PAW programme as there were safety issues with regard to electrical flexes, in particular, and the placement of microphones.

3.6.8 Procedure

Each week the class teacher and I introduced the Primary 6/7 class to the new lesson and story, following Wilson (2002). Three subsequent lessons each week consisted of the sample eight pupils planning, writing and editing their stories in a separate room (see Appendix 2, PAW flowchart). These three sessions over the five-week PAW programme period were video recorded and provided on-line data. The same procedure applied to the filming of TAP sessions.

3.6.9 Off-line

Off-line options included questionnaires, interviews, self-report inventories and Pupil View Templates (PVTs). These methods all demand a degree of language and comprehension skills (Whitebread *et al.*, 2009), which meant that the age of the pupils contributed to delimiting their appropriateness. Monitoring checklists and self-report inventories were further options, but they too required good reading and comprehension skills and tended to be geared to solely quantitative analysis. In addition Nisbet and Wilson (1977) and Prins *et al.* (2006) were sceptical about self-report inventories due to the poor insight that learners' have of their own behaviour. I felt this was an issue that could apply to my group of pupils. Questionnaires could be prescriptive and, as documented by Desoete (2008), could risk memory distortions due to the time lag between the actual performance of problem solving and the verbal report. Shamir *et al.* (2009) suggested that face-to-face interactions with an interviewer

could bias the interviewee's responses. I was also concerned about the amount of time out of class that they would entail.

Another possibility were PVTs, which Wall and Higgins (2006, p.41) describe 'as a mediated interview which supported children to reflect on their thinking in various situations and therefore elicit metacognition'. Of all the off-line methods documented above, I decided that they were the most suited to the 10-11 year old age range. I liked the ethos behind PVTs as they had the potential to empower children and provide an opportunity for their own views to be put forward in an environment with which they were familiar. This contrasted with an interview, where pupils might feel too ill at ease to verbalise what they really mean. Wall and Higgins (2006, p.40) described PVTs as 'a technique to provide a practical data collection tool which was suitable for the classroom context' and argued that the notion of scaffolding is incorporated into the design of PVTs. This is an important dimension in PAW and also of Vygotskian ideals.

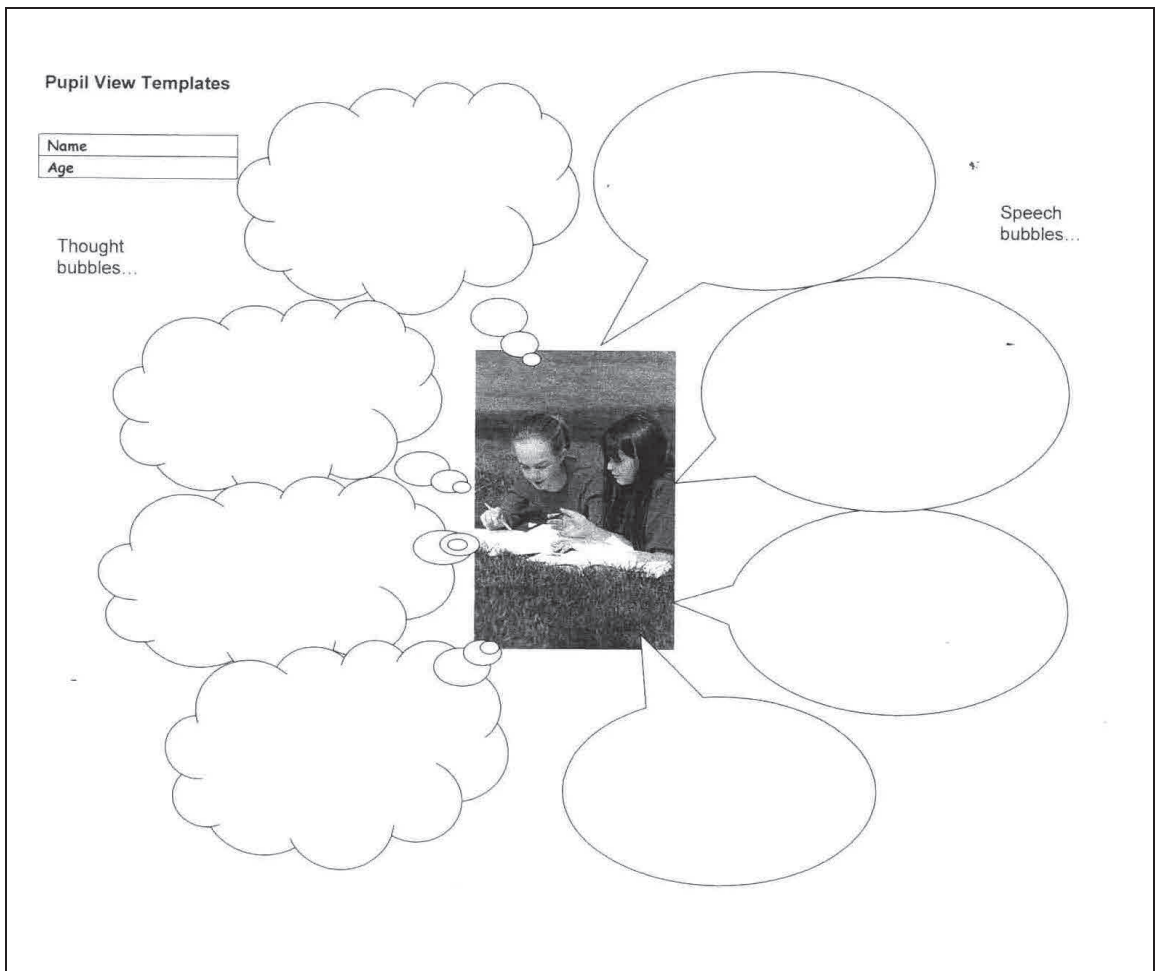
I appreciated that PVTs demanded language fluency and that delay in discussing one's own thinking could result in a distorted image due to memory difficulties. However, I attached importance to the dual nature of PVTs where assessment was linked to pedagogy (Wall & Higgins, 2006). My experience of using PVTs in the pilot study showed that pupils responded well to the opportunity to document their thoughts, which allayed my concerns and helped me to choose them as my off-line method. TAPs, with the benefit of video recording, had been selected as my on-line method as they would also allow the voice of the pupil to be heard. They would help to focus pupils' attention on the relevant issues of VCOP and aid them to internalise these.

In order to answer the second research question, PVTs (off-line) and TAPs (on-line), with video recording and transcriptions of video were used. Wall (2008, p.25) wrote that PVTs were designed ‘to transcend any division between teaching and learning in the classroom and empirical research’ and were a way to bridge the divide between theory and practice (Wall & Higgins, 2006, p.39); a tool not only to assess metacognitive skills but at the same time to increase awareness of these (Wall *et al.* 2009). I saw the advantage of highlighting awareness of metacognition, particularly if linked to successful learning outcomes. Wall *et al.* (2006) and Higgins *et al.* (2006) had used PVTs in a variety of different learning contexts and activities and provided evidence that this technique was an effective and non-threatening method to investigate pupils’ thinking about their own thinking. They saw it as a practical method that encouraged communication and interaction amongst peers and their teachers. The teacher leads the discussion, centred on the learning of the pupil and that of a significant other. This could be teacher, peers or family members, and it was this that created the impetus for discussion and elaboration by the children. I shall now outline the design of PVTs.

3.6.10 Design of PVTs

The Pupil View Template designed for this study is outlined below and follows McMahon and O’Neill (1992).

Figure 3.2 Pupil View Template



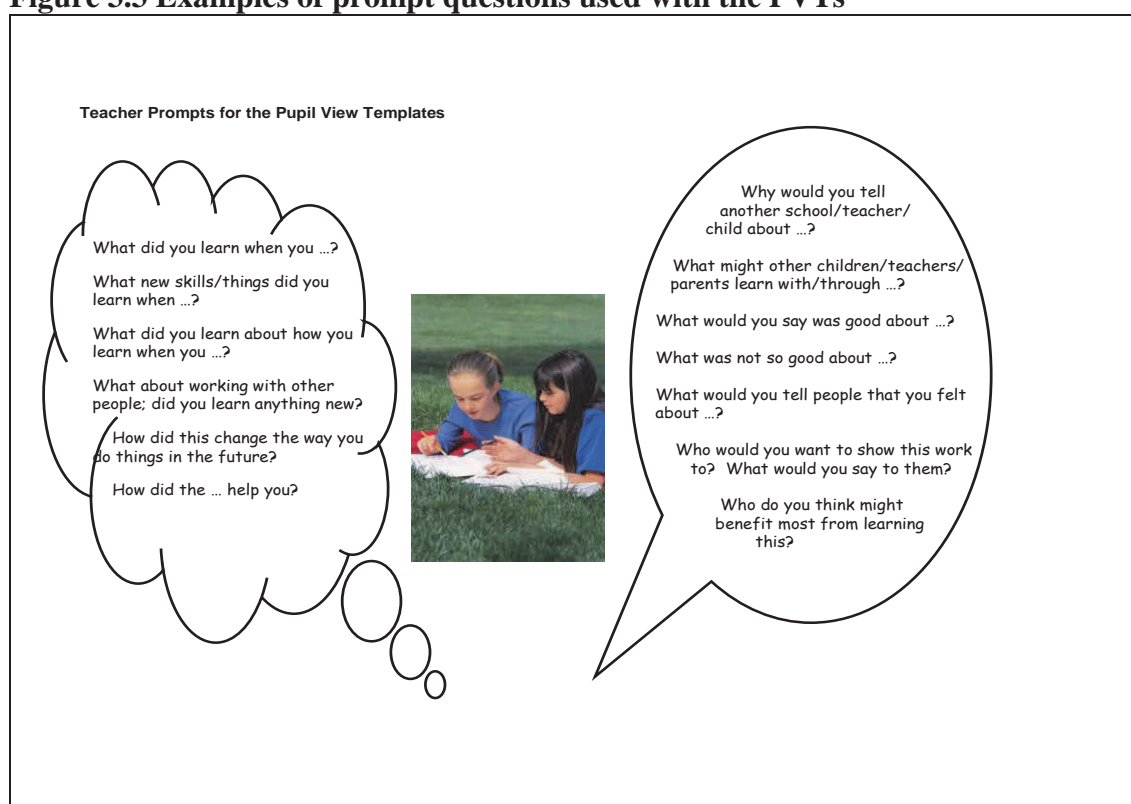
I selected the image of two children engaged in a literacy activity as it serves as a reminder of the PAW context. There is a range of speech and thought bubbles. The speech bubble was designed to look at the factors external to the child, such as the learning of others, views of parents and teachers and other views of learning in the particular field. In contrast, the thought bubbles looked at the internal processes of the children, for example what was going on inside their heads and what they were actually thinking. Wall and Higgins (2006) designed their templates with three speech and thought bubbles. I extended the number to four, since in the pilot study I found that the children wanted to write more. I also made the decision to print the PVTs on

A3 paper rather than A4, as I had found that in the pilot the pupils responded to the enlarged format and tried to write more.

3.6.11 Procedure with PVTs

PVTs were presented to all in the PAW sample group and used twice during the PAW programme. Wall and Higgins (2006) devised a list of prompts for the speech and thought bubbles and these are displayed below.

Figure 3.3 Examples of prompt questions used with the PVTs



The blanks in the above table should be replaced by 'PAW'.

I used the prompts illustrated in Figure 3.3 to provide me with structure and consistency when I asked the pupils to complete them. The pilot had revealed that it was during their second use that some of the more substantial data was produced; training and practice provided a richer data for analysis.

3.7 Further triangulation

I decided to include writing assessments, word count scores, details of the class teacher interview and details from my diary record of the PAW programme as I considered they provided further information and triangulation of the PAW programme. I will now discuss some of the advantages and disadvantages of including these measures.

3.7.1 Writing assessment

All the pupils in the composite Primary 6/7 class were to be given a writing task before and after the implementation of the PAW programme and assessed by their class teacher. I looked at the assessment scales used in the few studies that had investigated PAW and noted the concerns the authors documented. Nixon and Topping (2001, p.53) developed a new assessment scale for their study but acknowledged that inter-rater reliability was only 'relatively reassuring'. Yarrow and Topping (2001) decided to use Scottish Qualifications Authority 5-14 Assessment Unit (1997) criteria. This meant that their 35 criteria were assigned the equal value of one point. In this study, inter-rater reliability was tested through blind cross-marking of a sample of the pieces produced. At the time of my PAW programme, this marking criterion was no longer in use in Scottish schools and I therefore did not feel it was appropriate to use this scale. I finally decided, in conjunction with the class teacher, that greater ecological validity would be evident if we used the present school marking assessment (West Dunbartonshire Council, 2007). However, I did not organise any blind marking, which with hindsight was a limitation.

3.7.2 Design

All the pupils in the composite Primary 6/7 class were asked before the programme started to compose a letter to their head teacher telling her about their holidays. When the PAW programme finished they wrote another letter based on their head teacher's imminent retirement.

3.7.3 Procedure

Writing assessments routinely took place at the beginning and towards the end of each school term. These assessments were carried out by the class teacher as part of normal class procedure and would form part of an on-going assessment process which the school adopted three times per school year.

For the purposes of the PAW programme, the class teacher carried out the writing assessment before and on completion of the PAW programme. All pupils in the composite Primary 6/7 class participated, including the sample PAW group. The letters were assessed by the class teacher using criteria developed by Ros Wilson and documented by West Dunbartonshire Council (2007). Box plots using SPSS 21.0 for Windows software would be used to show the increase in outcomes. Outcomes would be also shown in bar chart form.

3.7.4 Word counts

I also decided to carry out a word count on both letters written before and after the PAW programme of the eight sample pupils and the rest of their class, who had followed the routine teaching programme of West Dunbartonshire Council (2007). My reasoning for this was concern that the school marking criteria, which would arguably

provide ecological validity and therefore be more meaningful to the school, would not provide a true indication of improvement in full. I had not been able to find other research that had adopted this method of assessment. I appreciated that there would be concerns that quantity does not necessarily imply quality and my argument was that, unless a pupil has the courage and motivation to write and experiment with words, there will never be the opportunity to improve. I felt that any increase in quantity of words should be carefully examined. Nixon and Topping (2001) and Yarrow and Topping (2001) documented their concerns when analysing writing and this influenced my thinking on this matter. The pre and post word count scores were presented in box plots and bar chart form to demonstrate the quantities of the text that all pupils produced and the subsequent increase after both teaching and training.

3.7.5 Teacher interview

I was anxious to include feedback from the class teacher as she had been integral to the PAW programme and her reflections and views would be important when planning future studies. I also wanted to demonstrate an inclusive approach to my research and importantly this recursive feature of ‘feedback’, involving school and teachers, is integral to action research (Elliott, 1991). I had considered questionnaires but decided that they would not allow for the in-depth, non-directive exploration that I felt was required at this stage (Hayes, 2000). I considered that questionnaires were more effective when attempting to probe the views of a more extensive group of people and would be better suited to research in the future on a larger scale when I would want to probe the views of a wider school community and also parents.

I decided to use an interview technique that would take place between myself, the researcher, and the class teacher and the design would be as an open-structured

interview (Hayes, 2000). I decided on this format rather than structured or semi-structured as I wanted to avoid as much directive interaction as possible. Denscombe (2003, p.167) writes that ‘unstructured interviews are really on a continuum and, in practice, it is likely that any interview will slide back and forth along the scale’. Denscombe (2003) also stressed that one of the main differences from structured interviews is that they allow the interviewees to use their own words. I felt that this was an important aspect, particularly as I had been so involved in the PAW programme. I hoped that allowing the class teacher freedom to express herself in her own words would counterbalance any bias that I might have in my role as both teacher and researcher.

I met with the class teacher after the last session of the PAW programme and asked for her views on the programme. I tried to be as non-directive as possible and allow the class teacher to control the line of discussion.

3.7.6 Diary

Edwards and Talbot (1999) supported the use of a diary as it was a more reliable source of evidence than memories. In the PAL/PAW research I had investigated I had found no mention of diaries as a means of data collection. However, Hayes (2000) suggested that diary data provides information directly relevant to the participants’ world and adds another dimension to the study. Having considered the advantages and disadvantages I decided to include a diary as evidence of my thoughts during the design and implementation of the PAW programme. Although I had video tapes as evidence of the interaction between the pairs, I felt that a diary would provide a record of my thoughts and recollections over the PAW programme and therefore provide information for future studies.

However, one of the disadvantages is that it is easy for the writer to be biased. I constantly reminded myself of this and tried to write an accurate account of the lessons and also of my thoughts. Another disadvantage was that there is no way in which checks can be made on diary entries (Hayes, 2000).

An A4 notebook was used to document my diary entries. Each day was dated and an attendance record for each pupil was kept. The format was informal and at the end of each session I recorded my thoughts and impressions of how the session had progressed. I felt immediacy of such documentation was important. I included comments about the pupils' behaviour, motivation and attitudes.

3.8 Summary

I have outlined the research and influences that informed my methodology. In addition I have discussed how I decided on my methodological processes and methods of data collection. In order to do this I have drawn on relevant literature within the field to give credence to my choices. Throughout this chapter I have referred to and illustrated research that has used a range of data analysis strategies. I shall now outline the stages involved in the selection of an appropriate method of analysis. I have chosen to detail this in the next chapter under the heading of analysis and results. Whilst I recognise that this is unusual, I hope as the next chapter evolves it will become apparent that the process of coding and the processes involved in the analysis are so interlinked with the results that, to provide explanations and understanding, the two processes are better provided as one.

CHAPTER 4

Analysis and Results

4.1 Introduction

The structure of this chapter is unusual as I wanted to describe the development process of the coding scheme. This is because it became so much part of the results that it became difficult to separate them. This chapter will therefore talk first about the development of the coding scheme and the results that emerged once it had been finalised, and also its development through other forms of data. Below are the types of data I collected. I have indicated the data to which the coding scheme was applied with an asterisk.

Three types of qualitative data were collected:

- the video recordings of the four pairs of pupils engaged in peer assisted writing*;
- the video recordings of the pupils engaged in PAW when carrying out the TAP assessments during Story 4 or 5*; and
- the completed PVTs carried out after Story 2 and 4*.

Two types of quantitative data were used:

- whole class writing assessments carried out by the class teacher pre and post PAW intervention; and
- a word count on the class writing assessments.

In addition the data includes:

- a class teacher interview carried out on completion of PAW programme; and
- examples from my diary, completed after each PAW session.

4.2 Demographics

The primary school is situated on the edge of a Scottish city. The sample consisted of eight pupils (five boys and three girls) from a composite Primary 6/7 class of 21 pupils. The remaining 13 pupils acted as the control group. The pupils were selected on a purposeful basis by their class teacher because she felt they were struggling with literacy skills. Pairings were also recommended by the class teacher. Profiles of the sample are provided in Table 4.1 below. The pupils are referred to by fictional names.

Table 4.1 Profiles of the pupils in the PAW group

Pupil pairings	Class	5/14 Results (Scottish Office Ed. Dept, 1991)	My impressions
Alastair	P6	B	Average ability – good inter-personal skills – lacks confidence – wants to please
Donald	P7	C	Above average ability – poor inter-personal skills – found it difficult to see others’ point of view – rushed his work – under-achieving
Brenda	P6	B	Below average ability – slow to grasp concepts and facts – poor motor skills – wants to please – lacks confidence
Laura	P7	C	Average ability – wants to do well – tended to take over tasks
Colin#	P6	B	Below average ability – poor motor skills – no confidence with writing
Kenneth#	P7	C	Above average ability – aware that he found writing difficult and would like to improve
Helen	P6	C	Average ability – dyslexic – good inter-personal skills
Graham	P7	C	Aspergers syndrome – above average ability – lacked confidence – poor inter-personal skills

– the case study focus, Pair A

In Table 4.1 above it is important to note the element of mixed inclusion, demonstrating a variety of rationales and differing writing abilities in the way the class teacher chose the pupils and also decided on the pairings. However, her main stratagem was to pair pupils who she felt would work well together. By using the term ‘average’ I aim to provide the reader with an indication of the pupils’ ability. I am suggesting that the pupil would be placed within the class in the middle range of pupils.

4.3 Coding scheme

I discussed in Chapter 3 my reasoning for using both qualitative and quantitative methodology and the epistemological assumptions underpinning the methodology and methods adopted. These assumptions inevitably influenced my methods of analysis and I now detail the process of analysis of the videos, PVTs and TAPs, the results of the teacher writing assessment, word count scores, class teacher interview and my diary extracts. I shall also discuss the combination of qualitative and quantitative data.

4.3.1 Introduction

I considered it important to use the same coding scheme to analyse the videos, PVTs and TAPs so I could compare and contrast results. Together with detailed descriptions of the various stages involved in the analysis, I provide quotes from the transcriptions to illustrate the coding scheme. Reference will also be made to the notes I made while transcribing the video-tapes as these provide insight into my thinking and the difficulties I experienced. Non-verbal information evidenced on the videos, observations generated whilst carrying out the analysis and discussions between the two analysts are documented. The process of developing the coding scheme, discussed

in detail in the next section, was carried out in discussion with my second analyst in order to improve the validity of the study.

4.3.2 Developing the coding scheme

The case study approach helped to reduce the data to a manageable size, but due to the range and complexity of the data, analysis will be discussed in stages: the coding scheme; familiarisation with the data; developing the unit of analysis; winnowing; revised metacognitive codings; further development of the coding scheme; and analysis of the case study. Generation of the coding scheme, which at first felt like a stage of the methods, actually became exploratory. I therefore came to a better understanding of metacognition and PAW through the process than if I had simply allocated pre-determined codes.

I will firstly focus on the video data as this was the most complex. The selected data analysis and representation followed models by Cresswell (1998) and Crabtree and Miller (1999).

4.3.3 Familiarisation with the data

My knowledge of metacognition made it difficult for me to embark on the process of analysis as if it were a blank slate and so attempting a pure form of grounded theory (Glaser & Strauss, 1967) was impossible without creating bias and jeopardising validity. I felt that the use of an amalgam of Brown (1981) and Flavell's (1979) models would refute or endorse the occurrence of metacognition and was therefore appropriate; to my knowledge, this scheme had not previously been used to analyse PAW interactions. I decided to adopt a flexible analysis system based on these

recognised coding schemes, but was aware that my analysis would be an iterative process of construct generation and coding synthesis (Cresswell, 1998; Glaser & Strauss, 1967) using these models as a continuous reference point.

First, all video recordings of the four pairs in the sample group were viewed in order to immerse and familiarise myself with the full range of data that they provided. (The data was not as full as I had planned owing to some pupils missing classes through illness so that some stories were not completed. Also, the TAP assessments interrupted the later stories so that their content had been unduly influenced by the TAP assessments). I also read and typed up the PVTs, at this stage making separate columns for thought and speech bubbles. In line with Wall and Higgins (2006, p.45), I found that the speech and thought bubbles had complementary functions in supporting the pupils' thinking about learning. The thought bubbles revealed more information about the learners' own thinking processes in terms of learning. The speech bubbles helped the pupils to see themselves from the point of view of significant others and, as the context was supportive and the results favourable, this was in a positive light. Lastly, I viewed the tapes with the TAP recordings on three separate occasions, a familiarisation approach advocated by Cresswell (1998), before transcribing them and reviewing the PVTs. This enabled me to move from first impressions to think about how the data fitted with the literature. My reasoning was to see how my impressions fitted with the coding scheme based on Brown's (1981) and Flavell's (1976, 1979) models.

All tapes from Pair A were transcribed. These comprised the pupils completing a story untrained and two further stories after training; the story when the TAPs assessment was carried out was only used for the TAP assessment purposes. Transcription in A4 note books used double line spacing and wide margins for comments. Over time,

comments and codings were colour-coded so that the progression of my thought processes was made visible. Before outlining the processes involved I shall discuss the decisions involved in selecting my unit of analysis.

4.3.4 Unit of analysis

Roscoe and Chi (2004, p.2) use ‘boundaries of episodes which were categorised by the type of learning activity’. This felt sensible as it would involve both partners and be relevant to PAL/PAW, yet I anticipated problems in establishing where the boundaries lay. Another option was to follow Larkin (2009, p.7), who attempted to establish incidents of metacognition. As noted earlier, Larkin also documented difficulties encountered in isolating the metacognitive incidents from the flow of conversation. I felt that consistency in terms of analysis would be difficult to maintain. My decision was therefore to define the unit of analysis as any phrase or sentence that conveyed meaning. I considered this would convey metacognitive thought and the boundaries would be clearly identified, helping to ensure consistency of analysis and therefore validity. Another influence was my intention to use the same coding scheme for the video, PVTs and TAPs. It was therefore important to have the same unit of analysis. The data from the video tapes and TAP assessments included a unit of joint activity. The PVTs, although they involved a degree of interaction between myself and the pupils, was more an individual assessment that barred me from using a unit of joint activity.

4.3.5 Winnowing

My first attempt at devising a coding scheme produced an extensive list of ideas that needed to be refined, so I condensed the list of items into a more manageable size.

Cresswell (1998, p.140) refers to this process as ‘winnowing’. Table 4.2 below shows my original list and how I combined categories; also included are my definitions.

Table 4.2 Development of analysis

Original list	2 nd Stage and Refined set of categories	Definition	
One idea leads to another	}	Logical enhancement/deduction of what has gone before	
Elaboration			} Elaboration
Bouncing ideas			
Planning	Planning	Development of anything salient to how the task should be carried out	
Questions	Questioning	Any request for additional information and could pertain to planning and organisation of text	
Rapport	Rapport	Positive supportive attitude (verbal/non-verbal)	
Irrelevant	X		
Bringing back on task	Bringing back on task	Comment out of context designed to redirect thoughts	
Reflex thought	}	Introduction of something new through generated prior experience	
Trigger			Reflex association
Off task	}	Discussion with no relevance to task in hand	
Irrelevant			Off task
Teacher input	Teacher input		
Dividing tasks	}		
Collaboration	}		
Team working	}	Appropriate method of story writing or organisation involved in planning	
Organisation			} Organisation
Taking stock			
Imagination	Imagination	Ability to create ideas	
Pride	Pride	Overt pleasure in own or partner’s work/acknowledge that valued person will appreciate it as well	
Evaluation	Evaluation	Assessment of data and whether it is sufficient to draw a conclusion or indicate further information is required	

I compared my categories with those based on Brown (1981) and Flavell (1979). The main differences centred on the categories of *planning* and *information management*, which had sub-components of *organising*, *elaborating*, *summarising* and *selective focusing* (Schraw & Dennison, 1994). In the discussion below I detail how I resolved

these anomalies. Table 4.3 below outlines the metacognitive codes and definitions (Schraw & Dennison, 1994) based on Brown (1981) and Flavell (1979).

Table 4.3 Metacognitive definitions based on Brown (1981) and Flavell (1979)

Category	Definition
Knowledge of metacognition	
Declarative	Knowledge about one's skills, intellectual resources and abilities as a learner
Procedural	Knowledge about how to implement learning procedures (e.g. strategies)
Conditional	Knowledge about when and why to use learning procedures
Regulation of metacognition	
Planning	Planning, goal setting and allocating resources prior to learning
Information management	Skills and strategy sequences used on-line to process information more efficiently (e.g. organising, elaborating, summarising, selective focusing)
Monitoring	Assessment of one's learning or strategy use
Debugging	Strategies used to correct comprehension and performance errors
Evaluation	Analysis of performance and strategy effectiveness after a learning episode

At this point in the analysis process the complexity of metacognition was apparent, and I realised that the range of skills required was extensive, particularly in writing. I was aware that I might have to reconsider categories and definitions, as much previous research had been in more overt problem-solving contexts, for example maths (Desoete, 2008); comprehension (Palinscar & Brown, 1984); and science (Larkin, 2006). I compared my list with Brown and Flavell's and below detail my progression of thinking.

At this stage I found no evidence of *declarative*, *procedural* and *conditional* knowledge of metacognition. I realised that knowledge of metacognition was more

difficult to discern as, in the context of PAW, the analysis depended on a degree of interpretation by the analyst. Much previous research had used assessment tools such as questionnaires, where the skills were more apparent. Pupils had to select certain criteria such as, 'I said the pictures lots of times', which is a declarative skill (Shamir *et al.*, 2009). I was aware that Brown (1981) considered that knowledge of metacognition developed in adolescence and might therefore not be prevalent in 10 - 11 year old pupils.

Both Brown and Flavell's lists and my own included the category of *planning*. I decided to retain my *questions* (with regard to planning). To my knowledge analysis of PAW had not been carried out in this way and, in this interactive context, questions would inevitably be a part of the process. In addition my *organisation* with regard to *planning* was also relevant and was analogous to their 'allocating resources to prior learning'. I therefore made the decision to include *planning questions* and *planning organisation* in my analysis as I felt these to be a more appropriate analysis in the context of PAW.

I looked closely at the concept of *information management* (IM). I felt that this term was similar to my *organisation* with regard to text. The coding scheme developed from Brown and Flavell had included the sub-components of their *information management* as *organising*, *elaborating*, *summarising* and *selectively focusing*, whilst mine included *questioning*, *organisation*, *imagination* and *elaboration*. We both had the sub-components of *organising/organisation*. I considered that *information management* could be an appropriate component onto which to hang a range of sub-components. I therefore decided to term this sub-component *IM organisation*. I made the decision to retain my *imagination* as evidence of the first time an idea was put forward and

elaboration would refer to subsequent ideas developed hence giving rise to *IM imagination* and *IM elaboration* respectively. Also, I decided to keep my *IM questioning* as evidence of planning of text (this should be differentiated from *planning questions* and *planning organisation*, discussed above) that focused on the task execution rather than management of text. I made the decision to include Brown and Flavell's *IM summarising*, but not *IM selective focusing*. I felt I could not justify *IM selective focusing* as a single category as it appeared to be subsumed within *IM imagination* and *IM elaboration*. Further reflection helped me to see that the category of *reflex association* I had defined as 'the introduction of something new through generated prior experience' was a form of my *elaboration*, defined as 'logical enhancement/deduction of what had gone before'; both were a means of managing and extending ideas. This element of managing and extending ideas could therefore be included in *IM* in the subcomponent *IM elaboration*. These decisions centred on *planning* and *information management* involved careful re-evaluation of categories and definitions in the context of PAW (see Table 4.6).

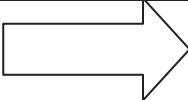
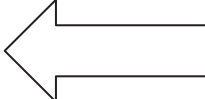
At this point I had found no examples of *monitoring* or *debugging*. On re-examination of the data, I realised that I had missed examples of monitoring. This was my first experience of the difficulty of distinguishing between *evaluation* and *monitoring*. I re-evaluated my definitions at this point and decided to adopt definitions constructed by Ku and Ho (2010) as I felt they fitted better with my thinking and helped analysis of these components in the context of PAW. Table 4.4 provides the new definitions of monitoring and evaluation.

Table 4.4 Definitions of monitoring and evaluation

Monitoring	Utterance aimed at checking and validating one's comprehension of the task (Ku & Ho, 2010)
Evaluation	Activities characterised by a strategic self-assessment of one's reasoning, thought products and task progress (Ku & Ho, 2010)

In Table 4.5 below I list two examples of how my thinking developed in my analysis of *evaluation* and *monitoring*. Both are quotes that moved with the new definitions.

Table 4.5 Illustration of difficulties analysing monitoring and evaluation

Monitoring	Evaluation
Because I don't want to use said again, at least that's what I thought he shouted in my story	 ...later that night we eventually reached Amber's house. I like using openers for words that come in between... it makes it more... adulty
	

Careful viewing also revealed some instances of *debugging*, characterised as either self-correction or a pupil correcting a mistake made by their partner.

4.3.6 Revised metacognitive codings

I used these refined categories (Table 4.6) to analyse Tape 1 of Pair A (untrained). The coding scheme I had developed so far was listed on a spreadsheet and all instances of each category, duly numbered, were added. I also included additional categories of bringing back on task, off-task, rapport, pride and teacher input in a similar way (see Table 4.6). At this stage I was uncertain whether to retain these categories, as they were not metacognitive and did not relate to my research questions.

Table 4.6 My revised coding scheme based on Brown's (1981) and Flavell's (1979) components and my additional codes

Sub-components of metacognition	Definitions	Examples
Declarative	Knowledge about one's skills, intellectual resources and abilities as a learner	None found
Procedural	Knowledge about how to implement learning procedures (e.g. strategies)	None found
Conditional	Knowledge about when and why to use learning procedures	None found
Planning question	Seeking information with regard to future arrangements for carrying out task or project	Where shall we have it?
Planning organisation	Arrangements made to complete task in hand	I'll write about the other person
Information management question	Requesting further information to assist processing of text	What's more better bale or bolt?
Information management organisation	Manipulating data for the purpose of further use and analysis.	Sister 'cos we've already got a boy
Information management imagination	Development of data for a step change in thought and creation of facts	...when Jamie and Carly spent an hour in the park
Information management elaboration	Further enhancement or development of ideas and strategies	No, Jamie and Carly spent an hour, a whole hour to walk home
Information management summary	Succinctly précising foregoing ideas and strategies	But picked up the flashlight and ran to keep up with Carly
Monitoring	Utterance aimed at checking and validating one's comprehension of the task	No, what's going on here? What's going on? You're saying they're bored
Debugging	Strategies used to correct comprehension and performance	No, S P R I N T E D (spells it out) I wrote 'spinted'
Evaluation	Activities characterised by a strategic self-assessment of one's reasoning, thought products and task progress	You're doing the story, I'm not doing anything
Back on task	Comment out of context designed to redirect thoughts	Hi, Colin, come on Colin!
Off task	Discussion with no relevance to task in hand	Hi! Anyone who is watching this (messing about)
Rapport	Positive supportive attitude (verbal/non-verbal)	That's right! (grins at partner)
Pride	Overt pleasure in own or partner's work/acknowledge that valued person will appreciate it as well	(C. shows it to the teacher) Do you want to see what we've written before?
Teacher input	Teacher input	Don't forget to think about the WOW words!

4.3.7 Further development of coding scheme

Even after the synthesising process above, I still had a wealth of data and had to decide how to delimit it further. I also wanted to familiarise myself with and practise the coding scheme, since analysis of metacognitive content is recognised to be difficult (Ku & Ho, 2010; Larkin, 2009; Zhang, 2010). Not only did I find the various sub-components problematic to code, I found distinguishing between metacognitive and cognitive activities difficult (Flavell, 1979; Veenman *et al.*, 2006). Having gone through the development phase above, I felt confident that I had an evidence base for metacognition in PAW.

I extended the analysis to a video story of another pair of pupils as this allowed me to validate further the categories. I decided to include off-task collaboration (discussion that showed supportive discussion not directly relevant to the story), because contained in this category was evidence of intelligent discussion that, although not directly relevant to the story, was knowledge building. I considered this term raised issues of what teachers mean by ‘off-task’ when considering how long pupils are able to concentrate on a topic at any one time and that, particularly in writing, ideas come from discussion. I would argue that ideas emanate from discussions that are perhaps not directly about the subject in hand. In-depth discussion of this issue was beyond the scope of this study, but should be considered in future studies.

4.3.8 Analysis of case study pair

I now progressed to re-analyse Tape 1, Untrained, Sample Pair A (case study pair); my metacognitive categories (see Table 4.6) were listed on a spreadsheet onto which were added numbered and referenced examples of each category. I included my categories

of bringing back on task, off-task, rapport, pride, and teacher input and added off-task collaboration.

This exercise revealed some interesting results and the most significant centred on *IM* and *planning*. It was already apparent that *information management* was a significant category. *Information management* included the sub-components of *questioning*, *organisation*, *imagination*, *elaboration* and *summary*; however I decided to extend the list to include *IM reasoning*, *IM instinctive repeat*, and *IM recapping*. *IM reasoning* was included as there appeared to be an element of debate when pupils were discussing how to manage immediate text. *IM instinctive repeat* was added, as repetition of text was a strategy that was employed. *Information management recapping* was included as, at this stage, I felt that this category was different to *IM summary* included in the sub-components of Flavell and Brown's list although this decision was subsequently reversed. With regard to *planning* I added the sub-components of *imagination* and *elaboration* as at this time I felt that, similar to *IM*, there was evidence of these further categories. *Planning imagination* pertained to initial ideas discussed during the planning stages and *Planning elaboration* included the extension of the initial idea. Table 4.7 below illustrates definitions and examples of the new set of sub-components of *planning* and *information management*.

Table 4.7 Definitions and examples of planning and information management

Category	Definition	Examples
Planning		
organisation	Arrangements made to complete the task in hand	Let's do a bit more than that
imagination	Developing ideas for the purpose of completing the task	In a cave
elaboration	Further development for the purpose of completing the task	And a boy is trying to find his way out of the cave.
questioning	Seeking information with regard to future arrangements for carrying out task or project	Who's writing?
Information management		
organisation	Manipulating data for the purpose of further use and analysis	I'll change it in a moment
summary	Succinctly précisising foregoing ideas and strategies	Nam, Seb, remember, Seb's that guy. (said in response to partner forgetting name)
reasoning	Discussed one's analysis of approach to further assessment of facts	We could do it in Japan (IM elaboration) because there are lots of floods there
instinctive repeat	Indicative of needing further time to assimilate information or facts	Spent an hour walking home (repeat of partner)
imagination	Development of data for a step change in thought and creation of ideas	Magda jumps in after and dies
elaboration	Further enhancement or development of ideas and strategies	The elephants had been through as well - walking - balancing itself on a tree trunk.
recapping	Repeat of facts previously discussed to aid further analysis or declaration	Where were we? Died? That was it because he was not dead!
questioning	Seeking information with regard to future arrangements for carrying out task or project	One person won't make a difference, will it?

Further analysis began on transcriptions of other video tapes of Sample Pair A using the categories in Table 4.7. At this stage I was concerned about the difficulties I experienced differentiating between *planning organisation* and *IM organisation*. I could see two options open to me: to amalgamate these terms, or to define *planning organisation* as pertaining to goal execution and *IM organisation* as process of text organisation or arrangement. I chose the latter because I felt they were two separate skills. Part of the difficulty was that planning was evident at all stages of the writing task. I continued to experience difficulty differentiating between *monitoring* and

evaluation. Here I had to consciously include the word ‘*reasoned*’ when analysing *evaluation* to distinguish between them.

I progressed using this refined framework. However, once I embarked on further analysis of the first tape I decided that I could only justify the *planning* sub-components of *organisation* and *questioning*. I decided that *planning imagination* and *elaboration* were in fact manipulation of text and therefore part of *IM imagination* and *elaboration* respectively; that *IM summary* and *recapping* should also be amalgamated to form the same category (*IM summary*), as they were capturing the same skill. The Table below (Table 4.8) summarises the revised sub-components of *planning* and *IM*.

Table 4.8 Definitions and examples of revised planning and information management

Category	Definition	Examples
Planning		
questioning	Seeking information with regard to future arrangements for carrying out task or project	What do you think we should call her?
organisation	Arrangements made pertaining to goal execution	We’ll just leave it there
Information management		
organisation	Process of text organisation and arrangement	I’ll add another character now
summary	Succinctly précisising foregoing ideas and strategies	No, it was the penguins
reasoning	Discussed one’s analysis of approach to further assessment of facts	No, she would soak up all the water
Instinctive repeat	Indicative of needing further time to assimilate information or facts	Leaves everywhere.....Yes leaves everywhere (<i>repeat of partner</i>)
imagination	Development of data for a step change in thought and creation of ideas	I think it should be in the Spring
elaboration	Further enhancement or development of ideas and strategies	Yes penguins...they are really smelly
questioning	Requesting further information to assist processing of data	One person won’t make a difference, will it?

I encountered several further challenges when making category decisions within *information management*. For example, I had decided to term *IM repeat* as a sub-

component of *information management*, yet felt that it could also be termed *procedural* knowledge of metacognition as it could be perceived to be a strategy that some pupils adopted in order to give them time to consider a problem. Previous research had also documented the difficulties of separating knowledge and regulation of metacognition (Veenman *et al.*, 2006). I felt the repeat could be interpreted as ‘I’m not sure what to write’. The repeat gave additional time to think and was therefore a procedure adopted by this particular pupil. For my PAW analysis I decided to discount the *procedural* option as the majority of the repeats were from a particular member of the pair and I felt could be an idiosyncratic style. Also, of the two pupils, he was the weaker, less able and with a greater lack of confidence. Further analysis options were that it could be interpreted as a form of affirmation meaning, ‘I think that is good’, or as a form of monitoring. I spent considerable time reviewing these possibilities to see if I could differentiate consistently between them but, despite reviewing sections of the video for observational evidence, the situation was not clear-cut. The best alternative seemed to be to analyse these ‘repeats’ as *IM repeats*, but to be aware of the range of possible alternatives. This analysis highlights how a simple option of repeating covers an amalgam of possibilities and emphasises how the interactive process, unique to PAW, helped to foster and promote a range of strategies and skills.

Re-analysis of the entire data was subsequently undertaken in consultation with my second analyst. Before starting this stage of the analysis process both myself and my second analyst undertook individual analyses of several pages of the transcriptions in order to ensure that our understanding of the categories was in accord. This parallel run was successful and revealed that we were in complete agreement. It was at this point that I was able to detect some examples of *declarative*, *procedural* and

conditional metacognition. The coding scheme had now been refined and is illustrated below in Table 4.9.

Table 4.9 Refined coding scheme with examples

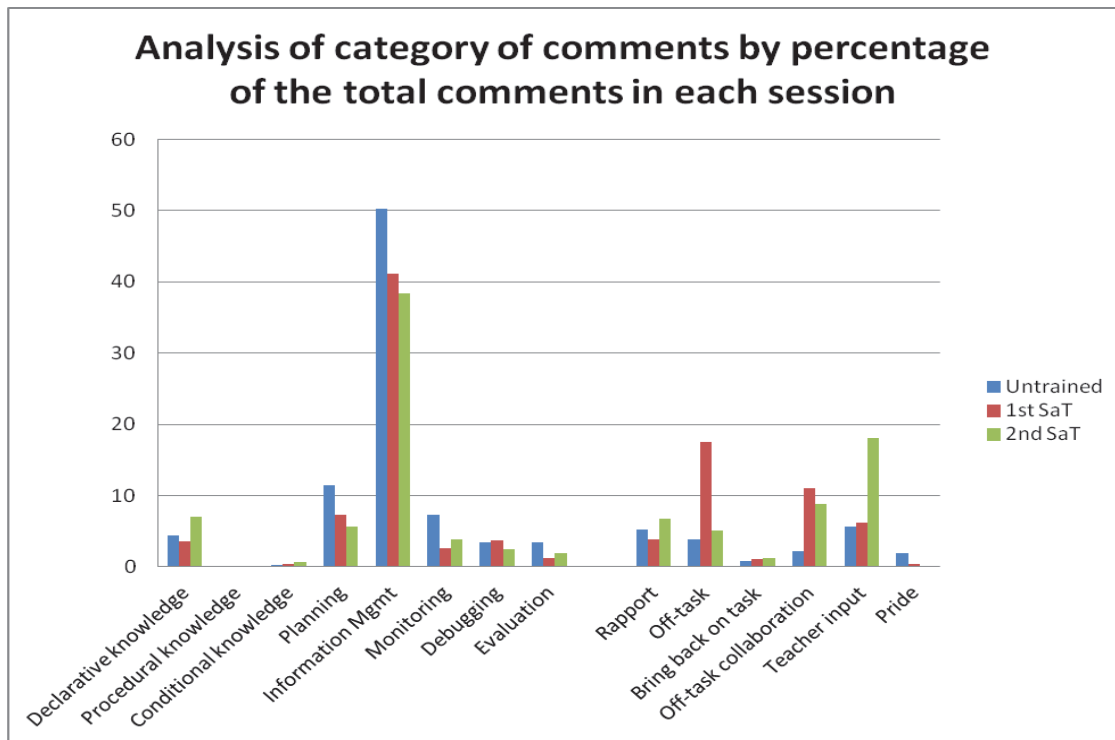
Coding	Definitions	Example
Declarative knowledge	Knowledge about one's skills, intellectual resources and abilities as a learner	That's a WOW word, disgusting
Procedural knowledge	Knowledge about how to implement learning procedures (e.g. strategies)	K. a tall man with a, a tall man with blond hair (IM elaboration); C. I'll just write a tall man (debugging); K. I'm just trying to get the detail or that sort of thing (procedural)
Conditional knowledge	Knowledge about when and why to use learning procedures	Mrs G, Mrs G, you know how everyone says computer games are bad for your imagination. I think they actually help
Planning question	Seeking information with regard to future arrangements for carrying out task or project	Where shall we have it?
Planning organisation	Arrangements made pertaining to goal execution	We'll do that in the actual story
Information management organisation	Process of text organisation and arrangement	Present, no just present
Information management instinctive repeat	Indicative of needing further time to assimilate information of facts	Let's do it a bit more there (planning organisation). I do a bit more there (IM repeat)
Information management imagination	Development of data for a step change in thought and creation of ideas	Put a WOW word in (Declarative) stinking monster (IM imagination)
Information management questioning	Requesting further information to assist processing of text	What did I write there? Pitch black cave?
Information management summary	Succinctly précising foregoing ideas and strategies	Everyone was very excited so they could get away from the flood
Information management elaboration	Further enhancement or development of ideas and strategies	Pitch black cave (IM imagination)... pitch black damp cave (IM elaborating)
Information management reasoning	Discussed one's analysis of approach to further assessment of facts	Terrified, just like frightened
Monitoring	Utterance aimed at checking and validating one's comprehension of the task	Before I did this I did not do well in writing
Debugging	Strategies used to correct comprehension and performance	No! I'll write Jamie took his knife. (<i>in response to Colin who wanted to use 'he'</i>)
Evaluation	Activities characterised by a strategic self-assessment of	Before I joined this class I thought I was rubbish but I

Rapport	one's reasoning, thought products and task progress Positive supportive attitude (verbal/non-verbal)	think with being paired up it has really helped C. claps.... Well done!
Off-task	Discussion with no relevance to task in hand	Look! We've finished the whole story
Bring back on task	Comment out of context designed to redirect thoughts	Right! Come on Colin!
Teacher input	Teacher input	No, just leave a line
Pride	Overt pleasure in own or partner's work/acknowledge that valued person will appreciate it as well	That was good! (<i>smiles at partner</i>)
Off-task collaboration	Discussion that showed supportive discussion not directly relevant to the story	K. Green is my favourite colour – C. Mine are pink and blue. K. Colin, do you like school? C. Yea, it's all right. <i>This exchange followed a discussion (on WOW words and which colour they were going to use to highlight the WOW words)</i>

The category totals were scored for each page of transcribed video recorded dialogue and a numerical record kept. I was now confident with this categorisation and therefore started a similar analysis process with PVTs and TAPs.

Figure 4.1 below shows, in order, the analysis of category comments by percentage of the total number of comments for Pair A when writing Story 1 (Untrained) and Story 3 and Story 4 (1st SaT and 2nd SaT)

Figure 4.1 Results - general

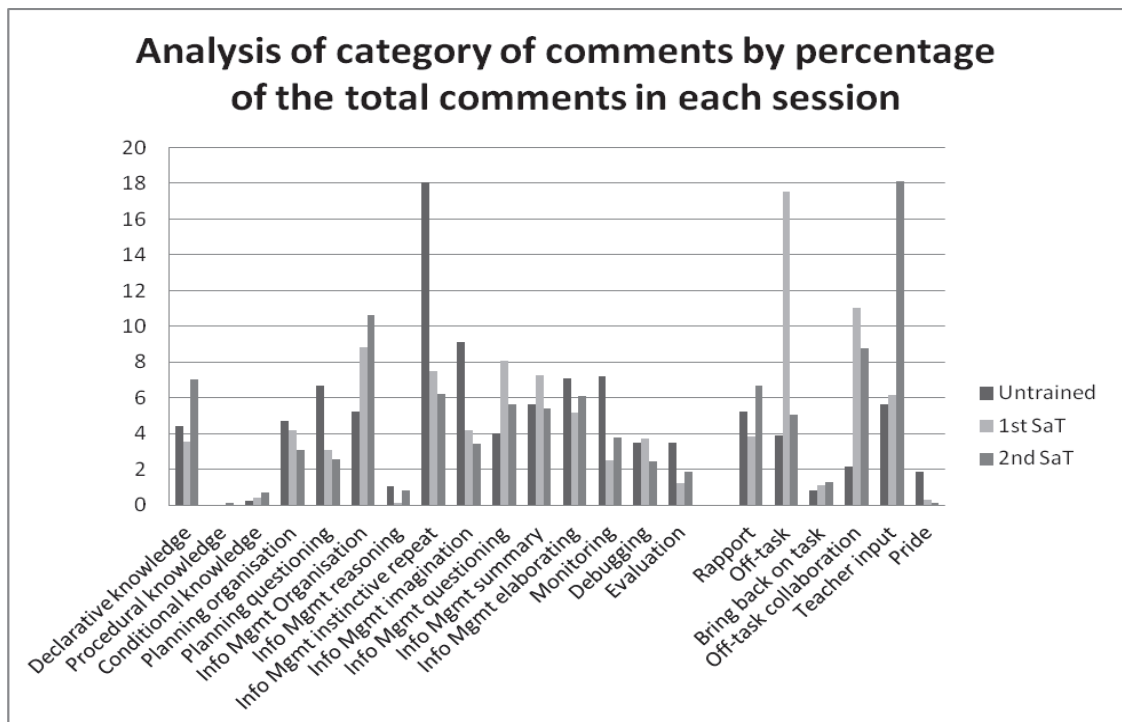


This bar chart shows, as a percentage of total number of comments, that *IM* is the major category, suggesting a need to look further into its sub-components. This is followed up below. There is no agreement in the literature concerning the order of development of knowledge and regulation of metacognition. Brown (1981) suggested regulation components of *planning*, *information management*, *monitoring*, *debugging* and *evaluation* develop before knowledge of metacognition components of *declarative*, *procedural* and *conditional* sub-components. My analysis supports this for *procedural* and *conditional* knowledge, but not *declarative* knowledge. My conclusion was there must be something about PAW that helps *declarative* knowledge to develop, and I shall discuss this further in a later section.

Another interesting result was the decrease in both *planning* and *IM* over the three stories. In maths or science, increases in *planning* have been documented (Desoete, 2009). Also, I could not find any reference to *IM* in maths and science studies. In Figure 4.2 I have separated the sub-components of *information management* and *planning* in order to demonstrate the complexity of these components.

Figure 4.2 below shows the sub-components of *information management* (*IM organisation*; *IM reasoning*; *IM instinctive repeat*; *IM imagination*; *IM questioning*; *IM summary* and *IM elaboration*) and demonstrates the complex skills pertaining to this particular component in writing. It also shows the sub-components of *planning* (*planning organisation* and *planning questioning*).

Figure 4.2 Results - detailed



4.4 Results of PVTs and TAPs

Having unpicked the data from the videos, I examined the PVTs and TAPs using the same coding scheme.

Figure 4.3 Results - PVTs & TAPs

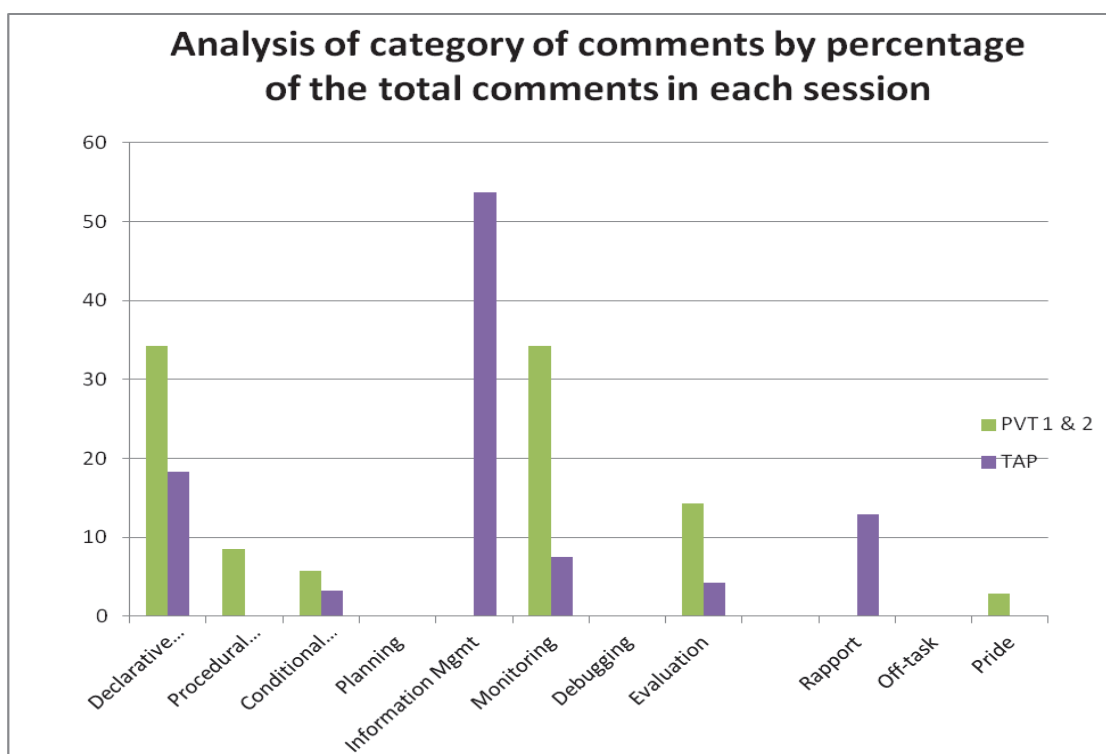


Figure 4.3 above shows the variation in PVT and TAP results. The range of metacognitive components was less than in the video analysis. The PVTs revealed more *declarative*, *procedural* and *conditional* thinking than TAPs, and more evidence of *monitoring* and *evaluation*. In the PVTs, knowledge of metacognition components of *declarative*, *procedural* and *conditional* knowledge refute Brown's view that regulation of metacognition components develop before knowledge of cognition. This result suggests that there might be something about PVTs that promotes this type of thinking. Table 4.10 provides examples of the comments included in the PVTs.

Table 4.10 Examples of comments from the PVTs

Declarative knowledge	I have found that I can work well and I have a great imagination
Procedural	I work better in groups... creating my imagination and my writing skills
Conditional	I will work with partners much and better
Planning questioning	<i>None found</i>
Planning organisation	<i>None found</i>
Information management organisation	<i>None found</i>
Information management reasoning	<i>None found</i>
Information management instinctive repeat	<i>None found</i>
Information management imagination	<i>None found</i>
Information management questioning	<i>None found</i>
Information management summary	<i>None found</i>
Information management elaboration	<i>None found</i>
Monitoring	I came up with more VCOP with a partner
Debugging	<i>None found</i>
Evaluation	I thought my levels are going to be better after PAW
Off-task	<i>None found</i>
Off-task collaboration	<i>None found</i>
Bring back on task	<i>None found</i>
Teacher input	<i>None found</i>
Seeking information	<i>None found</i>
Pride	I would show it to my Granny

TAPs revealed no *procedural* knowledge. *Information management organisation* was only present in TAPs, not PVTs. Similar to *IM* found in the video, the major category was *IM* in TAPs . Neither TAPs or PVTs revealed evidence of *planning* or *debugging*, nor did they show off-task, off-task collaboration, teacher input or bringing back on task. I have listed in Table 4.11 below examples of the comments from the TAPs. At this point a similar parallel transcription was carried out by both analysts on the PVTs

and TAPs. This again revealed that both analysts were in agreement concerning the categories and their attribution in the analysis.

Table 4.11 Examples of comments from the TAPs

Declarative knowledge	C. did not know it was a connective
Procedural	'cos it's just like he said something, he replied 'cos he's answered back
Conditional	...because I read a book and it kept changing <i>(this is reference to an author who spoke as if the animal)</i>
Planning questioning	<i>None found</i>
Planning organisation	<i>None found</i>
Information management organisation	Nan's really feeling it's the only...she's wanting to cry
Information management instinctive repeat	Everyone was scared out of their minds... scared out of their minds
Information management imagination	...she was feeling down
Information management questioning	What were we going to say?
Information management summary	OK this is T talking though
Information management elaboration	What were we going to say? (IM question) ...Everyone was scared out of their minds or worried... scared and worried (IM elaboration)
Information management reasoning	That compared to that (<i>in relation to writing</i>)
Monitoring	We've never used it in one of our stories before
Debugging	<i>None found</i>
Evaluation	I think it is easier doing paired writing (declarative) because it give you more ideas to write down
Off-task	<i>None found</i>
Off-task collaboration	<i>None found</i>
Bring back on task	<i>None found</i>
Teacher input	<i>None found</i>
Seeking information	<i>None found</i>
Pride	<i>None found</i>

4.5 Evaluation of class teacher writing assessments

The quantitative analysis consisted of the teacher's writing assessment scores and the word count scores, pre and post the PAW programme. All the pupils in the composite Primary 6/7 class were asked before the programme to compose a letter to their head teacher telling her about their holidays. In total there were 21 pupils – the eight pupils who took part in the PAW programme and the remaining 13 who acted as the control group. These pupils progressed with the school's writing programme, Vocabulary, Connectives, Openers and Punctuation (VCOP), adopted by West Dunbartonshire Council and developed by Ros Wilson (Wilson, 2002). The PAW group pupils were the weaker members of the class as identified by the class teacher. On completion of PAW all pupils wrote another letter to the head teacher on her retirement. The class teacher was responsible for marking the writing assessments and an example of the marking criteria (developed by Ros Wilson and documented in West Dunbartonshire Council (2007)) is shown in Appendix 7. I compiled the word counts scores by tallying the number of words written in the writing assessments. The results of the writing assessments and the word count scores achieved are set out in Table 4.12 below. These results are then presented as box plots in Figures 4.4 and 4.5 below.

Table 4.12 Results of the writing assessments and the word count scores

	Writing assessment				Word counts			
	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain %</u>	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain %</u>
<i>Rest of class</i>								
Pupil A	9	15	6	67	169	304	135	80
Pupil B	6	12	6	100	111	382	271	244
Pupil C	5	9	4	80	191	269	78	41
Pupil D	7	14	7	100	73	205	132	181
Pupil E	4	11	7	175	80	259	179	224
Pupil F	9	16	7	78	83	307	224	270
Pupil G	5	15	10	200	246	350	104	42
Pupil H	8	17	9	113	168	360	192	114
Pupil I	5	11	6	120	173	314	141	82
Pupil J	6	13	7	117	81	229	148	183
Pupil K	6	13	7	117	169	374	205	121
Pupil L	7	12	5	71	100	303	203	203
Pupil M	5	11	6	120	134	364	230	172
<i>PAW group</i>								
Pupil N	9	13	4	44	97	251	154	159
Pupil O	5	13	8	160	97	152	55	57
Pupil P	4	13	9	225	43	291	248	577
Pupil Q	5	11	6	120	158	229	71	45
Pupil R	3	11	8	267	39	110	71	182
Pupil S	6	13	7	117	149	270	121	81
Pupil T	6	11	5	83	62	165	103	166
Pupil U	2	9	7	350	14	177	163	1,164

Table 4.12 above shows the writing assessment level before the PAW programme started and the pre and post writing assessment and word count scores of each pupil. Additionally it shows the gains and the percentage increases in the writing assessment and word count scores for each pupil. In this table and some of the tables below I have included both the absolute gains and the percentage gains. I think it is helpful to see both the actual improvement and the extent of improvement from the pre PAW/VCOP performance levels, particularly as the PAW group were identified as weaker than the rest of the class.

Table 4.12 also shows that the class Teacher's selection of pupils clearly included the weakest pupils in the class (all the level Bs and no level Ds). The rest of the class was therefore not a matched control group for the PAW group. At this point I considered a more appropriate terminology for the rest of the class was a comparison group. The PAW group had been selected by the class teacher because she had identified them as pupils who struggled with writing skills. I suggest that the following results are viewed against research by Gerber (2002, p.316) who documented that pupils who struggle with literacy achieve at a slower rate and more instructional effort is required to obtain more similar (equal) levels of achievement.

Figure 4.4 Box plots of writing assessments

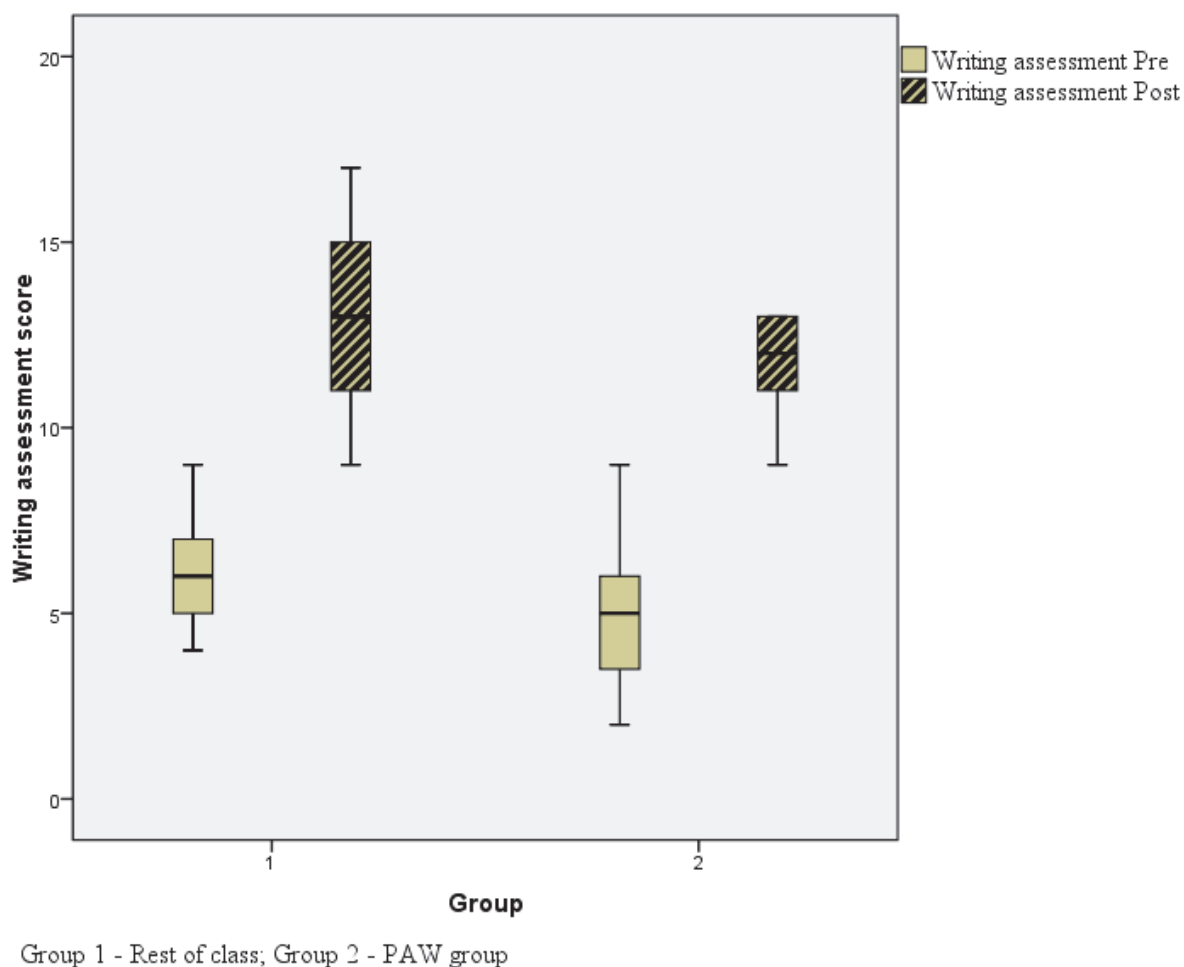
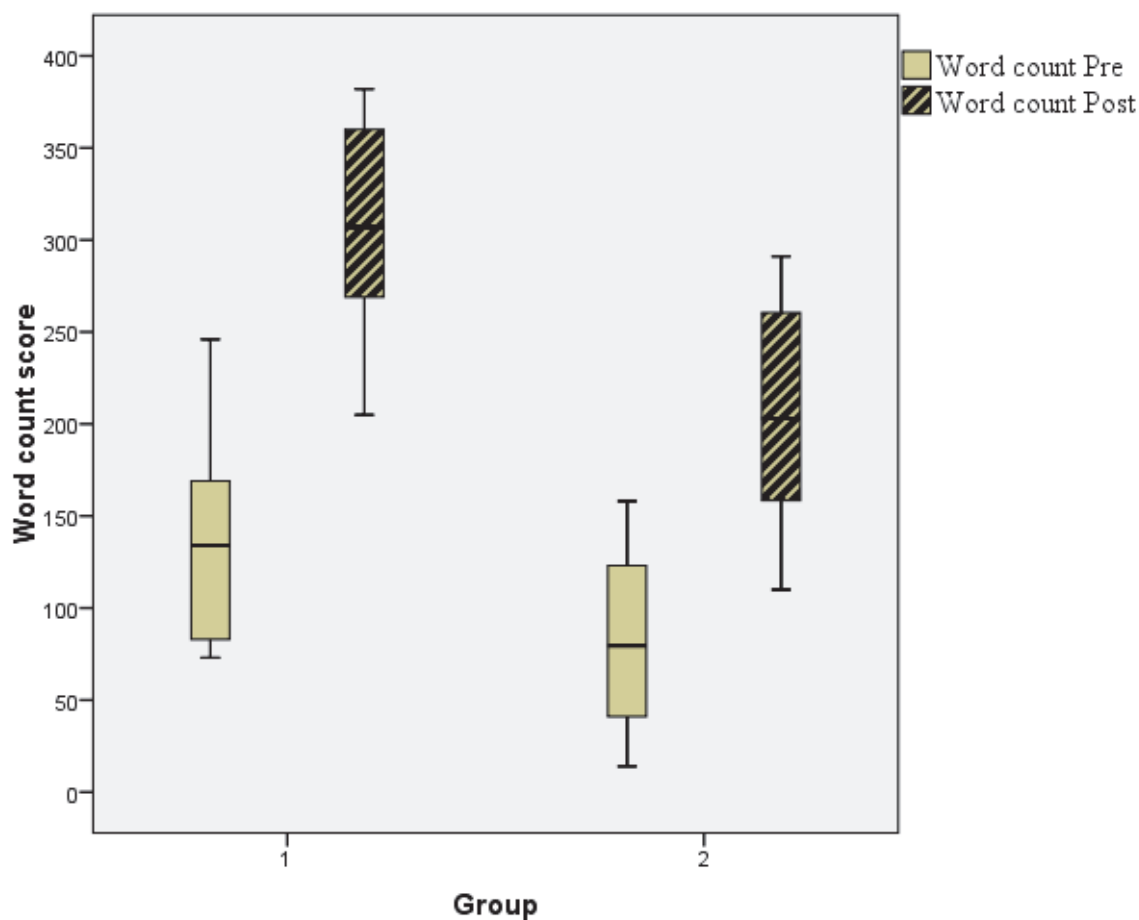


Figure 4.5 Box plots of word count scores



Group 1 - Rest of class; Group 2 - PAW group

Figures 4.4 and 4.5 display the results of the rest of the class and the PAW group for the writing assessments and word counts. (The horizontal lines within and at the top and bottom of the boxes indicate the medians, upper quartiles, and lower quartiles; the ends of the lines issuing from the boxes represent the individual highest and lowest scores.) Figure 4.4 details that both groups made similar gains in the writing assessments and it also shows that most of the weaker pupils in the PAW group were brought up towards the mid and top level in the group. Figure 4.5 shows that the rest of class made greater gains in the word count scores than the PAW group. The box plots

in Figures 4.4 and 4.5 support the assertion made by the class teacher that she had included most of the weakest pupils in the PAW group.

Table 4.13 Quartile results of the writing assessments and the word counts

		Rest of Class			PAW group		
		Pre	Post	Gain	Pre	Post	Gain
Writing assessment	Upper quartile	7.5	15.0	7.5	6.0	13.0	7.0
	Median	6.0	13.0	7.0	5.0	12.0	7.0
	Lower quartile	5.0	11.0	6.0	3.3	11.0	7.7
Word count	Upper quartile	171.0	362.0	191.0	136.0	265.2	129.2
	Median	136.8	309.2	172.4	82.4	205.6	123.2
	Lower quartile	82.0	264.0	182.0	40.0	155.3	115.3

Table 4.13 summarises the performance of the groups. It shows that the PAW group gains in the writing assessments were closely similar to those of the rest of the class across all levels of pupils and a degree better for the lower quartile. Table 4.13 also shows that there were greater gains in word counts for pupils in the rest of the class.

Figure 4.6 Bar chart of writing assessment median scores

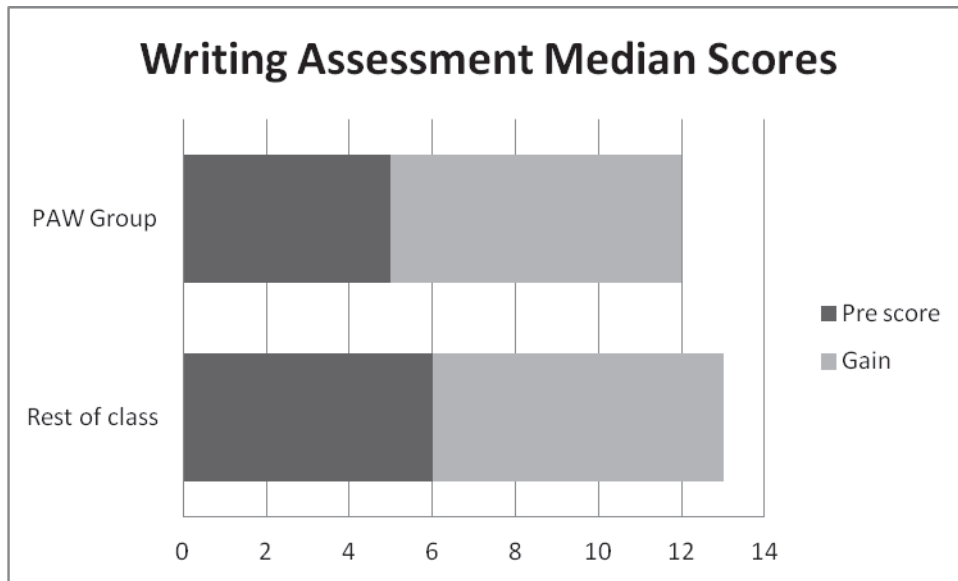


Figure 4.6 again illustrates that both groups made similar gains in the writing assessments although the PAW group started from a lower base.

Figure 4.7 Bar chart of word count median scores

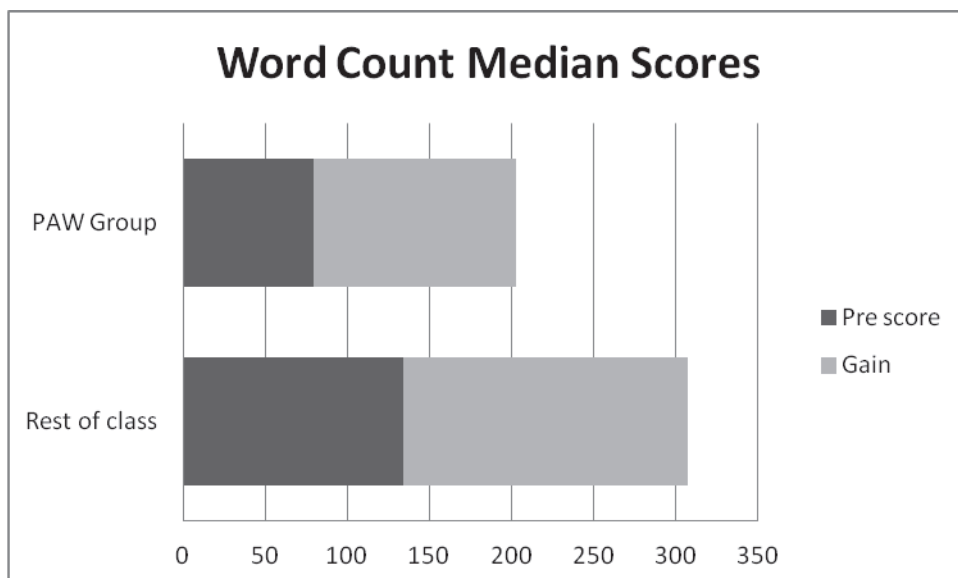


Figure 4.7 provides a visual representation that the rest of the class made greater word count gains than the PAW group.

At this point I decided to look at the results of the top and bottom three pupils in the PAW group because Table 4.13 showed that the lower quartile in the PAW group had made particularly large gains. I considered these results with the top and bottom three pupils in the rest of the class. To do this I first sorted the results based on the pre writing assessment results and then by sorting the results by pre word count scores. These are shown in Tables 4.14 and 4.15 below. I then further tabulated the results of the top and bottom three pupils in both the rest of the class and the PAW group (Table 4.16 and 4.17).

Table 4.14 Results of the writing assessments and the word count scores sorted by pre writing assessment scores

Pupil	Writing assessment				Word counts			
	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain %</u>	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain %</u>
<i>Rest of class</i>								
A	9	15	6	67	169	304	135	80
F	9	16	7	78	83	307	224	270
H	8	17	9	113	168	360	192	114
L	7	12	5	71	100	303	203	203
D	7	14	7	100	73	205	132	181
K	6	13	7	117	169	374	205	121
B	6	12	6	100	111	382	271	244
J	6	13	7	117	81	229	148	183
G	5	15	10	200	246	350	104	42
C	5	9	4	80	191	269	78	41
I	5	11	6	120	173	314	141	82
M	5	11	6	120	134	364	230	172
E	4	11	7	175	80	259	179	224
<i>PAW group</i>								
N	9	13	4	44	97	251	154	159
S	6	13	7	117	149	270	121	81
T	6	11	5	83	62	165	103	166
Q	5	11	6	120	158	229	71	45
O	5	13	8	160	97	152	55	57
P	4	13	9	225	43	291	248	577
R	3	11	8	267	39	110	71	182
U	2	9	7	350	14	177	163	1,164

Table 4.15 Results of the writing assessments and the word count scores sorted by pre word count scores

Pupil	Level at Pre	Level at Post	Writing assessment				Word counts			
			<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain %</u>	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain %</u>
<i>Rest of class</i>										
G	D1	D3	5	15	10	200	246	350	104	42
C	E1	E2	5	9	4	80	191	269	78	41
I	E1	E2	5	11	6	120	173	314	141	82
A	D1	D3	9	15	6	67	169	304	135	80
K	E1	E3	6	13	7	117	169	374	205	121
H	D1	D3	8	17	9	113	168	360	192	114
M	D1	D2	5	11	6	120	134	364	230	172
B	D1	D2	6	12	6	100	111	382	271	244
L	E1	E2	7	12	5	71	100	303	203	203
F	D1	D3	9	16	7	78	83	307	224	270
J	E1	E3	6	13	7	117	81	229	148	183
E	>D	D2	4	11	7	175	80	259	179	224
D	D1	D3	7	14	7	100	73	205	132	181
<i>PAW group</i>										
Q	D1	D2	5	11	6	120	158	229	71	45
S	D1	D2	6	13	7	117	149	270	121	81
N	D1	D2	9	13	4	44	97	251	154	159
O	D1	D2	5	13	8	160	97	152	55	57
T	D1	D2	6	11	5	83	62	165	103	166
P	<C	C3	4	13	9	225	43	291	248	577
R	<C	C2	3	11	8	267	39	110	71	182
U	<C	C2	2	9	7	350	14	177	163	1,164

Tables 4.14 and 4.15 show by each of the two measures that pupils P, R and U were the weakest in the entire class. The two measures of sorting the pupils provided almost identical groups of the top and bottom three pupils in the PAW group. However there was scant correlation between the top and bottom groupings in the rest of the class. The extent of the gains by the three weakest pupils in the PAW group is noteworthy. Here it is important to re-iterate that the PAW group were the weaker group and would

not therefore have been expected to make such positive gains as the stronger rest of the class group. These pupils achieved the greatest percentage increases in their writing assessment scores and two of them had word count percentage increases more than twice as great as any other pupil. Pupils P and U made large gains with both the writing assessments and word count scores and both started from a low base; pupil R made a substantial gain in the writing assessment but his word count gain was second lowest amongst the entire class.

Table 4.16 Cumulative results of the stronger and weaker pupils sorted by pre writing assessment scores

Pupil	Writing assessment				Word counts			
	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain</u> <u>%</u>	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain</u> <u>%</u>
<i>Rest of class</i>								
Strongest 3	26	48	22	85	420	971	551	131
Weakest 3	14	33	19	136	387	937	550	142
<i>PAW group</i>								
Strongest 3	21	37	16	76	308	686	378	123
Weakest 3 (pupils P,R&U)	9	33	24	267	96	578	482	502

Tables 4.16 shows that the weaker pupils in the PAW group made greater gains than the stronger pupils in both PAW group and the rest of the class in the writing assessment; in the rest of the class the stronger pupils made greater gains in the writing assessment than the weaker pupils in the rest of the class.

Table 4.17 Cumulative results of the stronger and weaker pupils sorted by pre word count scores

Pupil	Writing assessment				Word counts			
	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain</u> <u>%</u>	<u>Pre</u>	<u>Post</u>	<u>Gain</u>	<u>Gain</u> <u>%</u>
<i>Rest of class</i>								
Strongest 3	15	35	20	133	610	933	323	53
Weakest 3	17	38	21	124	234	693	459	196
<i>PAW group</i>								
Strongest 3	20	37	17	85	404	750	346	86
Weakest 3 (pupils P,R&U)	9	33	24	267	96	578	482	502

Table 4.17 again shows that the weakest pupils in the PAW group made greater gains than the stronger pupils in both the PAW group and the rest of the class in the writing assessment. The weakest pupils in the PAW group made greater word count gains than the stronger PAW group pupils when sorted by pre writing assessment or pre word count scores. In the rest of the class the weaker pupils made marginally greater gains in the writing assessment and distinctly greater gains in the word count scores than the stronger pupils in the rest of the class.

It is difficult to reach a conclusion owing to the small sample. However the inference from these results, despite the acknowledged problems of assessment criteria, is that the weaker PAW group made greater writing assessment improvement than either the stronger or weaker pupils of the rest of the class and they also made greater gains than the other pupils within the PAW group.

4.8 Teacher interview and diary

I have included the results from the class teacher interview and my diary extracts together as they form further triangulation that can be viewed alongside the video, TAPs, PVTs, class teacher assessments and word counts. They help to complete and reinforce the results from the video and class teacher assessments that show that PAW is a valid method of supporting writing as measured by the writing assessments .

On completion of the PAW programme I met the class teacher and requested her comments on the programme. The interview was unstructured and informal. Table 4.18 is an indication of how the interview developed.

Table 4.18 Development of class teacher interview

Questions:

- Can you tell me how you think the PAW programme developed?
 - Can you tell me what you felt were the positive aspects of the programme?
 - Can you tell me how you would like to change the programme?
 - Were there any really negative aspects of the programme?
 - Do you have any ideas what we might do in the future?
-

Table 4.19 Examples from class teacher interview

- Gains in knowledge and self-belief – so things just clicked
 - Confidence to talk about VCOP (this was not possible before the PAW programme)
 - Celebration each week – really good stuff
 - Being ‘top dogs’ in the classroom gave further credence
 - No scenes about missing out on activities to do PAW
 - Writing in pairs seemed to take away ‘I can only write a sentence’ attitude
 - They all thought they were as good as each other
-

Table 4.19 above shows that all comments were positive and this raised concerns for me; although I had neither intended to structure nor influence the interview, I might

have unintentionally done so. I was concerned that my own enthusiasm and that of the class teacher for the programme would lead to a biased result. However, I had been aware throughout the programme that the interactive process of PAW helped the pupils to take charge of their learning; the teacher and I were there to provide support, but it was the pupils who were to a greater extent in control. Equally in the class teacher interview I had given the teacher the opportunity to provide critical comments. The ethos of joint partnership and the desire to provide learning opportunities for the pupils had been prevalent throughout the programme and I considered that it was in evidence in the interview.

Table 4.20 Examples from my diary

- Supportive
 - Good collaboration
 - Promoted confidence and self-esteem
 - Delimited negative feelings about writing
 - TAP helped to promote discussion and thought
 - Time spent off-task but revealing intelligent general knowledge comments
-

Examples from my diary took two forms. I have listed the positive comments in Table 4.20. Collaboration, support, confidence, decrease in negative feelings, praise and promotion of discussion and thought were all emphasised. Important observations are that the PAW programme helped to promote discussion and thought and seemed to delimit negative feelings about writing. Also there was evidence of good collaboration that I feel requires further investigation as to the conditions, personalities and learning contexts that promoted this area. I also noted that consideration should be given to investigating discussions termed as off-task.

Table 4.21 below, on the other hand, shows a more critical slant and reveals that aspects such as training and timing of TAP assessments should be re-evaluated in future research. The training of learning assistants to carry out TAP assessments could also be considered in order to ascertain if their involvement in PAW would be an appropriate activity.

Table 4.21 Diary ideas for future PAW research

- More time for training
 - TAPs should have taken place earlier because I felt it helped VCOP understanding
 - Learning assistants could carry out TAP assessments
-

4.9 Data combination qualitative/quantitative analysis

In designing my PAW research project I had hoped to demonstrate the efficacy of implementing a PAW programme. I also wanted to ascertain the nature of the pupils' interactions when engaged in a PAW programme. The project revealed a wealth of qualitative data and I had to restrict the amount I was able to analyse. The most noteworthy finding was the complex range of *information management*. The qualitative analysis allowed me to analyse this category in detail. The advantage of the quantitative aspect was the measured element of the category outcomes. The results revealed *information management* as an important and complex skill which should be considered in teaching literacy skills in the classroom. However, the difficulty of categorisation reduces the integrity of the results.

The qualitative analysis of the video was the first stage and revealed the fullest range of metacognitive categories: knowledge of metacognition featured *declarative* but only scant indication of *procedural* and *conditional* metacognition. Regulation of metacognition categories were *planning*, *information management*, *monitoring*,

debugging and *evaluation*. The results confirmed my decision to use a coding scheme based on Brown (1981) and Flavell (1979). In addition, the results substantiated my use of a flexible coding scheme as it was necessary to extend the metacognitive subcomponents in the PAW context.

The same coding scheme was used to analyse the Pupil View Templates and Think Aloud when Prompted assessments and results revealed a reduced range of metacognitive categories. Pupil View Templates of the three assessment methods revealed the full range of knowledge of metacognition categories of *declarative*, *procedural* and *conditional* metacognition. *Declarative* metacognition was the most prominent category. This suggests that PVTs have the potential to promote this category in particular. PVTs also revealed more evidence of *monitoring* and *evaluation*. I would have anticipated that the video and in particular the TAPs would have evidenced more *evaluation*, as the nature of TAPs appeared to focus the pupil on this approach.

The qualitative analysis also revealed the intricate nature of *planning*. The subcomponents were *planning organisation* and *planning questioning*. The quantitative analysis (Figure 4.1) showed the decrease of this component over the three stories, which is not what would have been anticipated in a PAL study in maths or science.

Teacher writing assessments results pre and post the PAW programme were carried out by the class teacher. This qualitative assessment provides information of the areas where the pupils showed knowledge on an individual basis. The quantitative evidence of these results (Table 4.13) helped to demonstrate the efficacy of implementing a

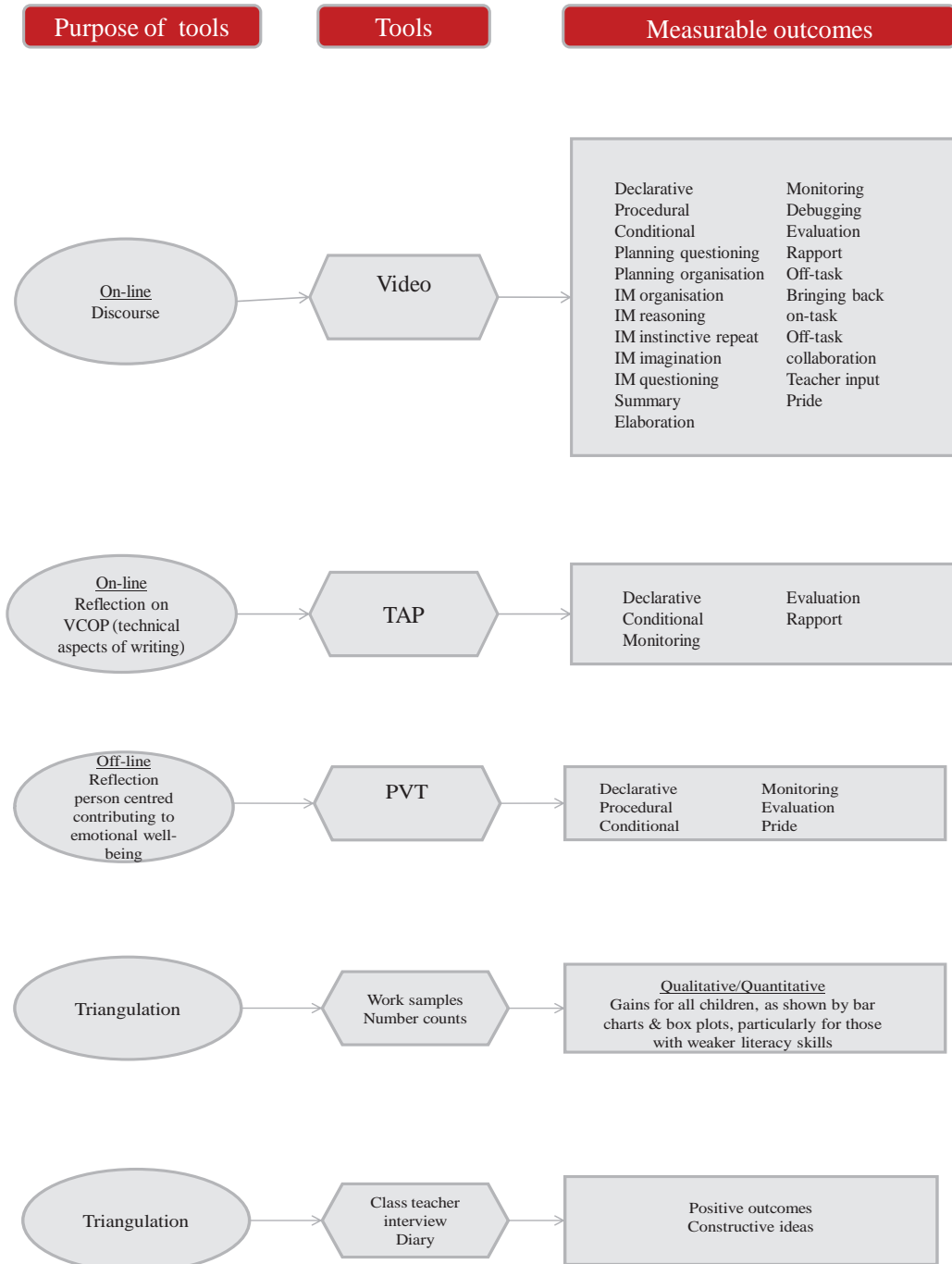
PAW programme with a group of pupils with a range of abilities and Additional Support Needs.

The quantitative data analysis showed that the writing assessment gains were of a similar order across both the rest of the class and PAW group (Table 4.13). This result is contrary to what would have been expected as the PAW group had been identified as the weaker group. However the rest of the class made greater gains in the word count scores.

Further triangulation came in the form of the class teacher interview and my diary record. I included only qualitative results as these two methods were carried out and analysed on an informal basis. However, both revealed a positive range of comments. My diary record was evidence of my thoughts whilst the PAW programme was carried out and also contained my thoughts concerning future research.

4.10 Summary of key issues

Figure 4.8 Results of methods used to show outcomes of PAW



The results highlighted the different metacognitive skills linked to PAW that, to my knowledge, have not been documented previously in a similar way. In particular the size and range of sub-skills subsumed within *information management* emphasises the complexity of the writing process.

The results question that regulation of metacognition develops prior to knowledge of metacognition. They also suggest that *declarative* knowledge develops at approximately the same time as the regulation of metacognition components. However, owing to the difficulty of separating knowledge of metacognition and knowledge of cognition, I suggest this result should be viewed with caution. In this small sample *procedural* and *conditional* knowledge were seen to develop at a slower rate.

In this five week programme there was no indication of any progression in metacognitive development. Vygotsky (1978) highlighted the manipulation of language in a social context and advocated less emphasis on formal instruction. His thinking emphasised that it is this combination that could promote thinking. Whilst the context of PAW undoubtedly provided this ingredient I felt, with hindsight, it was over optimistic to have expected progression during the PAW programme. However, the impetus remains for studies of a longitudinal nature.

The reality of implementing PVTs and TAPs is that they are diametrically opposed assessments. Pupil View Templates were a pupil-centred assessment that elicited *declarative* knowledge of metacognition, small evidence of *procedural* and *conditional* knowledge, *monitoring*, *evaluation* and *pride*. It was an assessment that had the potential to focus the pupils' attention on both positive and negative aspects of PAW

and about themselves as writers. Pupil View Templates did not evidence *information management*, whilst in both video and TAPs this was the largest category.

TAP assessments revealed *declarative* and *conditional* knowledge of metacognition, *information management*, *evaluation* and rapport. Within the TAP approach, however, was a more directive prompting to focus the pupils' attention on the VCOP components. The assessment therefore seemed to advance educational outcomes by progressing understanding and therefore cognition, however I cannot substantiate this.

The quantitative teacher writing assessments showed that the PAW sample group improved commensurate with the rest of the class. In the word counts the rest of the class achieved greater increases across all levels as compared to the PAW group. In addition, detailed examination of the teacher writing assessment results showed that the PAW programme supported in particular the pupils who struggled with writing skills (Tables 4.16 and 4.17).

It is important to emphasise that the PAW group had been identified by the class teacher as pupils who particularly struggled with writing skills. The results documented in Table 4.16 and Figures 4.4 for the writing assessment highlighted that PAW supported the weaker pupils so that they made similar progress to the more able pupils in the rest of the class group. Gerber (2002) emphasised that pupils who struggled with literacy skills do not make similar progress to those pupils who do not encounter problems. Gerber (2002) discussed the slower rate of progress and the need for 'more instructional effort' in order for pupils who experience difficulty to make progress. It is apparent that PAW provided a context where the weaker pupils could make similar progress to that of their stronger peers.

Further thoughts for future research should be directed at how PVTs and TAPs influence assessment outcomes. In the next chapter I provide a discussion of these results in terms of this study, my research questions, previous research and include an evaluation of the methodology I used.

CHAPTER 5

Discussion

5.1 Introduction

In this section I will discuss my results with reference to the previous literature. I will answer my research questions and include an evaluation of my methodology. It is useful at this point to reiterate my research questions.

1. How does a PAW programme support pupils' development in:
 - Metacognition?
 - Writing?
2. What do on-line and off-line assessment methods tell us about the metacognitive outcomes of Peer Assisted Writing?

This was an exploratory study in a context where research was scarce, with few studies looking explicitly at PAW. Only five Peer Assisted Writing studies could be found: Duran and Monereo (2005); Larkin (2009); Nixon and Topping (2001); Sutherland and Topping (1999); Yarrow and Topping (2001). However, only Duran and Monereo (2005) and Larkin (2009) attempted qualitative analysis.

In my research I developed a Peer Assisted Writing programme based on Topping (1995). Four pairs of pupils from a composite Primary 6/7 class participated in the PAW study over a five week period. They attended three sessions of approximately 45

minutes each week; they completed four stories in addition to training sessions. I used on and off-line methods to investigate metacognitive outcomes evidenced during PAW. On-line methods included video recording and Think Aloud when Prompted and the off-line method was Pupil View Templates.

Quantitative analysis demonstrated that the weaker PAW group were able to improve their writing skills commensurate with the stronger rest of the class group. I also carried out an interview with the class teacher and kept a diary record throughout the PAW programme. These further measures helped to substantiate the efficacy of implementing a PAW programme; although providing benefits for all pupils in the group, PAW was shown to particularly benefit the weaker pupils.

Further support for the PAW programme came from the qualitative analysis of the video recordings. These findings confirmed the complexity of the skill of writing. They also substantiated that arguably PAW promotes an identical range of skills which had been previously identified by Bereiter and Scardamalia (1987) and Hayes and Flower (1980) as essential for success in writing. The context of PAW was shown to provide a range of scaffolds that supported the writing process. *Information management* was revealed as the largest and most complex category and I had to extend the range of subcomponents in order to describe accurately the range and complexity of this important category. I found no other research that had itemised this component in a similar way. My results also confirmed that development of knowledge of metacognition and regulation of metacognition are mutually dependent. The results also raised issues about the possibility that cognitive activities and *declarative* knowledge of metacognition are not separable. I shall now discuss my findings in detail with particular reference to my research questions.

The first part of my first research question utilised my analysis of the transcriptions of the video tapes. These were selected as they provided on-going, in depth, natural data of the PAW programme. Analysis of the video tapes therefore provided evidence of the processes of PAW. The second part of my first research question centred on the pupils' development in writing and in order to answer this question I looked specifically at the combinations of quantitative and qualitative analysis. This included the writing assessments and the word count scores pre and post the PAW programme. In order to answer my second research question I then looked at the analysis of the PVTs and TAPs and the video as it was apparent that they assessed different aspects of metacognition.

My choice of a case study approach provided in depth knowledge of my sample pair and, together with the three sets of qualitative data, contributed to a more complete picture of different aspects of metacognition. It also provided further understanding of how to develop pupils' thinking and learning. The extracts from both the class teacher interview and my own diary provided further triangulation and helped to endorse the other results.

In this discussion I shall first look at some of the key issues revealed in my results section. These highlight aspects of what I had learnt about metacognition in the context of PAW, both during the development of my coding scheme and the process of analysis. I have chosen to discuss the video analysis first, as it is the foundation for the PAW study and creates the framework on which the PVTs and TAP assessments could be hung and discussion helps to answer my first research question.

5.2 PAW as a context for metacognition

It is apparent from the detailed analysis in Figure 4.2 that the PAW context gave rise to a complex range of metacognitive components deemed important in writing and learning. In the following discussion I will show how forms of scaffolding contained within PAW helped to reduce the memory load and arguably supported the pupils to access their ZPD.

Table 5.1 Sharing of roles

Examples	Metacognitive code
K. Now what are we going to write?	Planning question
C. Then eventually they got out, remember?	Monitoring
K. Oh dear! We forgot to miss a line!	Debugging
C. Oh no! Now we can just...	Rapport
K. If we'd only missed a line between that (pointing) we'd have been there... (demonstrates)	Monitoring
C. We'd be on the second page by now!	IM organisation
K. Now anyway what are we going to write?	Back on task
C. They eventually got out...	IM recap
C. Come on Kenneth, you write!	Planning organisation
K. What can we do now?	Planning question
K. I'm just going to write!	Planning organisation
C. Carly and Jamie had to carry...	IM imagination
C. Right?	IM question
C. Carly twisted her ankle and we had to carry her out	IM elaboration
K. and the monster almost got out but she rolled... got out of the way	IM elaboration
C. Na! Make it... Na! Jamie had to kick the monster	IM elaboration
K. Jamie shoots the monster	IM elaboration
C. Yes! (claps his hands)	Pride/rapport

Table 5.1 above provides examples of how the pupils shared the responsibility of composing and writing their story. I would argue that this form of scaffolding helped

to reduce an individual pupil's workload. Hayes and Flower (1980) specified the multiple demands faced by writers: making plans, revising plans, drawing knowledge and ideas from memory, developing concepts, imagining and responding to an informed or critical reader, considering reader needs and managing the mechanics of writing (spelling, grammar, handwriting or keyboarding). Flavell *et al.* (2002, p.266) believed that the human cognitive system has limitations on its information processing capacity and that these were more severe in children. Speed of processing will increase with age and, with age, mental activities become easier (Flavell *et al.*, 2002, p.267). However, it is well documented that pupils who struggle with literacy skills encounter difficulties in coping with a range of skills simultaneously (Bereiter & Scardamalia, 1987; Hayes & Flower, 1980; Snowling, 1995). The support and scaffolding offered by a partner in PAW would appear to support the pupils to perform to their potential (Vygotsky, 1978). Table 5.1 provides examples of scaffolding. The gains the PAW group made in their writing assessment also complement this evidence.

The pupils were also seen to expand on both their own ideas and those of their partner, so reducing the workload. I have included examples of this in Table 5.2.

Table 5.2 Expanding on ideas

Examples	Metacognitive code
C. Carly dropped the flashlight and the monster was right behind	IM imagination
C. and the monster was almost right behind	IM elaboration
K. Yes, and Carly went back	IM elaboration
C. Because she was running so fast	IM elaboration

A further aspect is the element of peer feedback which I have illustrated below in Table 5.3.

Table 5.3 Peer feedback

Examples	Metacognitive code
K. Colin took his knife out and tries	IM recap
C. tried	Debugging
K. that doesn't make sense	monitoring (peer assessment)
C. tries, tries, tries	Debugging
K. Sounds like tried, tries would be present tense and tried – we're doing past tense	Declarative

Throughout the pupils discourse, the elements of *monitoring*, *evaluation* and *debugging* served the purpose of immediate feedback. Reiteration (*monitoring*), reiteration including specific evaluation (*evaluation*) and correcting mistakes (*debugging*) is feedback that also allows more processing time by 'slowing' the process down. *Monitoring*, *evaluation* and *debugging* played a dual role and provided feedback and gave pupils further opportunities to internalise information and also to think further. In the context of a busy classroom the teacher would not be able to provide this immediacy or frequency. Throughout the entire PAW programme the range of regulatory metacognitive skills was seen to be continually repeated and therefore practised. Indeed, the reciprocal pairing system lent equality to the exercise and allowed pupils to take turns to experience a range of metacognitive activities. They had an equal opportunity to benefit from practising metacognitive skills that would arguably better equip them to succeed in educational settings and to make 'thoughtful life decisions' (Flavell, 1979, p.910). Important attributes such as collaborative skills, giving and receiving praise and establishing rapport were also present. The reciprocal pairings gave both members of the partnership the opportunity to take on the lead or teacher role. Moll and Whitmore (1993) suggested that the role of 'teacher' involved scaffolding by means of support, which is also an integral part of Vygotsky's

philosophy of teaching and learning. This support can be evidenced in the sharing aspects in Table 5.1.

The interactive nature of PAW allowed verbalisation and communication and provided a stimulus for further discussion. The VCOP programme (Wilson, 2002) and VCOP prompt cards that I developed to stimulate questioning provided mnemonic crutches and encouraged understanding of the components of vocabulary, connectives, openers and punctuation. My informal interview with the class teacher confirmed that the PAW process had promoted understanding of the VCOP components, which is evidence of cognition. The increase of cognition was revealed in the greater knowledge the pupils demonstrated in their use and understanding of vocabulary, connectives, openers and punctuation. This was also evidenced in the class teacher writing assessments.

Brown (1981), amongst others, documented that the foundation of metacognition is knowledge. Flavell *et al.* (2002, p.164) specified that metacognitive knowledge refers to the segment of one's acquired knowledge that has to do with cognitive matters. The evidence is that the PAW programme, and also the TAP assessments that mainly concerned VCOP components, supported the acquisition of cognitive knowledge. During the writing activity, each member of the partnership supported the other in experimenting with and practising new skills. Examples can be seen in the support offered for spelling and also the modelling of evaluation skills. A consequence of this cognitive knowledge appears to be progression in *declarative* knowledge of metacognition evidenced in the number of *declarative* knowledge of metacognition examples, many of which were also examples of cognitive knowledge. Metacognitive knowledge is accrued long-term knowledge, dependent to a great extent on memory devices. These include understandings and beliefs about situations, environments,

variables such as person, tasks, strategies and sensitivities that interact and so transform the outcomes of tasks and problems (Flavell, 1979). The role of memory is therefore crucial.

Vygotsky (1978) stressed the role of manipulation of language and the unique form of cooperation between pupil and adult, arguing that it is a central element of the educational process. Research literature also provided evidence of the effectiveness of peer tutoring (Cohen *et al.*, 1982; Yarrow & Topping, 2001). Duran and Monereo (2005) went further and suggested that the difference between teacher–pupil and pupil–pupil interactions is that in the latter, in addition to *Initiation, Response* and *Feedback (IRF)*, there is also evidence of *Collaboration* and *Evaluation (CE)* steps, both of which are essential for success in writing. The important point here is that *Collaboration* and *Evaluation* both additionally contribute to metacognition (Brown, 1981; Flavell, 1979). The collaboration between pupils was observed and evidenced in the above extracts (Table 5.1), where it was apparent that the story was the result of joint discussion and activity. The discourse revealed a range of metacognitive skills contained within PAW plus *rappport*, a consequence of *collaboration*, and *pride*, a consequence of praise from partner and peers culminating in pupils' delight in their work and that of their partner.

PAW therefore provided the verbal social interaction Vygotsky (1978) held to be crucial to promote thinking and learning. It was apparent that the social aspects of PAW created the opportunities to develop the internal cognitive processes which are the metacognitive ones (Tarricone, 2011). For example, PAW promoted the potential for problem solving and verbalisation which in turn promoted the opportunity of learning in the ZPD (Vygotsky, 1978). Individual, internal verbalisation is of course

possible, but the range of scaffolds already discussed and the *planning* questions promoting further discussion would not have been evident in an individual activity. In addition, the presence of a partner provided the opportunity for immediate affirmation evidenced in the PAW programme. Research documented that peer approval is a major contributing factor to the development of positive self-esteem (Graesser *et al.*, 2009).

The PAW programme therefore supported the pupils to succeed and, in so doing, the pupils realised that they could achieve. Success led to increased motivation, which resulted in positive educational outcomes. These ideas are supported by the views of Tarricone (2011) who suggested that issues of memory, knowledge, metacognition and learning cover an intricate tapestry and these components all support and are affected by each other. The centrality of knowledge as stressed by Brown (1981) is particularly important, but all the components are essential in order to acquire knowledge, memory, metacognition and motivation. I discussed earlier the scaffolding structures contained within PAW – sharing of roles, expanding ideas, peer feedback, the VCOP programme and prompt cards – all of which appear to have a role in promoting the acquisition of knowledge, memory, metacognition and motivation.

In order to answer the second part of my first research question, which investigates how the PAW programme supports pupils' development in writing, I am going to look at both the class teacher assessments and the associated word count scores pre and post the PAW programme. It is arguable that it is these scores which demonstrate the efficacy of the PAW programme. The writing assessments pre and post the PAW programme were carried out by the class teacher. My group of eight pupils who formed the PAW sample group had been specifically chosen by their class teacher as pupils who struggled with writing. The control (comparison) group consisted of the

rest of the class and included a group of pupils who the class teacher considered were not experiencing difficulty with writing skills. I cannot claim any degree of random assignment concerning my sample group and the rest of the class. Research by Gerber (2002) has documented that pupils who struggle with writing do not make similar progress to those pupils who do not encounter difficulty. Indeed they make slower progress and need more instructional effort. However, the quantitative results of the class teacher assessments pre and post the PAW programme showed similar gains for both groups of pupils (Table 4.12 and Figures 4.4 and 4.5) and so helped to demonstrate the efficacy of implementing a PAW programme with a group of pupils with a range of abilities and Additional Support Needs. The quantitative analysis of the class teacher assessments for the PAW group also provided evidence that the weaker pupils in the group made the most progress (Table 4.16).

The word count scores also revealed interesting, although in some ways contradictory evidence. I had considered that any increase in quantity of words should be carefully examined. This was for two reasons; previous research had demonstrated the problems associated with the assessment of writing (Nixon & Topping, 2001; Sutherland & Topping, 1999; Yarrow & Topping, 2001). These authors had acknowledged deficiencies in their writing assessment scales; the former had specially designed their own assessment scale and the latter two had adapted the Scottish Qualification Authority (1997) criteria. There was no evidence of any published reliability scales. I was also concerned that there were issues associated with my marking system (West Dunbartonshire Council, 2007). I appreciated that there were difficulties in accurately assessing writing. However I decided that the writing assessment needed further scrutiny in order to understand fully the pupils' progress. The writing assessment evidenced an increase in word count for one pupil from 15 to 177. The writing

assessment scores showed that the PAW group were able to achieve similar gains to the rest of the class yet equivalent gains were not revealed in the word count scores.

The criteria for the writing assessment recommends that pupils need to write approximately 200 words in order to attain level C (pupils in Primary 6/7 would at least be expected to attain level C and D (West Dunbartonshire Council, 2007)). An example of the listed criteria can be found in Appendix 7. Before the programme there was only one pupil in the entire class with a word count score above 200 words. On completion of the VCOP programme all the rest of the class achieved word count scores of 200 or more words. In the weaker PAW group four pupils still failed to achieve 200 words after completion of the PAW programme; despite this they still managed to write sufficient to demonstrate, in the class teacher's view, the necessary writing assessment criteria for the next level.

The results showed that the weakest pupils in the PAW group pre PAW had not been able to write sufficient words to be graded with the other pupils in the class. On completion of PAW their word count scores were sufficient for them to progress to the next level. Also close examination of the assessments showed evidence of syntax and logical reasoning. Although some pupils had not included any full stops, implicit in the structure of the strings of written words was evidence of knowledge of simple syntax and semantics. Appraisal of the writing assessments also showed evidence of a range of connectives, (because, but, and, if, so, when) and these had not always been given recognition.

Research by Gerber (2002) has shown that the progress of pupils who struggle with writing is slower than their peers. It is also well documented that pupils who struggle

with writing require greater levels of instructions and effort in order to make similar progress to their more able peers. Bereiter and Scardamalia (1987) and Hayes and Flower (1980) both emphasised that pupils who experience difficulty with writing struggle to cope with the complex ranges of skills involved in the writing process. These would include composing a story and the complex range of skills this would involve such as syntax, semantics and also the skills of monitoring, evaluating, revising, expanding on a theme and debugging. Although the word count scores were not as great as the rest of the class the evidence from the writing assessments is that the PAW group increased their knowledge of VCOP as this is the basis of the assessment. The increases in word count scores in the PAW group, although smaller than the increases of the rest of the class, showed that pupils were giving themselves the opportunity to experiment and practise writing words, phrases and sentences. The evidence is that this was not possible pre PAW and this is demonstrated in particular by the pupils whose assessment pre the PAW programme showed word count scores of 14, 39 and 43.

I would argue that these pupils were showing particular difficulty with coping with the complex range of skills associated with writing identified by Bereiter and Scardamalia (1987) and Hayes and Flower (1980). The post PAW writing assessment scores measured were the first attempts these pupils had to practise on their own after the implementation of the programme; it seems reasonable to suggest that some pupils would take several writing exercises to learn to put into practice the skills they had acquired and used during PAW. It also must be remembered that some of these weaker pupils had been identified by their class teacher as experiencing difficulty with motor skills. It also seems reasonable to suggest that the rest of the class who had not been identified as experiencing difficulty were more accustomed, at this point, to writing by

themselves and were therefore more practised. My argument remains that PAW contained the requisite scaffolds which supported the pupils who experienced the most difficulty in the PAW group to achieve the most progress. The question, however, remains for future research to investigate further these aspects. Whilst the writing assessment is only one example, I felt that the quality of the handwriting showed an increase in confidence and that when the results of the writing assessment together with the word count scores were triangulated with positive evidence from the teacher interview they provided evidence of the efficacy of implementing PAW.

5.3 Information management

As part of developing the coding scheme for the PAW programme, I expanded *information management* to include the sub-components of *organisation, reasoning, repeat, imagination, elaboration, questioning* and *summary*. These formed the major component in my analysis, implying they were stimulated by the PAW situation; these are the very skills deemed important for successful writing (Bereiter & Scardamalia, 1987; Hayes & Flower, 1980). Conversely, in PAL studies in maths, researchers have concentrated on analysing the skills of *prediction, planning, monitoring* and *evaluating* (Desoete, 2008) and, perhaps predictably, *information management* does not feature. Table 5.4 details the seven subcomponents of IM and also provides definitions.

Table 5.4 Definitions: Information management

Metacognitive code	Definition
Organisation	Process of text organisation and arrangement
Reasoning	Discussed one's analysis of approach to further assessment of facts
Instinctive repeat	Indicative of needing further time to assimilate information or facts
Imagination	Development of data for a step change in thought creation of ideas
Elaboration	Further enhancement or development of ideas and strategies
Questioning	Requesting further information to assist processing of data
Summary	Succinctly précising foregoing ideas and strategies

My literature search found no other study that had itemised all these sub-components in a similar way. Schraw and Dennison (1994) had suggested that *information management* included the skills of *organising*, *elaborating*, *summarising* and *selectively focusing*. I felt that these four sub-components of *information management* did not illustrate the complexity of this component; the actual 'managing of information' entailed a much wider range of skills. However, I decided that the sub-component of '*selectively focusing*' was subsumed within *IM imagination* and *IM elaboration*. *Selectively focusing* was demonstrated by the way pupils selected an idea and then expanded upon it, so did not merit a separate category.

My list of *information management* sub-components and the skills Bereiter and Scardamalia (1982) and Flower and Hayes (1997) deemed essential for successful writing were similar. For example, *information management* contains an element of problem solving that Flower and Hayes (1977) suggested is a process 'expert' writers carry out. This was revealed particularly by the sub-components of *IM reasoning*, *IM questioning* and *IM summary*. I suggest that the interactive and verbalisation processes in PAW help to stimulate the problem-solving process crucial to successful writing, analogous to what Scardamalia and Bereiter (1982, p.165) termed 'the knowledge

transforming process’ and in contrast to a ‘knowledge telling strategy’, a process associated with ‘novice writers’. It is therefore the context of PAW that provides the setting where the skills contained within *IM* can be promoted and practised.

Table 5.5 illustrates some of the *IM* scaffolds contained within Sample Pair A’s discussion. Kenneth’s thinking resulted in initial *IM imagination*, followed by *IM elaboration*, and subsequently followed by *IM recapping* and *IM summary* – further evidence of scaffolding. Palinscar *et al.* (1993) particularly commented on *summary* and *recapping* as providing pupils with processing and thinking time. Hacker, Keener *et al.* (2009, p.163) stressed the power of *recapping* and re-reading of work, not only providing time to think, but encouraging further ideas and adjusting the pupil’s goals. They noted that the result is further *planning* and stimulation of new ideas. In an individual setting these scaffolds would not have been available for the pupils and the result could have been a stagnation of ideas and therefore cessation of progress.

Table 5.5 Examples: Scaffolding

Examples	Metacognitive codes
K. and the zombie	IM imagination
C. zombie forgets	IM elaboration
K. cutting through	IM elaboration
C. there you go, threw himself at the zombie	IM elaboration
C. (Clapping)	Pride
K. no, the zombie	IM recap
C. what?	IM question
K. the zombie	IM repeat
C. the zombie threw himself at the zombie	IM summary
K. and threw himself down the stairs	IM elaboration
C. no, hit his head off the door	IM elaboration
K. tumbled down the stairs and hit his head off the door	IM recap and IM elaboration

My analysis also evidenced that within PAW were examples of *affirmation* and *pride*. Together with direct evidence of writing success, these would have contributed to increased motivation and resulted in the promising learning outcomes revealed by the class assessments. Zimmerman and Risemberg (1997) stressed the importance of self-efficacy and suggested this is influenced by success in using self-regulatory processes (*planning, information management, monitoring, debugging and evaluation*). They further suggested that improved use of these skills influenced motivation for writing and, as a result, further use of self-regulatory processes. The successful outcomes of the PAW programme indicated that PAW provided the appropriate range of supports to promote skill in writing. The assessments carried out by the class teacher showed that the pupils' understanding of VCOP components increased. Significantly, the weaker pupils in the sample group made the greatest gains. Analysis of the pupils' discourse indicated the range of metacognitive skills within the context of PAW, all of which were deemed essential for success in writing (Bereiter & Scardamalia, 1987; Hayes & Flower, 1980). This gives credence to Hacker, Keener *et al.* (2009), who discussed writing as applied metacognition.

Another important issue to be considered is the essential nature of writing across the school curriculum. Practice in metacognitive skills promotes their development and growth (Flavell, 1979) and is a predictor of subsequent cognitive development (Meltzer *et al.*, 1998). It was PAW that provided the pupils with an appropriate context to experiment and practise the full range of metacognitive skills, both knowledge and regulation of metacognition. *Planning* was relevant to these studies and I shall consider its place in the process of writing in the next section.

5.4 Planning

Planning is documented as an important skill for success, not only in writing (Bereiter & Scardamalia, 1987) but metacognitive expertise (Brown, 1981) and for success in learning (Harris *et al.*, 2009). *Planning* is the component previous research had documented as crucial in maths (Larkin, 2006) and science (White *et al.*, 2009). *Planning* has been shown to be essential, not merely in planning the design of an investigation but throughout all subsequent stages such as planning the analysis stages. This could well involve further planning due to reflection and *evaluation* processes (Bereiter & Scardamalia, 1987). White *et al.* (2009, p.189) refer to this as the ‘inquiry cycle’. It is possible to argue that this is analogous to the recursive processes involved in writing. Hayes and Flower (1980) also stressed the problem-solving nature of writing and the complexity involved in the nested activities that good writers have to cope with simultaneously.

The recursive nature of writing was also referred to by Bruer (1993) who stated that for successful writing, metacognitive skills should be constantly in use in order to plan, evaluate and re-evaluate the progress of both thinking and writing: *planning* is the component that, as expertise grows, you would expect to increase (Flavell *et al.*, 2002). From my own teaching experience I have seen that pupils, particularly those who struggle in the classroom, often fail to plan. My deduction is that the ability to plan requires some knowledge base and, importantly, confidence.

My analysis revealed that *planning* was the second largest metacognitive category to *information management*. I found it included the sub-components of *questioning* and *organisation* and was prevalent throughout the writing process. Although my analysis

revealed evidence of *planning* throughout all the stages of the story writing process, the overall results for *planning* (as evidenced in Figure 4.1) showed a decrease in *planning* over the three stories. The detailed analysis, exploring the sub-components (see Figure 4.2), showed that while *planning questioning* decreased over the three stories, *planning organisation* remained fairly constant. I should have expected to see an increase in *planning* overall, particularly as this is needed from the initial stages through to editing (McCormick, 2003). The class teacher assessments showed that all pupils made progress during the PAW programme. However, a concurrent increase in the number of examples of *planning* was not apparent in the analysis.

A possible explanation for the observed decrease in *planning questions* could be that the PAW programme promoted confidence and therefore delimited the need for *planning questioning* and reassurance. At the start of the programme, the greater frequency of *planning questions* could have been the result of unfamiliarity with PAW and thus lack of confidence. The video and PVTs in particular give proof of the pride and subsequent confidence that the pupils developed through the PAW programme. They also had the visual representation of their success before them, in the stories they had created. It is, however, difficult to reach a conclusion as the results are founded on an individual pair. They should therefore be viewed as an indication and not a template for all cases until further studies have been carried out.

It is arguable whether, in the absence of a context where verbalisation was promoted, this skill would have been so prominent. In the analysis there is evidence of what Desoete (2008) suggested is a sequence of sub-goals leading to the main problem goal. The complexity of *planning* contains a problem-solving process of analysis and reflection that the PAW process is able to promote.

Table 5.6 Examples: Planning questioning/monitoring

Examples	Metacognitive code
C. What shall we do now?	Planning questioning
K. It could be in the spring	IM imagination
C. 'cos we've done it in the summer and winter	Monitoring
K. No, we've done winter	Debugging

Table 5.6 shows how a *planning question* results in *monitoring* that is a form of reflection and reinforcement of what the pupils are engaged in, and serves as a device to aid memory. Reflection in itself plays an important part in metacognitive processes (Flavell *et al.*, 2002; Rosenthal, 2000). Hacker, Keener *et al.* (2009) argued that the use of monitoring processes provides the potential for every other process and that what determined the selection of a process is if the writer's intended meaning is achieved. In this example, *monitoring* leads on to *debugging*.

Planning questions acted as 'idea prompting statements' that King (1994) also acknowledged in her work. Illustrations can be found in Table 5.7, where *planning questions* initiated *IM imagination* and *IM elaboration*. The implication is that they contributed to development of metacognition in this PAW study.

Table 5.7 Examples: Planning questioning/information management

Examples	Metacognitive code
K. What can we do now?	Planning questioning
K. I'm just going to write!	Planning organisation
C. Carly and Jamie had to carry...	IM imagination
C. Right?	IM question
C. Carly twisted her ankle and we had to carry her out	IM elaboration
K. and the monster almost got out but she rolled... got out of the way	IM elaboration
C. Na! Make it.... Na! Jamie had to kick the monster	IM elaboration
K. Jamie shoots the monster	IM elaboration
J. Yes! (claps his hands)	Pride/rapport

5.5 Declarative knowledge of metacognition

The problems in distinguishing metacognitive activities and cognitive activities have been noted in a range of studies (Ku & Ho, 2010; Ward & Traweek, 1993). Flavell (1979) and Veenman *et al.* (2006) discussed their close relationship and Flavell (1979) in particular asserted their possibly indefinable links. Ward and Traweek (1993) argued that the same activity may be invoked for either purpose depending on its goal. Ku and Ho (2010, p.253) also suggested that the difference lies in the goal of the activity. Cognitive activities help to ensure acquisition, retention and transfer of knowledge for the execution of the task. Metacognitive activity allows for the regulation and governing for task execution.

The extract below (Table 5.8) shows that *information management repeat* is used by Colin, and this is subsequently followed by further repeats by both boys. Finally, Kenneth spells out 'Z O M B I E', showing, in my analysis, evidence of *declarative* metacognition. *Declarative* knowledge of metacognition is 'knowing about things' and contains an element of self-awareness and awareness of others (Flavell *et al.*, 2002). This example shows Kenneth's awareness of his own ability to spell the word correctly and demonstrates his awareness of Colin being unable to spell successfully. Colin used *IM repeat* to provide himself with time to think about the spelling of 'zombie', while Kenneth realised his dilemma and spelt the word for him.

Table 5.8 Example 1: Declarative knowledge of metacognition – PAW

Examples of declarative metacognition	Metacognitive codes
K. a zombie	IM image
C. a zombie	IM repeat
K. a zombie	IM repeat
C. a zombie	IM repeat
K. (spells: Z O M B I E)	Declarative metacognition and knowledge of cognition

My argument is that Kenneth's belief was that he was better at spelling than his partner and that he was able to spell the word 'zombie'. The evidence for this is when he actually took charge of the situation. I was also able to see this in his facial expressions and body language in the video tapes. This is therefore an example of *declarative* knowledge of metacognition when it is implied in a child's talk and evidenced in the video, whereas the examples gained from the TAPs and PVTs demonstrated an explicit form of declarative knowledge of metacognition (see Table 5.9).

I would also argue that Example 1 above is evidence of *declarative* cognition in the ability to spell 'zombie' correctly. Kenneth shows by spelling the word out correctly that he possesses spelling knowledge. This example illustrates how difficult it is to separate cognition and metacognition and poses the question that remains as yet unresolved in metacognitive literature: whether it is possible to disentangle them (Flavell *et al.*, 2002; Veenman *et al.*, 2006).

PAW therefore provided a context where *declarative* knowledge of cognition and metacognition could be practised and promoted. The context allowed for both self-awareness and self-knowledge and overt knowledge. I would also suggest that carrying

out the three assessments in the same context allowed me to build up a more complete picture of pupils' *declarative* knowledge of metacognition.

The examples of *declarative* knowledge of metacognition obtained from the video, PVTs and TAPs show interesting and subtle differences (Table 5.9).

Table 5.9 Example 2: Declarative knowledge of metacognition – videos, TAPs & PVTs

Video	a. That's a WOW word... disgusting b. Spells: <i>Z O M B I E</i> c. It means that you can, that you can't be in it for too long (<i>referring to claustrophobic</i>)
TAPs	C. did not know it was a connective
PVTs	I have found that I can work well and I have a great imagination

The video demonstrated that in the PAW context pupils had the opportunity to add to their knowledge base. This was shown in the way pupils explored their knowledge of the VCOP components, which are arguably one of the foundations of writing. The video also showed pupils discussing the VCOP components. Think Aloud when Prompted encouraged discussion centred on the VCOP components and the pupils were seen to reflect on their decisions. In this way they served two roles, for assessment and importantly pedagogy. Pupil View Templates placed the pupil at the heart of the activity and supported them to dwell on the positive elements in their writing, not only from their own point of view but from that of their peers and family. I considered that this form of metacognition therefore presented as emotional and confidence building, which research has shown plays a crucial role in developing and promoting self-esteem (Hacker, Keener *et al.*, 2009).

This issue concerning knowledge of metacognition leads on to the controversial issue of how knowledge of metacognition develops and how it is regulated. The results from

the video analysis showed little evidence of either *procedural* or *conditional* knowledge of metacognition. However, *declarative* knowledge of metacognition was shown to develop alongside the regulation of metacognition components of *planning*, *information management*, *monitoring*, *debugging* and *evaluation*. This contradicted research by Brown (1981), who documented that knowledge of metacognition develops during adolescence as a result of increased experience of regulation of metacognition components. Veenman *et al.* (2006) and Wall and Higgins (2006) suggested that under appropriate conditions regulation of metacognition could develop in early primary school, although metacognitive knowledge is present at a younger age (Kuhn, 1999). On the other hand, Flavell *et al.* (2002) asserted a concurrent progression. The evidence was therefore contradictory and I decided to re-examine my analysis of *declarative* knowledge of metacognition and also regulation of metacognition. I therefore looked closely at the examples from all three data collection tools. In the video my examples of *declarative* knowledge of metacognition were mostly concerned with the VCOP components, and I list below some examples.

Table 5.10 Example 3: Declarative knowledge of metacognition/cognition

Examples	Metacognitive codes
K. Let's see if we can think of something else?	planning question
K. You think?	planning question
C. into a claustrophobic (evidence of vocabulary)	IM imagination
K. Do you know what that means?	Monitoring
C. It means that you can, that you can't be in it for too long	declarative knowledge of metacognition
K. Put in a WOW word	declarative knowledge of metacognition
C. Stinking monster	IM imagination
K. Because we can make it protecting	IM imagination
K. (spells: P R O T E C T I N G)	declarative knowledge of metacognition
C. Make it over protective	IM elaboration

The examples in Table 5.10, taken from the video analysis, reinforce how difficult it is to separate cognition and metacognition. These examples feature knowledge of VCOP components. They suggest that within the examples of *declarative* knowledge of metacognition found in the video and TAPs were evidence of both *declarative* cognition and *declarative* metacognition. In these examples, metacognitive content is less visible but is implied in the cognitive process.

However, this duality took a different form in the PVT analysis. Here, the *declarative* knowledge examples showed knowledge and awareness of personal attributes or those of significant others. The interesting issue is that, although all three data collection methods showed that *declarative* knowledge of metacognition developed in tandem with the regulation of metacognition components, scrutiny of the examples shows that each reveals different aspects of metacognition, as illustrated in Table 5.11.

Table 5.11 Example 4: Declarative knowledge of metacognition

PVTs	I can talk in groups and give good ideas I have found that I can work well and I have a greater imagination
TAPs	Colin did not know it was a connective Using a connective makes it shorter and better
Video analysis	That's a WOW word (Spells P R O T E C T I N G)

Table 5.11 indicates that there are similarities between examples from the PVTs and those of questionnaires found elsewhere in the literature (Schraw & Dennison,1994), (Table 5.12). The implication is that PVTs and the examples found in questionnaires (both off-line), which can be pre or post activity, convey a reflective and positive aspect of the self. However, the important difference is, although both are off-line methods, the results found in the PVTs were a direct, personal reflection of the pupil in

his own words. Questionnaires are pre-written by someone else and, although they require the pupil to think and reflect, they do not contain a similar individual and personal view.

Analysis of *declarative* knowledge of metacognition was particularly problematic. I had to evaluate whether the sequences of speech evidenced ‘knowledge of oneself as a learner which included strengths and weaknesses and also knowledge of the task, skills and strategies required for successful learning’ (Harris *et al.*, 2009). This difficulty would not have been so apparent with questionnaires and self-report inventories, where examples of the various sub-components are listed, meaning the researcher does not have to make a subjective decision.

The examples below illustrate this issue and are taken from Schraw and Dennison’s (1994) Metacognitive Awareness Inventory:

Table 5.12 Example 5: Declarative knowledge from Schraw & Dennison (1994)

- I use different learning strategies depending on the situation
 - I am good at organising information
-

When the examples in Table 5.12 which had previously been defined as *declarative* knowledge of metacognition are compared to those in Table 5.11 it is easier to appreciate how analysing the video in particular presented the analyst with greater difficulty. In this instance the analyst has subjectively to infer into which category of metacognition to place the utterance.

5.6 Development and monitoring progression of metacognition

I had hoped to demonstrate evidence of the developmental nature of metacognition in the PAW context. The works of Brown (1981) and Flavell (1979) both stressed that practice resulted in metacognitive progression. Within PAW there were interactive components that had a good fit with what they held essential for metacognitive progression (Brown, 1981; Flavell *et al.*, 2002). Progression was not revealed in my results. Previous research had shown that shorter programmes in PAL/PAW achieved better educational outcomes (Roscoe & Chi, 2007; Topping & Ehly, 1998). However, when I considered that early indications of metacognition are found in pupils of 4 and 5 years old (Whitebread *et al.*, 2009) and progression continues until adulthood, I decided it was overly optimistic to have expected evidence of metacognitive progress during the relatively short duration of the PAW programme.

The evidence from all three data collection methods, both on and off-line, showed that in the context of PAW *declarative* knowledge of metacognition developed before *procedural* and *conditional* knowledge of metacognition and that *declarative* knowledge of metacognition developed to some extent alongside regulation of metacognitive components. The analysis of the video and PVTs revealed all three categories (*declarative*, *procedural* and *conditional* metacognition), but TAPs showed evidence of predominantly *declarative* metacognition and a comparatively small score for *conditional* knowledge. However this is a small scale research project and this area requires further investigation in order to confirm or refute these results.

Wall and Higgins (2006), however, noted a possible relationship between cognitive skills and the development of metacognitive knowledge and metacognitive skilfulness.

As previously discussed my analysis suggested that *declarative* knowledge of metacognition and cognition worked in harmony. Most of my examples of *declarative* knowledge of metacognition also showed evidence of cognition. Crucially, they were mainly based on VCOP components. I feel that the range of scaffolds incorporated into the PAW programme, (the PAW flowchart, VCOP prompt cards, planning and vocabulary sheets, a partner with whom to discuss issues) supported pupils in the acquisition and understanding of knowledge (cognition) and of a language with which they were able to converse. Brown (1981) referred to knowledge as the foundation of metacognition. What appears to be deficient in pupils who struggle in whatever area of the curriculum is, in fact, knowledge. It is arguable that it would not have been possible to put in place the range of scaffolds evidenced in PAW without the PAW programme. I therefore suggest that PAW is a pre-requisite for the development of metacognition.

5.7 TAPs, PVTs and video recording

This section provides discussion on my second research question. I shall show that the combinations of on and off-line assessments are integral to a fuller understanding of metacognition and learning of pupils. Veenman and Spaans (2005) distinguished between on and off-line methods; the former are concurrent, whilst the activity is actually being carried out, and the latter can be either pre or post activity. The on-line methods were recordings of talk between the pairs (the video tapes and TAPs), and the off-line method was PVTs.

Think Aloud Protocols and, in this instance, TAPs were used to gain information about the course and mechanism of cognitive processes by verbally probing pupils' internal

states (Ericsson & Simon, 1980). Think Aloud when Prompted was the result of a teacher/researcher prompting the pupils to articulate their thoughts on the VCOP components. Video recording took place in a natural setting and was not interrupted or ‘contaminated’ by a teacher/researcher; it provided information about the PAW process. Pupil View Templates were designed to elicit pupils’ views of learning and teaching with a particular focus on their thinking (metacognition). Wall and Higgins (2006, p.39) suggested that they acted as an aid to reflective dialogue between pupils and teachers, as part of the learning process.

The results showed that the three data collections tools provided a range of different evidence. Think Aloud when Prompted revealed information about pupils’ thinking (metacognition), at a specific time, in a selected area (VCOP). I realised it was important to examine the nature of the prompts and consider how they might have influenced the TAP assessment results. Shamir *et al.*’s (2009) prompts were similar to mine and contained a directive element (see Table 5.13). Desoete (2009, p.195) asked pupils to talk through their thoughts as they carried out the task and she acknowledged that it was sometimes necessary to remind them to ‘keep on thinking aloud’. I did not feel this approach was as overtly directive an approach as mine or Shamir *et al.* (2009), which seemed to be ‘harder work’ as the nature of the prompts encouraged the pupils to adopt a problem-solving approach. However, scrutiny of the TAP results in my PAW study showed that pupils did not always engage in this problem-solving process, which would have included *evaluation* processes, and been hard work for them.

Table 5.13 Examples of prompts

Researcher	Prompt
Shamir <i>et al.</i> (2009)	Please tell me what you did in order to recall the task?
Desoete (2009)	Please talk me through what you are thinking as you are carrying out the... activity.
My PAW programme	I am looking at this word/phrase I am looking (for example) at ‘stunning’ Talk me through the decisions you made when you chose ‘stunning’ <i>If a pupil is reluctant to talk, ask if he is happy with his choice and then if he would like to change it.</i>

My deduction from this discussion is that the skill of *evaluation* is hard work (Wall & Higgins, 2006) and could require more practice in order to obtain mastery, and that it is only through practice that *evaluation* skills develop. The implication is that it is later to develop than the other metacognitive skills. Veenman and Spaans (2005, p.8) also documented that this appeared to be the case. I suggest that this skill, in particular, could receive more input and practice in the classroom context. This aspect would again have to be substantiated by future studies.

Pupil View Templates (off-line) lacked the immediacy of TAPs and video. However, they were nonetheless conducted as part of the same PAW context and were also the result of prompts. In their case the pupils, after prompting by myself, documented their thoughts on paper. However, the nature of the prompts was different; the TAPs stimulated specific discussion about VCOP components whilst the PVTs were centred on the pupils’ own thoughts and feelings and those of significant others about PAW. Hacker, Dunslosky *et al.* (2009, p.1) talked about the ‘sense of agency’ in metacognition and that successful students take charge of their own learning. The PVTs evidenced an emotional metacognition not always apparent in a classroom. Emotional wellbeing is an important part of learning and development of the whole

person (Flavell, 1979), and ways to support the pupil to acquire a better sense of worth should surely be promoted. It is this sense of development of the whole person, together with literacy and numeracy that is placed centrally in the *Curriculum for Excellence* (Scottish Executive, 2004). It is arguable that PVTs as a result of PAW put pupils in a position to view themselves more favourably. As a result pupils found themselves in a better place to take charge of their own learning. I feel that the PAW context set the foundation for this to happen and the PVTs overtly documented this important aspect of learning (Brown, 1981; Flavell, 1979).

Information management was the largest component in both the video and TAPs. Although *information management* did not feature in the PVTs, implicit in documenting their thoughts the pupils had to internally manipulate and manage information. I feel that the absence of *IM* in PVTs might have been anticipated. Pupil View Templates asked pupils to document their thoughts about teaching, learning, their families and feelings about PAW and they were not specifically asked to engage in manipulating language. In a way, PVTs are a documentation of the final result of a pupils' thinking and the processes prior to that are internal and not revealed. This is in contrast to TAPs, which ask for a more overt problem-solving approach. Similar to the results from the video analysis, TAPs revealed significant evidence of *information management*. Perhaps this too is not unexpected, as the researcher asks questions whose very nature initiates pupils' thinking and, in verbalising their thoughts, the pupils had to manage and organise information coherently.

The pupils in my sample pairs had for a variety of reasons struggled with writing. The results from the video evidenced a range of metacognitive components and sub-components within the interactive PAW process. Significantly, pride, rapport and

collaboration were demonstrated. In addition, the class teacher's interview and my own observations noted pride, confidence and increased motivation throughout the PAW programme. The PVTs also evidenced rapport and pride; through reflection and thought, pupils were able to put themselves at the centre of a successful activity and view themselves positively at the heart of this process.

To attempt any activity to achieve a successful outcome requires confidence and consequently motivation. This stems in part from how you view yourself as a learner (Tarricone, 2011). The PAW context promoted successful outcomes both in writing and metacognition (Duran & Monereo, 2005; Yarrow & Topping, 2001), and PVTs seemed to support development of a sound sense of worth. Hayes (1996) strongly emphasised the role of self-efficacy and motivation in successful writing.

It was not possible to make direct comparisons with Wall and Higgins (2007) who also used PVTs, as they employed Moseley *et al.*'s (2005) coding model. Their analysis categorised units by whether they were predominantly evidence of the cognitive skills of information gathering, building understanding or productive thinking; or of strategic and reflective thinking (Wall & Higgins, 2007). Although using a different coding scheme, it is apparent their analysis contained a degree of subjectivity similar to my own PAW analysis. Similarly, they found that units are not mutually exclusive. They suggested a degree of overlap between cognition and metacognition, however they did not provide examples of this duality. Their results showed that both metacognitive knowledge and skilfulness are apparent across the sample year groups, but this was not so with their control year groups. They acknowledged that it is important to ascertain whether it was the method adopted (PVTs) that supported this finding or if it was something within the project that enabled pupils to talk about metacognition. This

situation was also evident in my PAW study and remains an issue for future studies to address.

5.8 Review of methods and limitations of the study

I consider that the quantitative element explored the efficacy of the PAW programme. Quantitative results of the writing assessments showed that the weaker PAW group were able to achieve results commensurate with the more able rest of the class group. The small numbers, no random sampling and no matched control group would normally be considered a weakness in most studies and therefore limit the trustworthiness of the results. It is possible to argue that in order to achieve a greater degree of validity students could have been matched by gender and pre test writing scores and randomly assigned either to the PAW sample group or to those who would follow their normal class routine and act as the control group. This format was followed by Yarrow and Topping (2001). However in my PAW study the PAW group who were identified as the weaker group were measured against the rest of the class who were the stronger group. Despite this the PAW group were able to make similar progress in the writing assessments to the rest of the class.

Triangulation of quantitative data in the form of teacher writing assessments and word count scores pre and post the PAW programme were tabulated in various ways and presented in bar charts and box plots. Scrutiny of individual scores confirmed that both weaker pupils and the more able benefited from PAW. In particular the writing assessment results showed that PAW benefited pupils who were weaker in writing skills. More contradictory evidence came from the word count scores which showed that the rest of the class achieved the greater increases. However PAW was able to

support pupils in such a way that they could write sufficient words to be assessed. The combination of the quantitative results and the qualitative results highlighted metacognitive elements analogous to the crucial elements of writing.

I considered that the writing assessment VCOP marking criteria was not entirely satisfactory. Although it appeared to be more sophisticated than the 5/14 marking criteria (Scottish Office Education Department, 1991) used by Yarrow and Topping (2001) in that it was more detailed and specific, its ethos was too rigid. It failed to give credit for effort, imagination and attempts that showed progress but were not necessarily completely correct.

Examination of the class teacher's writing assessment showed that progress in some cases, both in the selected PAW sample group and the rest of the class, was not always revealed. In some instances I felt the pre-assessment mark had been too high and therefore the margin of progress was not evident. Also it is more difficult to demonstrate progress of the higher achieving pupils as they had already reached a good level and extra polish and expertise were not revealed by the assessment scores. Criticisms of this form of assessment have been documented by Murphy (2002) and include some of my observations that students are not given credit for part knowledge. Murphy (2002) also suggested that high and low scoring pupils tend to be treated differently. Low scorers performances are judged on a relatively small sample of items compared to a higher achieving student.

The addition of a second marker would have contributed to claims of validity. At this point I am not clear what marking criteria would have been more appropriate. This is obviously an important issue that needs to be resolved as it is crucial that pupils

receive appropriate feedback about their efforts. This is particularly so with pupils who struggle with aspects of learning, as their self-esteem is in a large measure dependent upon their results and how others view them (Roscoe & Chi, 2007).

I could not draw definitive conclusions about the issue of training, as the sample was small and I was unable to detect any patterns or differences in the data of untrained and trained from the video analysis. I had decided as a result of the pilot study to supplement my original training programme with added demonstrations and more time for practice. It would be interesting to include further specific training in planning skills, questioning and explaining. When explaining, tutors have to transform prior knowledge into instructive, coherent messages (Roscoe & Chi, 2007), so the inclusion of these measures may have supported learning in the PAW programme. However, there is a line of research that suggests that over-attention to training detracts from the natural process of PAL/PAW (Fuchs *et al.*, 1994). The introduction of videoing as the pupils were carrying out their initial attempts of PAW is another possibility. These tapes could be played back and class discussions could have followed as a means of documenting and reinforcing the processes.

The contribution of PVTs and TAPs was considerable and I acknowledge that, prior to implementation of the PAW programme, I had not fully appreciated the extent of their impact. At the onset I felt that, taken together, evidence from the three data collection methods would support each other. However their contribution added a greater breadth to the tapestry of learning and social emotional well-being. Appraisal of the video revealed the metacognitive processes of PAW, plus important aspects of cooperation, collaboration and pride. The PVTs revealed a different kind of metacognition that presented as more emotional and personal. Pupil View Templates placed the pupil at

the centre of a successful activity. Think Aloud when Prompted, on the other hand, to some extent promoted problem solving and thinking around the VCOP components and also evidence of declarative metacognition.

My decision to ask TAP questions on VCOP could have skewed the data in an educational direction but acted to access and support pupils' thinking ability. Pupil View Templates accessed pupils' thinking and feelings about themselves as learners and also put them in the position of looking at themselves and how others might perceive them in the PAW context. Together, they provided a complementary picture that included metacognition in educational and emotional terms. I felt the three data collection methods (video, PVTs and TAPs) had clear advantages over questionnaires and formal interviews, arguably more concerned with assessment. My methods were child-centred and pupils were integral to all the processes. I suggest that these processes put the pupils in control and gave them a role of responsibility.

The unit of analysis I had selected was an individual one. I had felt at the time that this was an important decision forming the basis for the study. I had been concerned that the video and TAPs were the result of joint contributions, where both pupils were responsible for their responses. However, the PVTs were largely the work of an individual pupil. On reflection, I decided that behind the PVTs was a sense of partnership in the form of myself and the others in the group. The results revealed that it was not possible to compare results because the methods accessed different aspects of metacognition. A common thread apparent across these three methods was that they all not only assessed aspects of metacognition but arguably promoted it. It was only after in-depth analysis that I appreciated the diverse nature of the assessments.

Definitions had to be explicit and detailed and, particularly at the start of the analysis stage, it was important to refer to them constantly in order to be consistent. Practice improved the process of analysis and over time it became easier. More practice prior to the start of the main PAW programme would have been beneficial and, with hindsight, I should have transcribed and analysed more of the pilot study. For this PAW study I had the benefit of a colleague with whom I discussed problematic issues and who also marked independently sections of the transcriptions so that comparisons could be made. However, I feel there remained a need to further test inter-rater reliability. This had been more robustly achieved in studies by Fuchs *et al.* in 1996 and by Veenman *et al.* in 2006. The difficulties I experienced during the analysis stage again put limitations on the validity of the study and reinforce the need for strong inter-rater reliability measures.

There was also the issue of intelligence which in this study I had not assessed. Veenman and Spaans (2005) found that metacognitive skilfulness outweighs intelligence as a predictor of learning. It was on the basis of this finding that I decided not to consider intelligence for my PAW study. However, additional studies in the primary age range are called for in order to understand metacognition in all possible dimensions.

5.9 Summary

The theory on which the PAW study was based (Brown, 1981, Flavell, 1979; Piaget, 1969; Vygotsky, 1978) included elements of discussion, debate, collaboration and scaffolding (the PAW flowchart, VCOP components, VCOP prompt cards, planning

and vocabulary sheets and a partner). It was seen to support the pupils to work towards achieving their potential by creating a ZPD (Vygotsky, 1978).

The Brown (1981) and Flavell (1979) based coding scheme was the foundation for this study as it had become a benchmark in the analysis of metacognition (Ku & Ho, 2010; Larkin, 2009; Schraw & Dennison, 1994). However, the adoption of a flexible coding approach allowed me to develop additional codes and was important as the context of PAW had not, to my knowledge, been considered previously in this way.

My analysis revealed *information management* as the largest and most complex category and demonstrated the emergence of evaluation skill in the form of *IM reasoning*. The age differences between Larkin's (2009) study and my PAW programme could account for the lack of evidence in her study of any *evaluation* skills and also any complexity in her *constructing ideas to meet task demands*. I had considered that this category was analogous to my *IM* which my analysis had shown to consist of a range of sub-skills including *IM reasoning*. This could be interpreted as further evidence that *evaluation* and *reasoning* skills are later developing.

The component of *information management* emerged as unique to literacy and PAW. It did not feature in the analysis of the PAL studies in maths and comprehension that I investigated (Fuchs *et al.*, 1995; Fuchs *et al.*, 1994; Larkin, 2006; Palinscar & Brown, 1984). I had found it necessary to develop additional sub-components of *information management* to those which Schraw and Dennison (1994) had documented, *organising*, *elaboration*, *summarising* and *selectively focusing*. I expanded *information management* to include the sub-components of *organisation*, *reasoning*, *repeat*, *imagination*, *elaboration*, *questioning* and *summary*. The original four sub-components

of *information management* (Schraw & Dennison, 1994) did not illustrate the complexity of this component; that the actual ‘managing of information’ in PAW entailed a much wider range of skills. I excluded the sub-component of ‘*selectively focusing*’ as I saw it as subsumed within *IM imagination* and *IM elaboration*. The expanded *information management* supported the views of Hacker, Keener *et al.* (2009) that ‘writing is applied metacognition’. They also confirmed the complexity of the writing process and illustrate why pupils could find the skill of writing challenging.

Peer Assisted Writing was a context promoting evidence of *declarative* knowledge of metacognition. The results suggested that PAW supported the development of cognitive knowledge in line with *declarative* knowledge of metacognition. In this context *declarative* knowledge of metacognition developed prior to *procedural* and *conditional* knowledge of metacognition. However owing to the small scale study further studies are required in order to substantiate this result. Another point was that *declarative* metacognitive knowledge was not always visible but contained within declarative cognition, making it difficult to separate the two and suggesting that in some cases it was not possible to do so.

Planning is deemed an important metacognitive skill (Bereiter & Scardamalia, 1987; Hacker *et al.*, 2009). My PAW analysis revealed *planning* as the impetus and fore-runner to a range of metacognitive skills including *monitoring*, *evaluation*, *information management* and *debugging*. The analysis also demonstrated a decrease in *planning* over the programme that was not anticipated. I had looked for an increase in this important skill as the evidence from the quantitative results showed that the pupils had progressed. However, my deduction was that the number of early *planning* questions was an indication of insecurity and lack of confidence, and these diminished as the

PAW programme progressed, but they had the potential to skew the results. The more constant number of *planning organisation* codes was therefore a more consistent indicator.

The three data collection tools were video recording, TAPs and PVTs. The video recording provided information of the processes in terms of metacognition in PAW. The PVTs and TAPs supported different aspects of metacognition. The PVTs helped to place the pupil at the centre of the PAW programme and initiated a thinking chain that promoted documentation of success from the pupil's own point of view, that of peers and family. This emotional aspect of metacognition is extremely important and has implications for self-esteem and motivation. Together with the firm writing foundation with which the PAW programme had equipped the pupils, overt documentation of success supported confidence, self-esteem and motivation to attempt new challenges. It is this sense of agency (Hacker, Keener *et al.*, 2009) and the development of a positive self-concept that is crucial to achieve successful learning and the development of the whole person (Flavell, 1979). Think Aloud when Prompted provided the pupils with the opportunity to evaluate their prior reasoning in selecting VCOP components. However, the paucity of evidence of *evaluation* skills suggested these could be slower to develop and is hard work.

An important aspect which should be considered in future research is the need to test inter-rater reliability of the coding development more robustly. This could have been carried out by more robust blind rating of sections of the transcriptions and the addition of a third analyst. This is an important point as the subsequent discussion was founded on decisions made at this stage.

CHAPTER 6

Conclusion

6.1 Introduction

This chapter will show how the combinations of the context of writing and the social aspects of PAW have unpicked understandings of metacognition not previously revealed. This will include in-depth exploration of *information management* as the key metacognitive skill that has emerged. I shall then detail the scaffolds contained within PAW. I shall highlight their role in helping to reduce the load on working memory and the part they play in supporting access to the ZPD. I then turn attention to *planning*, another metacognitive skill.

I will emphasise how video demonstrated the complexity of writing. Also the individual and important roles that TAPs and PVTs played in assembling thinking, learning and emotional well-being profiles of the pupils in the PAW programme. Their contributions to both pedagogy (TAPs) and to social, emotional development and hence motivation to learn (PVTs) will be highlighted.

This is an action research study and as such is based in a classroom. The role of the teacher is central and, although I was not the class teacher, part of my remit was to include teaching staff and disseminate information learnt from the study as widely as possible. I shall detail the implications for classroom practice and include a section on what I consider to be relevant for the professional practice of an educational

psychologist. As a result of my findings I shall also outline recommendations to the research community, policy makers and practitioners.

I will conclude this study by detailing its unique contribution to extending knowledge of metacognition in the context of PAW.

6.2 PAW as an essential context for developing metacognition

The evidence to support PAL/PAW as a context to support learning is not in dispute and is evidenced in maths (Fuchs *et al.*, 1996), comprehension studies (Palinscar & Brown, 1984) and writing (Yarrow & Topping, 2001). The focus has generally been on the skills of *prediction, planning, monitoring* and *evaluation* in maths, and *questioning, summarising* and *clarifying* in comprehension. However the complex and extended range of metacognitive codes I developed in my PAW programme have not been itemised in such a way in any of the literature I found.

My analysis identified a complex range of skills that pupils need to acquire in order to achieve success in writing. The PAW programme was seen to support the metacognitive skills documented to be essential for success in writing (Bereiter & Scardamalia, 1987; Harris *et al.*, 2009). Bereiter and Scardamalia (1987) specifically reported *knowledge telling* as being associated with novice writers and *knowledge transforming* with more advanced writers. Successful writing is therefore a problem-solving process that involves goal setting and planning within a recursive cycle. When the metacognitive sub-components of my category of *information management* are considered, the analysis in this component alone provides evidence of problem solving; *IM organisation, IM reasoning, IM instinctive repeat, IM imagination, IM*

elaboration, IM questioning, and IM summary. This indicates a hitherto undeveloped complexity to metacognition in PAW and writing.

The unique contribution of this study therefore lies in the detailed analysis of *information management*. The analysis revealed *information management* as the largest component and the range of complex sub-components helped to emphasise the complexity of writing. By itemising the sub-components, the range of skills that pupils have to cope with almost simultaneously in any written task was demonstrated.

This was an important finding as it was necessary to make modifications to Brown's (1981) and Flavell's (1979) ideas by extending the list of metacognitive subcomponents and also rejecting others to ensure a fit with the context provided by PAW. I had decided against the inclusion of *selectively focusing* as this seemed to be contained within *IM imagination* and *IM elaboration*.

Of particular relevance is the working load and issues of memory. The PAW programme included a range of scaffolds working in combination to reduce the burden imposed on memory. Hayes and Flower (1980) noted the many demands writers have to deal with simultaneously; problem solving, goal setting, revising, planning, drawing knowledge and ideas from memory, developing concepts and the mechanics of writing which include spelling, grammar and handwriting or keyboarding. The presence of a partner supported the pupils in engaging in metacognitive skills. Access to these skills would arguably not have been possible in an individual setting. These scaffolds included sharing of roles, expanding ideas and peer feedback.

The interactive element in PAW promoting verbalisation encouraged the use of metacognitive skills (Flavell, 1979). The metacognitive elements themselves supported

scaffolding and thus opened up the potential derived from the ZPD. Monitoring and recapping provided processing time and individual feedback. My observations in a busy classroom are that teachers do not always give their pupils enough time to process information. This is an issue documented in a range of research (Flavell, 1979; Hacker, Keener *et al.*, 2009). In PAW the further scaffolds to reduce the burden imposed on memory were the VCOP programme itself, the PAW flowchart and the VCOP prompt cards. In addition, the TAP and PVT assessments can be termed scaffolds as the initiation of these assessments by myself appeared to promote metacognitive thought processes.

The results raised questions concerning the development of knowledge and regulation of metacognition. Brown (1981) documented that knowledge of metacognition develops later than regulation of metacognition and is dependent on the opportunity to practise skills of metacognitive regulation. Flavell (1979, p.176) suggested that development of metacognitive regulation is 'driven by metacognitive knowledge'. He suggested that development is therefore mutually dependent. My analysis showed that *declarative* knowledge of metacognition develops in tandem with regulation of metacognition components. Scrutiny of the detail of the analysis showed that many of the examples of *declarative* metacognition are grammar related and concern VCOP and the structured flowchart. However it should be noted that this could be a phenomenon that is solely related to the context of writing and because of the small sample size further research is necessary. It is enough to say that the structures of PAW helped to promote cognitive knowledge; and in my analysis cognitive knowledge and *declarative* knowledge of metacognition frequently presented together in the same analysis unit.

The PAW context provided the opportunity to practise regulation of metacognitive skills and also reinforce cognition and *declarative* knowledge of metacognition. Arguably, without cognition, *declarative* metacognition and metacognitive skills would not be evidenced in the analysis. It would appear that the opportunity to discuss and debate (problem-solving aspects of the writing process) supports a range of cognitive and metacognitive skills. The PAW results were similar to those of Wall and Higgins (2006) who noted links between the development of *declarative* metacognition, cognition and metacognitive regulation skills. The importance of knowledge has been affirmed by both Brown and Flavell, as without it there would be no upward spiral of development.

The extra categories of rapport, off-task, bring back on-task, off-task collaboration, teacher input and pride evidenced in the video added further dimensions. Peer Assisted Writing therefore promoted skills pertinent to life (Flavell, 1979). By progressing important aspects such as collaboration, rapport and pride pupils were able to view themselves and the efforts of others favourably which was advantageous to improved self-esteem. These results were also supported by the analysis of the PVTs.

The use of the on-line and off-line methods of TAPs and PVTs respectively brought different dimensions to the study. Pupil View Templates' contribution included an emotional element. The documentation by pupils of positive thoughts concerning themselves, peers and family helped to create a positive self-image for the learner. It is recognised that feelings of self-efficacy play an important part in pupils' motivation and interest in learning (Bandura, 1997; Bereiter & Scardamalia, 1987). Although the video showed that subsumed within the PAW programme were important strands of rapport, pride, collaboration, it was the PVTs that overtly encouraged the pupils not

only to reflect on their success but to document it. In this way their own success was presented before them visually. The PVTs documented the positive aspects that emanated from the pupils as the central figures in relation to school, family and peers. These positive elements therefore contributed to significant feelings of worth and hence improved self-esteem and confidence and motivation (Graesser *et al.*, 2009; Tarricone, 2011).

TAPs focused on the VCOP components and were a way of promoting discussion about their use. They supported the pupils to engage in problem-solving debate. In turn they promoted both cognition and *declarative* metacognition. Their contribution was therefore pedagogical rather than making salient research contributions. I had expected evaluation skills to feature more prominently as they are an important part of problem solving activities. I had anticipated that the prompts involved in TAPs would have promoted these skills. However, in my analysis *evaluation* appeared to be in the initial stages, suggesting that it requires time and practice to develop. Within *evaluation* are elements of debate and the weighing up of previous knowledge that again relies on memory. The multi-faceted dimensions of *evaluation* suggest that this skill is hard work (Wall & Higgins, 2007) and consequently, I feel, later to develop.

The teacher writing assessments evidenced that the weaker PAW group were able to make similar progress to the more able rest of the class group. The PAW programme also supported in particular, the weaker pupils. Their word count scores, although not as good as the rest of the class showed some children barely wrote a sentence in their pre test writing assessment, but in their post writing assessment they managed more than a page (see Appendix 8). The pupils were therefore able to associate themselves with success. It takes confidence to become motivated to start to write and the

interactive process involved in PAW appeared to support pupils of all abilities to do so. The noted increase in word count scores were also evidence of pupils' attempts at writing. It is arguable that it is only through the experience of actually writing words and making mistakes that progress can be made.

Although beyond the scope of this study, the analysis also revealed the interesting component of off-task collaboration that alerted me to reconsider teacher expectations of how long pupils are expected to concentrate and devote to tasks. Implicit in many of the conversations that I termed 'off-task collaboration' were discussions of previous experiences or information the pupils had learnt from their reading but were not directly relevant to the writing task in hand. The writing process in this context was imaginative writing and I would argue that some of the pupils' ideas resulted from some of these discussions.

6.3 Implications for classroom practice

A main objective of all schools should be to equip pupils for life in a busy world (Kuhn, 2005). The idea of a broader education is important and Kuhn (2005) argued robustly for a central place for metacognition. Flavell (1979) also stressed the wide ranging positive effects of metacognitive development. This would include educational attainment, which research has shown should involve promotion of metacognitive expertise (Brown, 1981; Flavell, 1979; Tarricone, 2011; Wertsch, 1978). Peer Assisted Writing was seen to support not only pupils' educational attainment but the ability to work with others and show appreciation of their strengths and weaknesses. In addition the writing process was presented as a concrete entity, in contrast to the more abstract notion of writing where teachers talk about a beginning, middle and end. The blend of

ingredients that includes structure and scaffolds in the form of the PAW flowchart, the VCOP prompt cards and the presence of a peer partner are all evident in PAW. My PAW analysis, particularly the video, added to this knowledge by demonstrating the further scaffolds in the interactive process (sharing of roles, expanding on ideas and feedback). It is arguable that it is the PAW context which gives rise to this unique range which supports the development of metacognition and in particular *information management*.

The skills of *collaboration* and *evaluation* are benefits of having a peer with whom to discuss issues (Duran & Monereo, 2005). This is important when it is remembered that these aspects are not present in discussions between teacher and pupil (Duran & Monereo, 2005). Allowing pupils to be active participants in their own and others' learning, in a context where they and their peers can see their success, is a powerful and motivating experience. The 'notion of agency and control' has already been stressed (Hacker, Dunslosky *et al.*, 2009) and it was shown that this is promoted in the PAW context. Activities such as PAW therefore need to be more prominent in classrooms.

Literacy is the basis for the majority of school-based subjects. It is a skill that plays a prominent part in everyday life and it is therefore essential that the complex skills of writing are promoted and reinforced uniformly across the curriculum. I suggest that all teachers are supported so that they appreciate the complexities of writing. Peer Assisted Writing, in particular, supports the full range of skills identified by Brown (1981) and Flavell (1979). Importantly, PAW supports not only these skills but also the additional ones identified in my PAW research: *IM reasoning*, *IM repeat*, *IM imagination* and *IM questioning*.

In my experience, one of the main complaints of teachers is lack of time to explore more methods of learning. This study has shown how PAW (i.e. the use of peers rather than necessarily involving much of teachers' time) can be an effective programme promoting a range of skills; metacognitive, educational, social and emotional, of both members of the partnership.

These arguments support my view that PAW should be incorporated into schools' development plans. However, it is recognised that a structure would have to be worked out to obtain a balance of approaches (PAW/PAL, individual and collaborative group work), all of which provide contexts for developing metacognition and learning and also development of the whole person.

6.4 Implications for professional practice of an educational psychologist

Over recent years the following issues concerning the future role of the educational psychologist have been identified in professional journals (Boyle & Lauchlan, 2009; Gersch *et al.*, 2006; Topping & Lauchlan, 2013):

- specialisms;
- the role of research;
- over investment in psychometric assessments;
- emphasis on a consultative approach at the expense of case studies, and
- the suggestion that it is essential that educational psychologists re-evaluate their role in order to survive as a profession.

I shall highlight specialisms, re-evaluation of the role of the educational psychologist, research and assessment as they all have relevance for the outcomes of my PAW study.

My PAW study has emphasised the complexity of the writing process and the analysis supported the work of Hacker *et al.* (2009) who discussed writing as applied metacognition. Topping and Lauchlan (2013) and Gersch *et al.* (2006) both argued that educational psychologists should acquire a specialism. They had found that it was rare for psychologists to play an active part in research projects and, when they did, it was mostly on a small scale with limited implications for policy and practice. Also that dissemination and follow up were poor.

Topping and Lauchlan (2013) and Gersch *et al.* (2006)'s definition of a specialism means that educational psychologists should have special interests and areas of expertise so they can deliver themed, expert consultancy to a whole education authority. Topping and Lauchlan (2013, p.79) emphasised that educational psychologists' knowledge of research design and practice was extensive which put them in a ideal position to implement larger scale research projects to the entire local authority and beyond. It seems appropriate to suggest that understanding the complexity of literacy should be one such specialism. I would argue that it is through research such as my PAW programme that expertise and knowledge is acquired. Understanding the acquisition of literacy in all its complexity requires on-going study and research. My PAW programme has illustrated not only the complexity of writing but that it is essentially a metacognitive process. When considered in terms of the importance of the skill of writing across the curriculum, it seems essential that there are psychologists within any Psychological Service who have developed literacy as a specialism.

Eodanable and Lauchlan (2009) found that very little time was allocated to research and evaluation work and that local authorities placed little value on what was carried out. Their argument is that research is central to the role of an educational psychologist and feeds back into the other key roles of training, intervention and assessment. The links between the development of a specialism and research are apparent and it would not be possible to develop expertise in an area without research.

Another important aspect is the background knowledge which an educational psychologist possesses not only through psychology but years of further study which provides them with a firm foundation on which to initiate research. It is the educational psychologist who is ideally placed within the school system to work on a regular basis with schools and teachers to support learning activities and to disseminate knowledge.

An experience I can take from my PAW study is that I not only worked with a group of eight pupils. I also worked, although to a lesser extent, with the whole class when the initial stories were introduced. Importantly I worked with their class teacher, head teacher and support for learning teacher and in addition provided information on the progress of the PAW project to all staff and parents. I therefore had access to a range of pupils, parents and staff. The photographic and explanatory display which the class teacher and I arranged in the school entrance hall was further visual evidence of the PAW programme and the requisite team work which it involved.

A further implication of working with greater numbers of pupils within a school is the inevitable increased psychologist involvement. I found that this involvement contributed to a more favourable standing within the school community. As pointed

out by Topping and Lauchlan (2013, p.79) undertaking research ensures an evidential basis for the advice you offer; this was the case with my PAW programme.

I have seen at first hand that other departments within the education authority are beginning to develop specialisms and suggest that Psychological Services will be left behind unless a proactive approach is taken. I would argue that there is no one better suited to undertake research in specific targeted areas than an educational psychologist whose extensive training involves research skills and participation in research projects. Further it is educational psychologists who set about their work (or should) through the ‘application of psychology’ (Boyle and Lauchlan, 2009, p.73). This is an important point and I suggest that the current role of the educational psychologist should be re-examined in this light. It appears crucial to ascertain what educational psychologists spend their time doing and to clarify that psychology plays a central role.

Boyle and Lauchlan (2009) suggested that another issue is that individual casework has become synonymous with psychometric testing. Whilst they acknowledged that psychometric assessment should still play some part in educational assessment they also advocated that, in order to obtain a more in-depth assessment, the use of other available tools should be investigated. I argue that TAPs and PVTs are two such tools. The results from the video analysis demonstrated the complexity of the written task. The TAPs and PVTs added further important information and dimensions to the tapestry of learning and social emotional well-being of the pupils. Think Aloud when Prompted contributed to the practice and promotion of metacognition. Picture View Templates facilitated pupils in placing themselves centrally as successful participants in the writing process. In particular, pupils were given the opportunity to practise the difficult skill of *evaluation*.

In view of the positive attributes of both TAPs and PVTs, it seems reasonable to suggest that educational psychologists include them in their repertoire of assessments. Both appear to not only provide metacognitive data for assessment purposes but support the development of metacognition and hence pedagogy. Their ethos is also in line with that of *Curriculum for Excellence* (2004) which stressed literacy, numeracy and social emotional well-being as central elements in a school curriculum.

This study revealed that the processes of PAW together with both TAPs and PVTs contributed to the promotion of the whole child and therefore supported aspects that have been highlighted as central elements to be developed in schools (Scottish Executive, 2004).

The PAW programme has been shown to benefit, in particular, pupils who struggle with literacy in the 10-11 year age range. I suggest that further studies should be carried out to ascertain which other age groups will benefit from PAW. I see the challenge for me is to work towards forwarding research in PAW on a larger scale. This could be carried out in one school and then research could take place in many schools. I consider that I have an ethical duty to my sample of pupils to try to disseminate this approach to learning across the education authority.

6.5 Implications for future research

Research in PAW is in its infancy. A major shortcoming in previous research in PAL/PAW has been the lack of consistency in terminology, definitions of metacognition, methodologies and coding schemes. This has been emphasised by the detailed differences and difficulties experienced in coding and analysis in this study. In addition, the developmental nature of metacognition means that comparison across the

age ranges is not possible. Once agreement is reached, studies across the curriculum should be compared, throughout the age ranges, using a variety of pairings. Research in different population groups will also be important.

Education today stresses an inclusive approach. I would therefore like to see replication of this PAW programme with larger numbers. Pre test/post test, two group designs could be adopted, with a range of pupils including the able pupil, pupils with ASPs and pupils with behavioural difficulties. I consider the qualitative aspects to be particularly important in order to verify and explore further what is involved in the interactions of pupils in the context of PAW. The extent of the inclusive possibilities also needs to be explored fully and documented. Pupils could also be tracked over several years, as a longitudinal angle is obviously of interest.

Within the constraints of this thesis there is an ethical and moral issue of the existing data that I have collected and not used. This should be transcribed and then analysed. Brown's (1981) and Flavell's (1979) coding scheme was seen to be an appropriate measure, but my additional categories, particularly the sub-components included in *information management* and *planning*, need to be endorsed and confirmed. There are also categories such as *selective focusing* that I decided not to use and these too, require further investigation so that my decision not to include them can be substantiated.

6.6 Concluding thoughts

The analysis highlighted the breadth and range of skills involved in the manipulation and arrangement of language and text. As a teacher and educational psychologist I feel that the complex blend of skills involved and the accompanying work load is not

always appreciated by teachers. This analysis has provided documentation of the value of PAW. Peer Assisted Writing supported the progression of a complex range of metacognitive skills; in particular *IM organisation, IM reasoning, IM repeat, IM imagination, IM questioning, IM summary and IM elaboration.*

Think Aloud when Prompted has been shown to influence pedagogic success. The class teacher assessment results showed that they promoted cognitive knowledge, accompanied in the majority of cases by *declarative* knowledge of metacognition. This focus on essential elements of vocabulary, connectives, openers and punctuation helped to instil a firm knowledge base.

Pupil View Templates also supported the learning process, albeit in a completely different way. Their contribution to pedagogy was essential; the pupils were centrally placed as part of a successful programme. They were encouraged to think about themselves and how peers and family might view them and this helped to complete the learning tapestry. Their contribution was therefore particularly important as they promoted success and thus confidence, self-esteem and motivation which all play their part in progressing successful outcomes (Bandura, 1997; Bereiter & Scardamalia, 1987).

Peer Assisted Writing supported all pupils in the programme, but particularly the weakest pupils. The implication was that for the weaker pupils in the PAW group PAW acted as a 'kick start' enabling them to acquire knowledge and so the courage and motivation to write. By actually writing they put themselves in a position to be assessed and so compete with their peers.

The range of pupils in the PAW programme suggests that PAW supports inclusive learning. Peer Assisted Writing included a range of scaffolds that helped pupils to start the journey to achieve their potential. These included sharing of roles, expanding on ideas and peer feedback. It was the video analysis which revealed the full range of complex metacognitive components. The unique contribution of this study highlights the complexity of *information management*. Contained within this component are the subcomponents of *IM organisation*, *IM reasoning*, *IM instinctive repeat*, *IM imagination*, *IM elaboration*, *IM questioning*, and *IM summary*. It is this range of sub-components that emphasises the complexity involved in organising text.

The urgency remains to initiate further studies on a larger scale in order to substantiate and add to existing knowledge or to refute this small-scale project. However, it would appear that the natural context of PAW creates an environment where crucial metacognitive skills, previously not documented, can be practised and thus promoted.

BIBLIOGRAPHY

- Ainscow, M. (1995). Education for all: Making it happen. *Support for Learning*, 10(4), 147-154.
- Alderson, P. (2005). Designing ethical research with children. In A. Farrell (Ed.) *Ethical Research with Children* (pp.27-36). Maidenhead: Open University.
- Anderson, J. R. (1996). ACT: a simple theory of complex cognition. *American Psychologist*, 51, 355-365.
- Antonietti, A. (2006). Metacognitive knowledge as a factor modulating self-regulation in multimedia learning. Paper presented at the European Conference of Educational Research, September, University of Geneva.
- Baker, L. & Brown, A. L. (1984). Metacognitive skills and reading. In P. D. Pearson, R. Barr, M. L. Kamil & P. Mosenthal (Eds.) *Handbook of Reading Research* (pp.353-394). New York: Longman.
- Baker, L. (1996). Social influences on metacognitive development in reading. In C. Cornoldi & J. Oakhill (Eds.) *Reading Comprehension Difficulties* (pp.331-352). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.
- Bannert, M. & Mengelkamp, C. (2008). Assessment of metacognitive skills by means of instruction to think aloud and reflect when prompted. Does the verbalisation method affect learning? *Metacognition Learning*, 3, 39-58.
- Barkley, R. A. (1998). Attention-deficit hyperactivity disorder. *Scientific American*, 279, 327-339.
- Baumfield, V., Hall, E. & Wall, K. (2008). *Action Research in the Classroom*. London: Sage.

- Bell, G. H. (1985). Can schools develop knowledge of their practice? *School Organisation*, 5(2), 175-184.
- Bereiter, C. & Scardamalia, M. (1982). From conversation to composition: The role of instruction in a developmental process. In R. Glaser (Ed.) *Advances in instructional psychology: Vol. 2*. Hillsdale, NJ: Lawrence Erlbaum.
- Bereiter, C. & Scardamalia, M. (1987). *The Psychology of Written Composition*. Hillsdale, NJ: Lawrence Erlbaum.
- Blöte, A., Resing, W. C. M., Mazer, P. & Van Noort, D. A. (1999). Young children's organizational strategies on a same - different task: Child Psychology, A microgenetic study and a training study. *Journal of Experimental Child Psychology*, 74, 21-43.
- Bottomley, D., Henk, W. A. & Melnick, S. A. (1997). Assessing children's views about themselves as writers using the Writer Self-Perception scale. *The Reader Teacher*, 51(4), 286-294.
- Boyle, C. & Lauchlan, F. (2009). Applied psychology and the case for individual casework: some reflections on the role of the educational psychologist. *Educational Psychology in Practice*, 25 (1), 71-84.
- Bracewell, R. J. (1993). Investigating the control of writing skills. In P. Mosenthal, L. L. Tammor & S. A. Walmsley (Eds.) *Research on Writing: Principles and methods*. Albany, NY: State University of New York.
- British Psychological Society (1990). Revised ethical principles for research with human subjects. *The Psychologist*, 3, 269-272.
- Brown, A. L. (1978). Knowing when, where and how to remember: A problem of metacognition. In R. Glaser (Ed.) *Advances in instructional psychology*. Hillsdale, NJ: Lawrence Erlbaum.

- Brown, A. L. (1981). Metacognition: The development of selective attention strategies for learning from texts. In M. L. Kamil (Ed.) *Directions in Reading: Research and instruction* (pp.21-43). Washington, DC: National Reading Conference.
- Brown, A. L. (1987). Metacognition, executive control, self-regulation and other mysterious mechanisms. In F. E. Weinert & R. H. Kluwe (Eds.) *Metacognition, Motivation and Understanding* (pp.117-140). Hillsdale, NJ: Lawrence Erlbaum.
- Bruer, J. T. (1993). *Schools for Thought*. Cambridge, MA: MIT.
- Bryman, A. (1984). The debate about quantitative and qualitative research: A question of method or epistemology. *The British Journal of Sociology*, 35(1), 75-92.
- Bush, G., Whalen, P. J., Rosen, B. R., Jenike, M. A. & Rauch, S. L. (1998). The counting Stroop: An interference task specialized for functional neuroimaging—validation study with functional MRI. *Human Brain Mapping*, 6, 270-282.
- Carroll, J. B. (1993). *Human Cognitive Abilities. A survey of factor-analysis studies*. Cambridge University Press.
- Chi, M. T. H. & Glaser, R. (1980). The measurement of expertise: Analysis of the development of knowledge and skill as a basis for assessing achievement. In E. L. Baker & E. S. Quellmalz (Eds.) *Educational Testing and Evaluation: Design, Analysis and Policy*. Beverly Hills, CA: sage Publications.
- Chipman, S., Segal, J. & Glaser, R. (1985). *Thinking and Learning Skills: Research and open questions* (vol. 2). Hillsdale, NJ: Lawrence Erlbaum.
- City of Edinburgh Council (2008). *What Happens Next? Understanding, analysing and evaluating the writer's craft in fiction*. Edinburgh: Publications Unit.
- Cohen, P., Kulik, J. & Kulik, C. (1982). Educational outcomes of tutoring: A meta-analysis of findings. *American Educational Journal*, 19(2), 237-248.

- Collier, J. Jr. & Collier, M. (1986). *Visual Anthropology*. Albuquerque, NM: University of New Mexico Press.
- Crabtree, B. F. & Miller, W. L. (Eds) (1999). *Doing Qualitative Research* (2nd edn.). Thousand Oaks, CA and London: Sage.
- Cresswell, J. W. (1998). *Qualitative Inquiry and Research Design. Choosing among five traditions*. Thousand Oaks, CA: Sage.
- Cromley, J. & Azevedo, R. (2006). Measuring strategy use in context with multiple-choice items. *Metacognition Learning*, 1, 229-247.
- Daiute, C. & Dalton, B. (1993). Collaboration between children learning to write: Can novices be masters? *Cognition and Instruction*, 10(4), 281-333.
- De Clercq, A., Desoete, A. & Roeyers, H. (2000). EPA2000: A multilingual programmable computer assessment of off-line metacognition in children with mathematical learning disabilities. *Behaviour Research Methods, Instruments and Computers*, 32, 304-311.
- Denscombe, M. (2003). *The Good Research Guide* (2nd edn). Buckingham: Open University.
- Denzin, N. K. & Lincoln, Y. S. (Eds) (2000). *Handbook of Qualitative Research*, (2nd edn). Thousand Oaks, CA: Sage.
- Desoete, A. (2008). Multi-method assessment of metacognitive skills in elementary school children: how you test is what you get. *Metacognition Learning*, 3, 189-206.
- Desoete, A. (2009). The enigma of mathematical learning disabilities. In D. J. Hacker. J. Dunlosky & A. C. Graesser (Eds.) *Handbook of Metacognition in Education* (pp. 206-218). New York: Routledge.

- Dewey, J. (1933). *How we think: a restatement of the relation of reflective thinking to the reflective process* (Rev. edn). Lexington, MA: Heath.
- Doran, C. & Cameron, R. J. (1995). Learning about learning. *Educational Psychology in Practice*, 11(2), 15-23.
- Duran, D. & Monereo, C. (2005) Styles and sequences of cooperative interaction in fixed and reciprocal peer tutoring. *Learning and Instruction*, 15, 179-199.
- Dweck, C. & Leggett, E. (1998) A social-cognitive approach to motivation and personality. *Psychological Review*, 78, 178-273.
- Dyson, A. (1990). Rethinking roles, rethinking concepts: Special needs teachers in mainstream schools. *Support for Learning*, 6(2), 51-60.
- Edwards, A. & Talbot, R. (1999). *The Hard pressed researcher* (2nd edn). Pearson Education Limited.
- Efklides, A. (2006). Metacognition and affect: What can metacognitive experiences tell us about the learning process? *Educational Research Review*, 1, 3-14.
- Elderkin-Thompson, V. & Waitzkin, H. (1999). Using videotapes in qualitative research. In B. F. Crabtree & W. L. Miller (Eds.) *Doing Qualitative Research*, (2nd edn). (pp.239-252). Thousand Oaks, CA: Sage.
- Elliott, J. (1990). Teachers as researchers: Implications for supervision and teacher education. *Teaching and Teaching Education*, 6(1), 1-26.
- Elliott, J. (1991). *Action Research for Educational Change*. Milton Keynes: Open University.
- Elshout, J. J. (1983). Is measuring intelligence still useful? In S.B Anderson & J. S. Helmick (Eds.) *On Educational Testing* (pp.45-56). San Francisco: Jossey-Bass.

- Ericsson, K. A. & Simon, H. A. (1980). Verbal reports as data. *Psychological Review*, 87(3), 215-251.
- Ericsson, K. A. & Simon, H. A. (1993). *Protocol Analysis: Verbal reports as data*. Cambridge: MIT Press.
- Fabricius, W. V. (1997). Review of memory performance and competencies: Issues in growth and development. *Merrill Palmer Quarterly*, 44, 114-119.
- Fantuzzo, J. W., King, J. A. & Heller, L. R. (1992). Effects of reciprocal peer tutoring on mathematics and school adjustment: A component analysis. *Journal of Educational Psychology*, 84, 331-339.
- Fawcett, L. M. & Garton, A. F. (2005). The effect of peer collaboration on children's problem-solving ability. *British Journal of Educational Psychology*, 75, 157-169.
- Feilzer, M. Y. (2009). Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research*, 4(6), 6-16.
- Fernandez-Duque, D., Baird, J. A. & Posner, M. I. (2000). Executive attention and metacognitive regulation. *Consciousness and Cognition*, 9, 288-307.
- Flavell, J. H. (1971). First discussant's comments: What is memory development the development of? *Human Development*, 14, 272-278.
- Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.) *The Nature of Intelligence* (pp.231-236). Hillsdale, NJ: Lawrence Erlbaum.
- Flavell, J. H. (1977). *Cognitive Development*. Englewood Cliffs, NJ: Lawrence Erlbaum.

- Flavell, J. H. (1978). Metacognitive development. In J. M Scandura & C. J. Brainerd (Eds.) *Structured Process Theories of Complex Human Behaviour* (pp.213-245). Alphen aan den Rijn, The Netherlands: Sijthoff and Noordhoff.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive development inquiry. *American Psychologist*, 34, 906-911.
- Flavell, J. H. (1981). Cognitive monitoring. In W. P. Dickson (Ed.) *Children's Oral Communication Skills* (pp.35-60). New York: Academic Press.
- Flavell, J. H. (1987). Speculations about the nature and development of metacognition. In F. Weinert & R. Kluwe (Eds.) *Metacognition, Motivation and Understanding* (pp.21-29). Hillsdale, NJ: Lawrence Erlbaum.
- Flavell, J. H. (1993). Young children's understanding of thinking and consciousness. *Current Directions in Psychological Science*, 2(2), 40-43.
- Flavell, J. H. (2000). Developing intuitions about the mental experiences of self and others. Paper presented at the meeting of the Jean Piaget Society, June, Montreal.
- Flavell, J. H., Miller, P. H. & Miller, S. A. (2002). *Cognitive Development* (4th edn). London: Prentice-Hall International.
- Flavell, J. H. & Wellman, H. M. (1977). Metamemory. In R. V. Kail & W. Hagen (Eds.) *Perspectives on the Development of Memory and Cognition*. Hillsdale, NJ: Lawrence Erlbaum.
- Flower, L. & Hayes, J. R. (1977). Problem-solving strategies and the writing process. *College English*, 39, 440-461.
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, 12, 219-245.

- Fortunato, I., Hechts, D., Tittle, C. K. & Alvarez, L. (1991). Metacognition and problem solving. *Arithmetic Teacher*, 39(4), 38-40.
- Frederickson, N. & Cline, T. (2002). *Special Educational Needs, Inclusion and Diversity*. Buckingham, Philadelphia: Open University Press.
- Fuchs, L. S., Fuchs, D., Bentz, J., Phillips, N. B. & Hamlett, C. L. (1994). The nature of student interactions during peer tutoring with and without prior training and experience. *American Education Research Journal*, 31(1) 75-103.
- Fuchs, L. S., Fuchs, D., Hamlet, C., Phillips, N., Karns, K. & Dutka, S. (1997). Enhancing students' helping behaviour during peer-mediated instruction with conceptual mathematical explanations. *Elementary School Journal*, 97(3), 223-249.
- Fuchs, L. S., Fuchs, D., Karns, K., Hamlett, C. L., Dutka, S. & Kataroff, M. (1996). The relation between student ability and the quality and effectiveness of explanations. *American Educational Research Journal*, 33(3), 631-663.
- Fuchs, L. S., Fuchs, D., Hamlet, C., Phillips, N. & Karns, K. (1998). High achieving students' interaction and performance on complex mathematical task as a function of homogeneous and homogenous and heterogeneous pairing. *American Educational Research Journal*, 35, 227-267.
- Garner, R. & Alexander, P. A. (1989). Metacognition: Answered and unanswered questions. *Educational Psychologist*, 24, 143-158.
- Geertz, C. (1973). Deep play: Notes on the Balinese cockfight. In C. Geertz (Ed.) *The Interpretation of Cultures: Selected essays* (pp.412-453). New York: Basic Books.
- Georghiades, P. (2004). From the general to the situated: three decades of metacognition. *International Journal of Science Education*, 26(3), 365-383.

- Georghiades, P. (2006). The role of metacognitive activities in the contextual use of primary pupils' conceptions of science. *Research in Science Education*, 36, 29-49.
- Gersch, I. S, Turner, M. & Gilani, T. (2006). Psychologists United: Catching up with achievements, innovations and developments in applied psychology. The University of East London Challenge and change conference. *Division of Educational and Child Psychology*. The British Psychological Society.
- Glaser, B. & Strauss, A. (1967). *The Discovery of Grounded Theory*. Chicago: Aldine.
- Graesser, A. C., Bowers, C., Hacker, D. & Person, N. (1997). An anatomy of naturalistic tutoring. In K. Hogan & M. Pressley (Eds.) *Scaffolding Student Learning*. New York: Brook Line.
- Graesser, A. C., D'Mello, S. & Person, N. (2009). Meta-knowledge in tutoring. In D. J. Hacker, J. Dunlosky & A. C. Graesser (Eds.) *Handbook of Metacognition in Education* (pp.361-382). New York: Routledge.
- Graham, S. (2006). Writing. In P. Alexander & P. Winne (Eds.) *Handbook of Educational Psychology* (pp.457-478). Mahwah, NJ: Lawrence Erlbaum.
- Greenwood, C., Delquadri, J. & Hall, R. (1989). Longitudinal effects of class-wide peer tutoring. *Journal of Educational Psychology*, 81(3), 371-383.
- Groundwater-Smith, S. & Mockler, N. (2007). Ethics in practitioner research: An issue of quality. *Research Papers in Education*, 22(2), 199-211.
- Hacker, D. J. (1998). Definitions and empirical foundations. In D. J. Hacker, J. Dunlosky & A. C. Graesser (Eds.) *Metacognition in Educational Theory and Practice* (pp.1-23). Mahwah, NJ: Lawrence Erlbaum.
- Hacker, D. J., Dunslosky, J. & Graesser, A. C. (Eds) (2009). *Handbook of Metacognition in Education*. New York and London: Routledge.

- Hacker, D. J., Keener, M. C. & Kircher, J. C. (2009). Writing is applied metacognition. In D. J. Hacker, J. Dunlosky & A. C. Graesser (Eds.) *Handbook of Metacognition in Education*. (pp.154-172). New York and London: Routledge.
- Hammersley, M. (2004). Action research: a contradiction in terms? *Oxford Review of Education*, 30(2), 165-181.
- Harris, K. R., Graham, S., Brindle, M. & Sandmel, K. (2009). Metacognition and children's writing. In D. J. Hacker, J. Dunlosky & A. C. Graesser (Eds.) *Handbook of Metacognition in Education* (pp.131-153). New York: Routledge.
- Hartman, H. J. (1998). Metacognition in teaching and learning: An introduction. *Instructional Science*, 26(1-2), 1-3.
- Hayes, J. R. (1996). A new framework for understanding cognition and affect in writing. In M. Levy & S. Randall (Eds.) *The Science of Writing: Theories, methods, individual differences and applications* (pp.1-27). Mahwah, NJ: Lawrence Erlbaum.
- Hayes, J. & Flower, L. (1980). Identifying the organization of writing processes. In L. Gregg & E. Steinberg (Eds.) *Cognitive Processes in Writing* (pp.3-30). Hillsdale, NJ: Lawrence Erlbaum.
- Hayes, N. (2000). *Doing Psychological Research. Gathering and analysing data*. Buckingham: Open University.
- Hick, P., Kershner, R. & Farrell, P. T. (2009). *Psychology for Inclusive Education: New directions in theory and practice*. London: Routledge.
- Higgins, S., Baumfield, V., Lin, M., Moseley, D., Butterworth, M., Downey, G., Gregson, M., Oberski, I., Rockett, M. & Thacker, D. (2004). *Thinking skills approaches to effective teaching and learning: what is the evidence for impact*

on learners? London: EPPI-Centre, Social Science Research Unit, Institute of Education.

- Higgins, S., Wall, K., Baumfield, V., Hall, E., Leat, D. & Woolner, P. with Clark, J., Edwards, G., Falzon, C., Jones, H., Lofthouse, R., Miller, J., Moseley, D., McCaughey, C. & Mroz, M. (2006). *Learning to Learn in Schools, Phase 3 Evaluation: Year Two Report*. London: Campaign for Learning. Available at: <http://www.campaign-for-learning.org.uk/projects/L2L/Resources/researchreports.htm>
- HMIe (2009). *Improving Scottish Education: A report by HMIe on inspection and review 2005-2008*. Her Majesty's Inspectorate of Education, Livingston.
- Hodkinson, P. & MacLeod, F. (2010). Contrasting concepts of learning and contrasting research methodologies: Affinities and bias. *British Educational Research Journal*, 36(2), 173-189.
- Jacobs, J. E. & Paris, S. G. (1987). Children's metacognition and reading: Issues in definition, measurements and instruction. *Educational Psychologist*, 22, 255-278.
- Jacobson, J., Thrope, L., Fisher, D., Lapp, D., Frey, N. & Flood, J. (2001). Cross-age tutoring: A literacy improvement approach for struggling adolescent readers. *Journal of Adolescent and Adult Literacy*, 46, 528-536.
- John-Steiner, V. & Mahn, H. (1996). Sociocultural approaches to learning and development: A Vygotskian framework. A paper submitted to a special issue of *Educational Psychologist*, 31(3/4), 191-206.
- Juel, C. (1996). Learning to learn from effective tutors. In L. Schaube & R. Glaser (Eds.) *Innovations in Learning: New environments for education*. (pp.49-74). Mahwah, NJ: Lawrence Erlbaum.

- Justice, E. (1986). Developmental changes of relative strategy effectiveness. *The British Journal of Developmental Psychology*, 4, 75-81.
- King, A. (1994). Guiding knowledge construction in the classroom: Effects of teaching children how to question and how to explain. *American Educational Research Journal*, 31(2), 338-368.
- King, A., Staffieri, A. & Adelgais, A. (1998). Mutual peer tutoring: Effects of structuring interaction to scaffold peer learning. *Journal of Educational Psychology*, 90(1), 134-152.
- Kluwe, R. H. (1982). Cognitive knowledge and executive control: Metacognition. In D. R. Griffin (Ed.) *Animal Mind - Human Mind* (pp.201-224). New York; Springer-Verlag.
- Kramarski, B. & Mevarech, Z. R. (2003). Enhancing mathematics reasoning in the classroom: The effects of cooperative learning and metacognitive training. *American Educational Research Journal*, 40, 281-310.
- Ku, K. Y. L. & Ho, I. T. (2010). Metacognitive strategies that enhance critical thinking. *Metacognition Learning*, 5, 251-267.
- Kuhn, D. (1972). Mechanism of change in the development of cognitive structures. *Child Development*, 43, 833-844.
- Kuhn, D. (1999). Metacognitive development. In L. Balter & C. S. Tamis-LeMonda (Eds.) *Child psychology. A handbook of contemporary issues* (pp.259-286). Philadelphia: Psychology Press.
- Kuhn, D. (2005). *Education for Thinking*. Harvard University Press.
- Kuhn, D. & Pearsall, S. (1998). Relations between metastrategic knowledge and strategic performance. *Cognitive Development*, 13, 227-247.
- Ladybird (2008). *The Princess and the Pea*. Ladybird tales. Ladybird.

- Larkin, S. (2006). Collaborative group work and individual development of metacognition in the early years. *Research in Science Education*, 36, 7-27.
- Larkin, S. (2009). Socially mediated metacognition and learning to write. *Thinking Skills and Creativity*, 4(3), 149-159.
- Larsson, S. (2009). A pluralist view of generalization in qualitative research. *International Journal of Research & Method in Education*, 32(1), 25-38.
- Lin, X. D., Schwartz, D. L. & Hatano, G. (2005). Towards teacher's adaptive metacognition. *Educational Psychologist*, 40, 245-256.
- Livingston, J. A. (1997). *Metacognition: An overview*. State University of New York at Buffalo.
- Mathes, P. & Fuchs, L. (1994). The efficacy of peer tutoring in reading strategies for students with mild disabilities. A best-evidence synthesis. *School Psychology Review*, 23(1), 59-80.
- McCormick, C. B. (2003). Metacognition and learning. In W. M. Reynolds & G. E. Miller (Eds.) *Handbook of Psychology: Vol. 7. Educational Psychology* (pp.79-102). Hoboken, NJ: Wiley.
- McMahon, H. & O'Neill, W. (1992). Computer-mediated zones of engagement in learning, In T. M. Duffy, J. Lowyck & D. H. Jonassen (Eds.) *Designing Environments for Constructive Learning* (pp.29-50). New York: Springer-Verlag.
- McNiff, J. (1988). *Action Research: Principles and practice*. London: MacMillan.
- Meltzer, L, Roditi, B., Houser, R. F. & Perlman, M. (1998). Perceptions of academic strategies and competence in students with learning disabilities. *Journal of Learning Disabilities*, 31, 437-451.

- Metcalf, J. & Shimamura, A. P. (1994). *Metacognition: Knowing about knowing*. Cambridge, MA: MIT Press.
- Moll, L. C. & Whitmore, K. F. (1993). Vygotsky in Classroom Practice: Moving from individual transmission to social transaction. In E. A. Forman, N. Minick & C. Addison Stone (Eds.) *Contexts for Learning* (pp.19-42). Oxford University Press.
- Moody, J. D. & Gifford, V. D. (1990). The effect of grouping by formal reasoning ability levels, group size and gender achievement in laboratory chemistry. *Paper presented at the annual meeting of the Mid-South Educational Research Association, November, New Orleans.*
- Moseley, D., Baumfield, V., Elliott, J., Gregson, M., Higgins, S., Miller, J. & Newton, D. P. (2005). *Frameworks for Thinking: A handbook for teaching and learning*. Cambridge University Press.
- Moshman, D. (1995). Reasoning as self-constrained thinking. *Human Development*, 38, 53-63.
- Nelson, T. O., Graf, S., Dunlosky, J., Marlatt, A., Walker, D. & Luce, K. (1998). Effect of acute alcohol intoxication on recall and on judgements of learning during the acquisition of new information. In G. Mazzoni (Ed.) *Metacognition and Cognitive Neuropsychology: Monitoring and control processes* (pp.161-180). Mahwah, NJ: Lawrence Erlbaum.
- Nelson, T. O., & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In G. H. Bower (Ed.) *The Psychology of Learning and Motivation* (pp.125-173). New York: Academic.

- Nelson, T. O. & Narens, L. (1994). Why investigate metacognition? In J. Metcalfe & A. P. Shimamura (Eds.) *Metacognition: Knowing about knowing* (pp.1-25). Cambridge, MA: MIT Press.
- Newman, G., Webb, B. & Cochrane, C. (1995). A content analysis method to measure critical thinking in face to face computer supported group learning. *Interpreters Computer Technology*, 3(2), 56-77.
- Nicholls, J. (1989). *The Competitive Ethos and Democratic Education*. Cambridge, MA: Harvard University.
- Nisbett, J. & Shucksmith, J. (1984). *The Seventh Sense: Reflections on learning to learn*. (1st edn.). Edinburgh: Scottish Council for Research in Education.
- Nixon, J. G. & Topping K. J. (2001). Emergent writing: The impact of structured peer interaction. *Educational Psychology*, 21(1) 41-58.
- Palinscar, A. & Brown, A. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction*, 1, 117-175.
- Palinscar, A., Brown, A. L. & Campione, J. C. (1993). First-grade dialogues for knowledge acquisition and use. In E. A. Forman, N. Minick & C. Addison Stone (Eds.) *Contexts for Learning* (pp.43-57). Oxford University Press.
- Paris, S. G. & Cross, D. E. (1988). Models and metaphors of learning strategies. In C. E. Weinstein, E. T. Goetz & P. A. Alexander (Eds.) *Learning and Study Strategies: Issues in assessment, instruction and evaluation. The Genetic Epistemologist*, 16, 27-37.
- Paris, S. G., Lipson, M. & Wixson, K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology*, 8, 293-316.

- Paris, S. G. & Winograd, P. (1990). How metacognition can promote academic learning and instruction. In B. F. Jones & L. Idol (Eds.) *Dimensions of Thinking and Cognitive Instruction* (pp.15-51). Hillsdale, NJ: Lawrence Erlbaum.
- Person, N. & Graesser, A. (1999). Evolution of discourse during cross-age tutoring. In A. O'Donnell, & A. King (Eds.) *Cognitive Perspectives on Peer Learning*. Mahwah, NJ: Lawrence Erlbaum.
- Piaget, J. (1926). *The language and thought of the child*. New York: Harcourt, Brace.
- Piaget, J. (1929). *The Child's Conception of the World*. New York: Harcourt, Brace.
- Piaget, J. (1964). *Six Psychological Studies*. New York: Vintage.
- Piaget, J. (1969). *Judgement and Reasoning in the Child*. London: Routledge and Kegan Paul.
- Pintrich, P. R. (1999). Motivational beliefs as resources for and constraints on conceptual change. In S. Schnotz, S Vosniadou & M. Carretoro (Eds.) *New perspectives on conceptual change* (pp.33-50). Amsterdam: Pergamon.
- Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching and assessing. *Theory into Practice*, 41(2), 219-225.
- Pressley, M. & Ghatala, E. S. (1990). Self-regulated learning: Monitoring learning from text. *Educational Psychologist*, 25, 19-33.
- Pring, R. (2000). The false dualism of educational research. *Journal of Philosophy of Education*, 34(2), 247-260.
- Pring, R. (2006). *Philosophy of educational research* (2nd edn). Continuum.
- Prins, F. J., Veenman, V. J. & Elshout J. J. (2006). The impact of intellectual ability and metacognition on learning: New support for the threshold of problematicity theory. *Learning and Instruction*, 16, 374-387.

- Prior, P. (2006). A sociocultural theory of writing. In C. MacArthur, S. Graham & J. Fitzgerald (Eds.) *Handbook of Writing Research* (pp.54-66). New York: Guildford.
- Prosser, J. (1992). Personal reflections on the use of photography in an ethnographic case study. *British Educational Research Journal*, 18(4), 397-411.
- Punch, K. F. (2005). *Introduction to Social Research*. London: Sage.
- Robson, C. (2002). *Real World Research*. Dublin: Blackhall.
- Roscoe, R. D. & Chi, M. T. H. (2004). The influence of the tutee in learning by peer tutoring. *Presented at the 26th Annual Conference of the Cognitive Science Society, August, Chicago*.
- Roscoe, R. D. & Chi, M. T. H. (2007). Understanding tutor learning: Knowledge-building and knowledge-telling in peer tutors' explanations and questions. *Review of Educational Research*, 77(4), 532-574.
- Rosenthal, D. M. (2000). Introspection and self-interpretation. *Philosophical Topics*, 28(2), 201-333.
- SPSS 21.0 for Windows. Internal.ncl.ac.uk/software/spss-21-win.php
- Scardamalia, M. & Bereiter, C. (1982). Assimilative process in composition planning. *Educational Psychologist*, 17(3), 165-171.
- Scardamalia, M. & Bereiter, C. (1986). Written composition. In M. Wittock (Ed.) *Handbook of Research on Teaching* (3rd edn., pp.778-803). New York: Macmillan.
- Schraw, G. & Dennison, G. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460-475.
- Schraw, G. & Moshman, D. (1995). Metacognitive theories, *Educational Psychology Review*, 7(4), 352-371.

- Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional Science*, 26, 113-125.
- Schunk, D. H. (1989). Self-efficacy and achievement behaviours. *Educational Psychology Review*, 1, 173-208.
- Scottish Executive (2004). *A Curriculum for Excellence*. Livingston: Her Majesty's Inspectorate of Education.
- Scottish Office Education Department (1991). *Curriculum and Assessment in Scotland: National Guidelines - English language 5-14*, Edinburgh: The Scottish Office.
- Scottish Qualifications Authority 5-14 Assessment Unit (1997). *National Tests in Writing: Information for teachers*. Dalkeith: Scottish Qualifications Authority.
- Shamir, A. & Lazerovitz, T. (2007). A peer mediation intervention for scaffolding self-regulated learning among children with learning disabilities. *European Journal of Special Needs Education*, 22, 255-273.
- Shamir, A., Mevarech, Z. R. & Gida, C. (2009). The assessment of metacognition in different contexts: individualised vs. peer assisted learning. *Metacognition Learning*, 4, 47-61.
- Shamir, A., Tzuriel, D. & Rosen, M. (2006). Peer mediation: the effects of program intervention, math level, and verbal ability on mediation style and improvement in math problem solving. *School Psychology International*, 27, 209-231.
- Shamir, A., Zion, M. & Spector-Ornit, L. (2008). Peer tutoring, metacognitive processes and multimedia problem-based learning: The effect of mediation training on critical thinking. *Journal of Science Education Technology*, 17, 384-398.

- Sheull, T. J. (1990). Phases of meaningful learning. *Review of Educational Research*, 60(4), 531-547.
- Sinclair, J. & Coulthard, M. (1975). *Towards an Analysis of Discourse: The English used by teachers*. London: Oxford University Press.
- Slavin, R. E. (1996). Research for the future. Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology*, 21, 43-69.
- Snowling, M. (1995). Phonological process and developmental dyslexia. *Journal of Research in Reading*, 18, 132-138.
- Sperling, R. A., Howard, B. C., Miller, L. A. & Murphy, C. (2002). Measures of children's knowledge and regulation of cognition. *Contemporary Educational Psychology*, 27, 51-79.
- Sperling, R. A., Howard, B. C., Staley, R., & Dubois, N. (2004). Metacognition and self-regulated learning constructs. *Educational Research and Evaluation*, 10, 117-139.
- Stenhouse, L. (1975). *An Introduction to Curriculum Research and Development*. London: Heinemann.
- Stenhouse, L. (1981). 'What counts as research?' *British Journal of Educational Studies*, 29(2), 103-113.
- Sternberg, R. J. (1990). *Metaphors of the Mind: Conceptions of the nature of intelligence*. Cambridge University Press.
- Sutherland, J. & Topping, K. (1999). Collaborative writing in eight year olds: Comparing cross ability fixed role and same ability reciprocal role pairing. *Journal of Research in Reading*, 22(2), 154-179.

- Swanson, H. L. (1990). Influence of metacognitive knowledge and aptitude on problem solving. *Journal of Educational Psychology*, 82, 306-314.
- Symonds, J. E. & Gorard, S. (2010). Death of mixed methods? Or the rebirth of research as a craft. *Evaluation & Research in Education*, 23(2), 121-136.
- Tarricone, P. (2011). *The Taxonomy of Metacognition*. New York: Psychology Press.
- Tashakkori, A. Teddlie, C. (1998). *Mixed methodology, combining qualitative and quantitative approaches*. Thousand Oaks, CA, London: Sage.
- Theodorson, G. A. & Theodorson, A. G. (1969). *A Modern Dictionary of Sociology*. New York: Crowell.
- Thomas, G. P. & Kin Mee, D. (2005). Changing the learning environment to enhance students' metacognition in Hong Kong primary classrooms. *Learning Research*, 8, 221-243.
- Topping, K. (1995). *Paired Reading, Spelling and Writing; The handbook for teachers and parents*. London & New York: Cassell.
- Topping, K. & Bryce, A. (2004). Cross-age peer tutoring of reading and thinking: Influence on thinking skills. *Educational Psychology*, 24(5), 595-621.
- Topping, K. & Ehly, S. (1998). Introduction to peer assisted learning. In K. Topping & S. Ehly (Eds.) *Peer Assisted Learning* (pp.1-23). Mahwah, New Jersey: Lawrence Erlbaum.
- Topping, K. & Ehly, S. (2001). Peer assisted learning: A framework for consultation. *Journal of Educational and Psychological Consultation*, 12(2), 113-132.
- Topping, K. & Lauchlan, F. (2013) Educational Psychologists as Researchers. *The Australian Educational and Developmental Psychologist*, 30(1), 74-83.
- Veenman, M. V. J. (2005). The assessment of metacognitive skills: What can be learned from multi-method designs? In C. Artelt & B. Moschner (Eds.)

Lernstrategien und Metakognition: Implikationen für Forschung und Praxis (pp.75-97). Berlin: Waxmann.

- Veenman, V. J. & Beishuizen, J. J. (2004). Intellectual and metacognitive skills of novices while studying texts under conditions of text difficulty and time constraint. *Learning and Instruction*, 14(6), 621-640.
- Veenman, M. V. J. & Spaans, M. A. (2005). Relation between intellectual and metacognitive skills: Age and task difference. *Learning and Individual Differences*, 15(2), 159-176.
- Veenman, M. V. J., Van Hout-Wolters, B. H. A. M. & Afflerbach, P. (2006). Metacognition and learning: conceptual and methodological considerations. *Metacognition and Learning*, 1, 3-14.
- Veenman, M. V. J. & Verheij, J. (2001). Technical students' metacognitive skills: relating general vs specific metacognitive skills to study success. *Learning and Individual Differences*, 13(3), 259-272.
- Vygotsky, L. S. (1962). *Thought and Language*. Cambridge: MIT Press.
- Vygotsky, L. S. (1978). *Mind in Society*. Cambridge, MA: Harvard University.
- Wall, K. & Higgins, S. (2006). Facilitating metacognitive talk: a research and learning tool. *International Journal of Research and Method in Education*, 29(1), 39-53.
- Wall, K. (2008). Understanding metacognition through the use of Pupil Views Templates: Pupil views of learning to learn. *Thinking Skills and Creativity*, 3, 23-33.
- Wall, K. & Higgins, S. (2007). Learning to learn in schools: How are students thinking differently about their learning? *Paper presented at EARLI Conference, August, Budapest*.

- Wall, K., Higgins, S., Miller, J. & Packard, E. (2004). Developing digital portfolios: How ICT can facilitate pupil talk about learning. In K. Morgan & M. J. Spector (Eds.) *The Internet Society Advances in Learning, Commerce and Security* (pp.27-36). Southampton: WIT.
- Wang, M. C., Haertek, G. D. & Walberg, H. J. (1990). What influences learning? A content analysis of review literature. *Journal of Educational Research*, 84, 30-40.
- Ward, L. & Traweek, D. (1993). Application of a metacognitive strategy to assessment, intervention and consultation: A think-aloud technique. *Journal of School of Psychology*, 31, 469-485.
- Wertsch, J. V. (1978). Adult-child interaction and the roots of metacognition. *Quarterly Newsletter of the Institute for Comparative Human Development*, 2, 15-18.
- West Dunbartonshire Council (2007). *Write to the Top: Teachers resource pack for improving standards in writing*. Andrell Education Ltd.
- White, B., Frederiksen, J. & Collins, A. (2009). The interplay of scientific inquiry and metacognition. In D. J. Hacker, J. Dunlosky & A. C. Graesser (Eds.) *Handbook of Metacognition in Education* (pp.175-205). New York: Routledge.
- Whitebread, D., Coltman, P., Pasternak, P. D., Sangster, C., Grau, V., Almeqdad, Q. & Demetriou, D. (2009). The development of two observational tools for assessing metacognition and self-regulated learning in young children. *Metacognition Learning*, 4, 63-85.
- Wilson, R. (2002). *Strategies for Immediate Impact on Writing Standards*. Andrell Education.

- Yarrow, F. & Topping, K. P. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology*, 71, 261-282.
- Yin, R. A. (1984). *Case Study Research: Design and Methods*. Newbury Park, CA; Sage.
- Zhang, L. (2010). Do thinking styles contribute to metacognition beyond self-rated abilities? *Educational Psychology*, 30(4), 481-494.
- Zimmerman, B. J. & Risemberg, R. (1997). Research for the future. Becoming a self-regulated writer: A social cognitive perspective. *Contemporary Educational Psychology*, 22, 73-101.
- Zohar, A. & David, A. B. (2008). Explicit teaching of meta-strategic knowledge in authentic classroom situations. *Metacognition Learning*, 3, 59-82.

APPENDICES

Appendix 1 PAW flowchart (Topping, 1995)

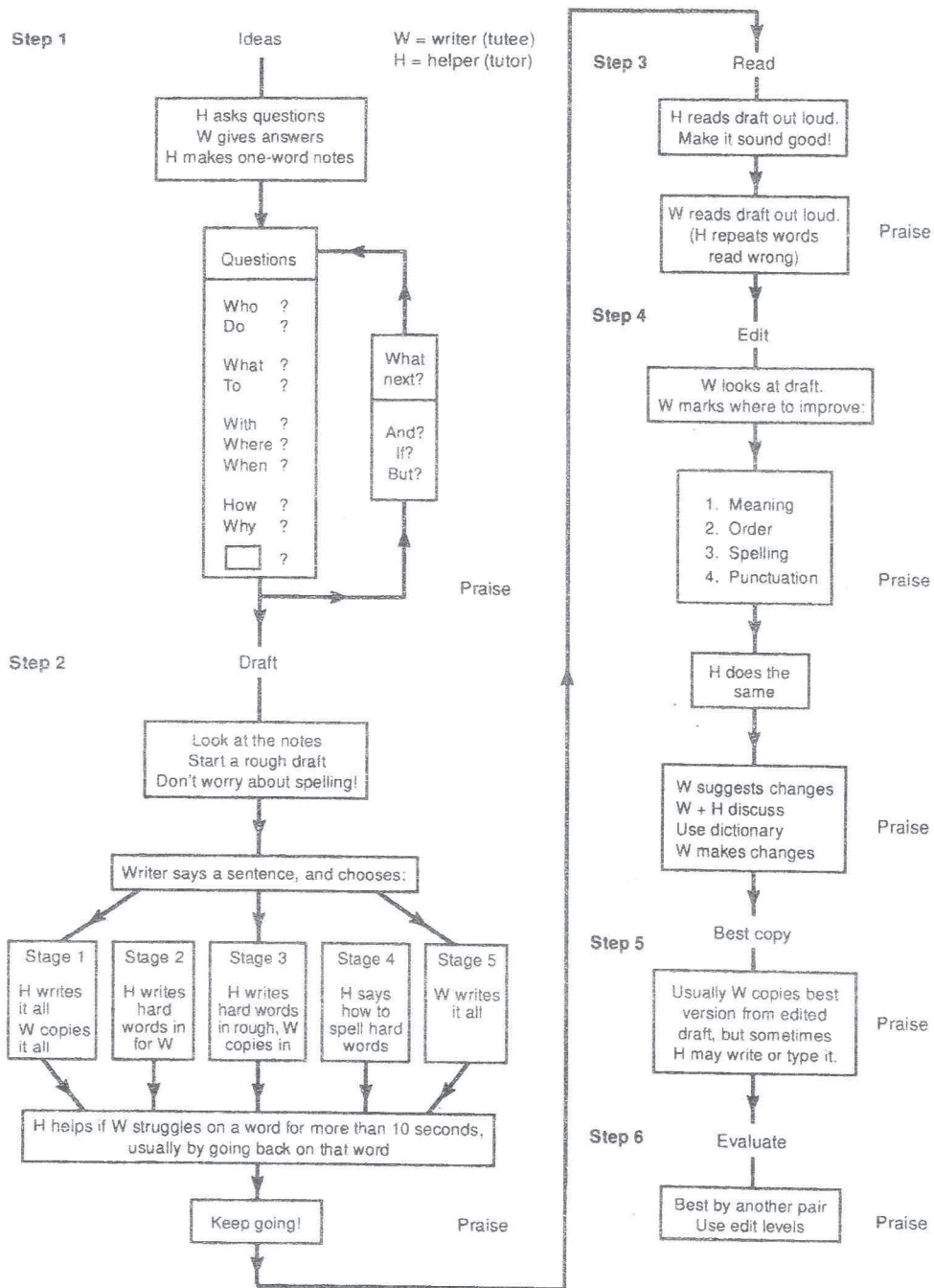
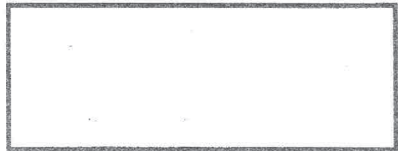
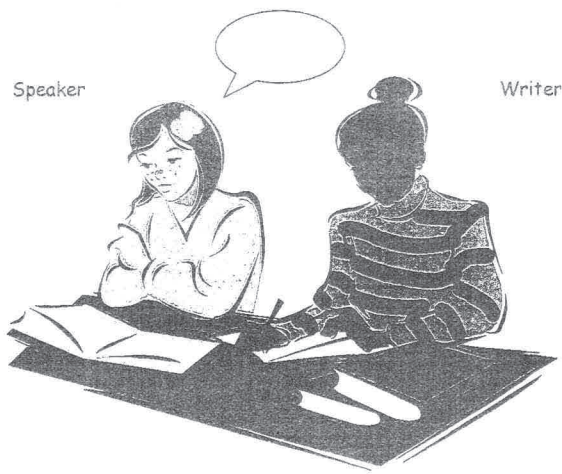


FIG. 1. The paired writing methods.

Appendix 2 My PAW programme

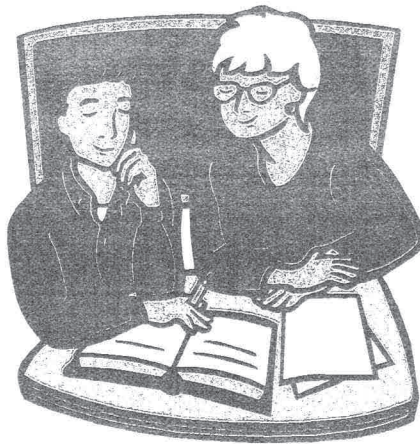
PAIRED WRITING



Working in Pairs

Creating a Story

Speaker and Writer plan and write
the story together



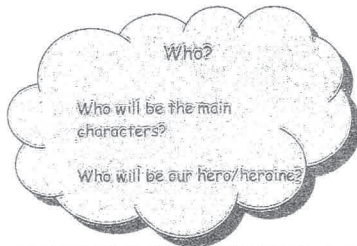
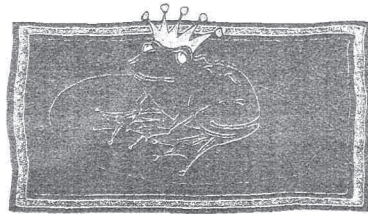
IDEAS

- 1) Use the bubbles for planning and vocabulary
- 2) Keep planning simple
- 3) Number the order of the bubbles
- 4) Start the story

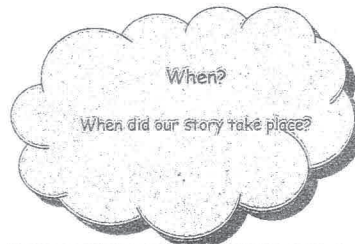
IDEAS

1. Ask each other questions
2. Share ideas
3. Writer uses the bubbles to record the answers

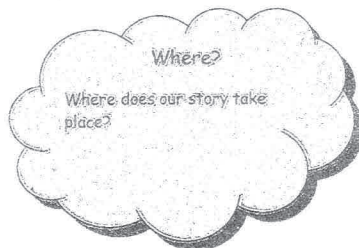
"The Princess and the Pond"



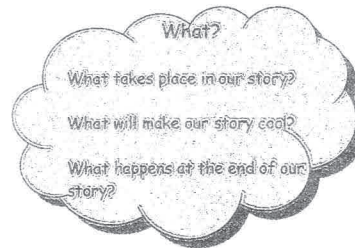
WOW words:



WOW words:



WOW words:

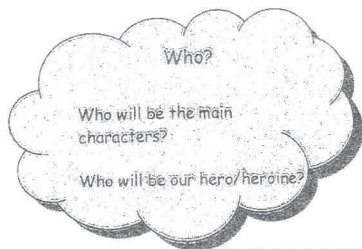


WOW words:

IDEAS

1. Ask each other questions
2. Share ideas
3. Writer uses the bubbles to record the answers

"Title"



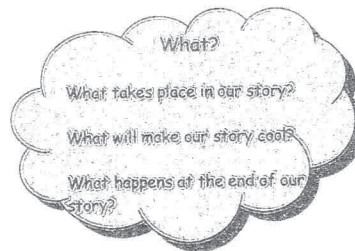
WOW words:



WOW words:



WOW words:

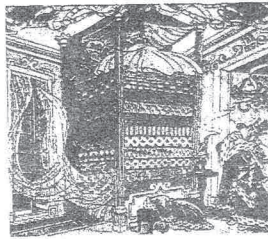


WOW words:

IDEAS

1. Ask each other questions
2. Share ideas
3. Writer uses the bubbles to record the answers

"The Princess and the Pea"



Who?

Who will be the main characters?
Who will be our hero/heroine?

WOW words:

When?

When did our story take place?

WOW words:

Where?

Where does our story take place?

WOW words:

What?

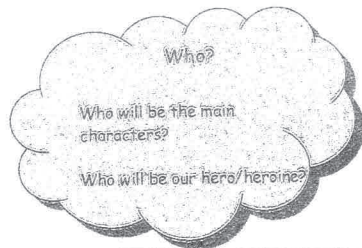
What takes place in our story?
What will make our story cool?
What happens at the end of our story?

WOW words:

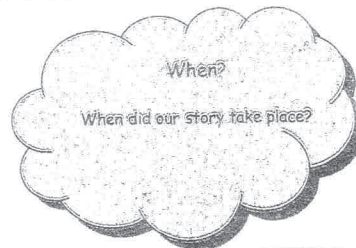
IDEAS

4. Ask each other questions
5. Share ideas
6. Writer uses the bubbles to record the answers

"The Monster"



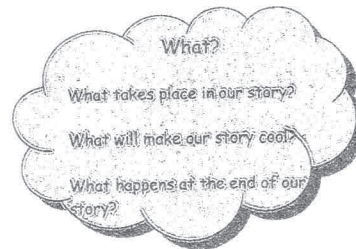
WOW words:



WOW words:



WOW words:

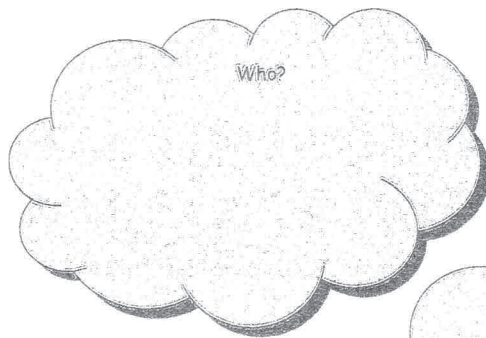


WOW words:

Names:.....
Date:.....

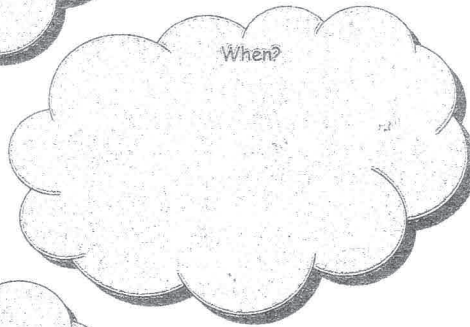
Story Title:.....

IDEAS & WOW WORDS

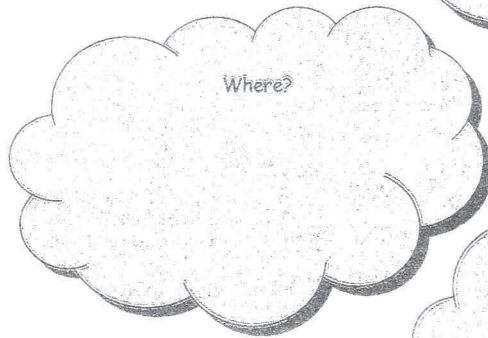


WOW words:

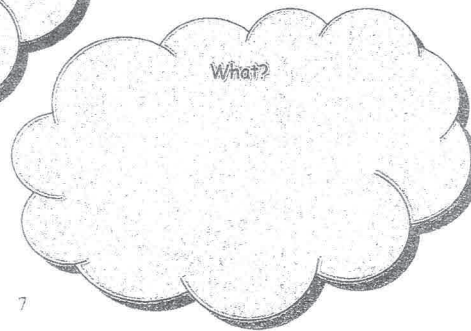
WOW words:



WOW words:



WOW words:



WOW WORDS

WHO



HOW



WHEN



WHAT



WHERE



PAIRED WRITING



Speaker and Writer

Decide who is going to be the Speaker, and who is going to be the writer.
Change roles half way through the story

Speaker tells Writer what to write (use double line spacing)



First Sentence

Think about Openers



Writer and Speaker remind each other to:

- Remember to Think about WOW Words
- Remember to Think about Connectives
- Remember to Think about Openers
- Remember to Think about Punctuation
- Remember to Think about Paragraphs

* * *

Remember, to ask each other questions

READ

Writer or Speaker reads the story - make
it sound exciting



Remember, praise for work and effort is
important

EDIT



Speaker and Writer edit Draft together

Together highlight VCOP words:

Vocabulary
Connectives
Openers
Punctuation

Together think of better VCOP ideas



Write new ideas on page



EDIT

Improving Your First Story

For each step of editing 1st writer asks 1st speaker and then 2nd writer and 2nd speaker to do the following.

Highlight WOW Words.

Is this the best word we can think of?

Can we think of a better word?

* * *

Are there any other changes we can make to improve our story?

EDIT

Improving Your Second Story

For each step of editing 1st writer asks 1st speaker and then 2nd writer and 2nd speaker to do the following.

Writer asks Speaker to highlight Connectives.

Is this the best connective we can think of?

Can we think of a better connective?

* * *

Are there any other changes we can make to improve our story?

EDIT

Improving Your Third Story

For each step of editing 1st writer asks 1st speaker and then 2nd writer and 2nd speaker to do the following.

Writer asks Speaker to highlight Openers.

Can we think of a better opener?

* * *

Are there any other changes we can make to improve our story?

EDIT

Improving Your Fourth Story

For each step of editing 1st writer asks 1st speaker and then 2nd writer and 2nd speaker to do the following.

Writer asks Speaker to highlight Paragraphs.

Are our paragraphs in the right place?

* * *

Are there any other changes we can make to improve our story?

EDIT

Improving Your Fifth Story

For each step of editing 1st writer asks 1st speaker and then 2nd writer and 2nd speaker to do the following.

Writer asks Speaker to highlight Punctuation.

Do our sentences make sense?

Can we improve any of our sentences?

Are there any other changes we can make to improve our story?

EDIT

Improving Your Training Story

For each step of editing 1st writer asks 1st speaker and then 2nd writer and 2nd speaker to do the following.

Writer asks Speaker to highlight WOW words.

Is this the best word we can think of?

Can we think of a better word?

Are there any other changes we can make to improve our story?

Appendix 3 VCOP prompt cards

Ask each other to think about WOW words.

*The beautiful film star gasped as the handsome
photographer hurtled down the stairs.*

Ask each other to think about connectives.

*The princess changed her dress before she went to see
the king.*

The dog barked because a burglar came into the house.

Ask each other to think about openers.

*Although the school football team lost 0-5 the
Headteacher said they played well and the score did not
reflect their performance.*

*Without warning the frog jumped onto the princess'
pillow.*

Ask each other to think about punctuation.

The child's beautiful, golden ball bounced into the pond.

Appendix 4 Main intervention timetable

Intervention Timetable

<u>Date</u>	<u>Time</u>	<u>Diane</u>	<u>Maeve</u>	<u>Colleague</u>	<u>Class</u>	<u>Pairs A&B</u>	<u>Pairs C&D</u>	<u>Video recording</u>
31-Aug	11.30 - 12.25	Joint teaching of VCOP & introduce PAW and 1st story	Joint teaching of VCOP & introduce PAW and 1st story		VCOP & introduction to PAW and 1st story	VCOP & introduction to PAW and 1st story	VCOP & introduction to PAW and 1st story	
01-Sep	1.10 - 2.15	1st story	1st story (untrained)		1st story with Diane	1st story (untrained) with Maeve	1st story (untrained) with Maeve	XX
01-Sep	11.30 - 12.25	n/a	Continuation of 1st story		n/a	Continue 1st story writing	Continue 1st story writing	XX
02-Sep	1.15 - 2.15	n/a	Completion of 1st story		n/a	Completion of 1st story	Completion of 1st story	XX
07-Sep	11.30 - 12.25	Joint VCOP lesson & introduce training story	Joint VCOP lesson & introduce training story		VCOP lesson & introduction of training story	VCOP lesson & introduction of training story	VCOP lesson & introduction of training story	
07-Sep	1.10 - 2.15	Complete training story	PAW training	XX	Complete training story	PAW training	PAW training	XX
08-Sep	11.35 - 12.25	n/a	Training with story	XX	n/a	Work on training story	Work on training story	XX
09-Sep	1.15 - 2.15	n/a	Training with story	XX	n/a	Complete training story	Complete training story	XX

Intervention Timetable

<u>Date</u>	<u>Time</u>	<u>Diane</u>	<u>Maeve</u>	<u>Colleague</u>	<u>Class</u>	<u>Pairs A&B</u>	<u>Pairs C&D</u>	<u>Video recording</u>
14-Sep	11.30 - 12.10	Whole class training	Whole class training		Whole class training	Whole class training	Whole class training	
	12.10 - 12.25	Joint introduction of 2nd story to whole class	Joint introduction of 2nd story to whole class		Introduction of 2nd story	Introduction of 2nd story	Introduction of 2nd story	
15-Sep	1.15 - 2.15	Supervise completion of 2nd story with class	Supervise work 2nd story with selected 8		Complete 2nd story	Start 2nd story	Start 2nd story	XX
16-Sep		No project work	No project work		No project work	No project work	No project work	
21-Sep		Holiday	Holiday		Holiday	Holiday	Holiday	
22-Sep	11.35 - 12.25	n/a	Supervise work 2nd story with selected pairs		n/a	Work on 2nd story	Work on 2nd story	XX
23-Sep	1.15 - 2.15	Introduce PVTs here???	Supervise completion of 2nd story & introduce PVTs with selected pairs		Introduction of PVTs	Complete 2nd story & introduction of PVTs	Complete 2nd story & introduction of PVTs	XX
28-Sep	11.30 - 12.25	VCOP lesson & introduce 3rd story	VCOP lesson & introduce 3rd story		VCOP lesson & introduction to 3rd story	VCOP lesson & introduction to 3rd story	VCOP lesson & introduction to 3rd story	

Intervention Timetable

<u>Date</u>	<u>Time</u>	<u>Diane</u>	<u>Maeve</u>	<u>Colleague</u>	<u>Class</u>	<u>Pairs A&B</u>	<u>Pairs C&D</u>	<u>Video recording</u>
	1.10 - 2.15	Supervise completion of 3rd story	Supervise start of 3rd story	XX	Complete 3rd story	Start 3rd story & TAP	Complete 3rd story	XX
29-Sep	11.30 - 12.25	n/a	Supervise work on 3rd story	XX	n/a	Work on 3rd story & TAP	n/a	XX
30-Sep	1.15 - 2.15	n/a	Supervise completion of 3rd story	XX	n/a	Complete 3rd story & TAP	n/a	XX
05-Oct	11.30 - 12.25	Introduce 4th story	Introduce 4th story		Introduction to 4th story	Introduction to 4th story	Introduction to 4th story	
	1.10 - 2.15	Supervise completion of 4th story	Supervise start on 4th story	XX	Complete 4th story	Complete 4th story	Start 4th story & TAP	XX
06-Oct	11.35 - 12.25	n/a	Supervise work on 4th story	XX	n/a	n/a	Complete 4th story & TAP	XX
07-Oct	1.15 - 2.15	PVTs with class	PVTs with selected pairs		PVTs	PVTs	PVTs	XX

Key:

~~Working in classroom~~

~~Provisional - still to be confirmed~~

n/a = Not involved with the Intervention Project

Appendix 5 Parent consent form

Letter – August 2009

School address, telephone numbers, website address and email contacts removed

Dear Parent

Writing – Research project at Primary 6/7

I am the Educational Psychologist for [redacted] Primary School and also an English teacher, (registered with the General Teaching Council to teach in Primary and Middle Schools). I am currently embarking on a research project involving paired writing. This project will form part of my doctorate studies at the University of Newcastle. During this time I shall be working closely with the class teacher and also, for some of the sessions, a colleague who is also a teacher. An aim of the project is to develop a writing programme to improve children's story writing skills.

The Head Teacher of [redacted] Primary School is enthusiastic about this project. She has given her approval, as have my supervisors within the Department of Educational Psychology at the University of Newcastle.

In this writing programme, which takes place over 6 weeks, the pupils are put into pairs to support each other to plan, write and edit their stories. It is intended that all Primary 6/7 will participate in this writing scheme which is designed to improve writing skills and confidence. Eight children will work with me and receive additional teaching sessions over the six week period and be part of the study.

Some of the writing sessions will be video taped. The children will be videoed as they plan, write and edit the stories, when they are completing their work sheets and when I am discussing their work with them. The video-tapes will be held confidentially and securely for five years after the end of the study and subsequently destroyed. The data collected from the video tapes will be transcribed and analysed. Any observational information gained from the videos will also be treated as confidential and will be held securely. All participants' identities will be anonymised in any reports of the study.

Your child has been chosen for the group but before he/she can take part, it is necessary for you to consent to their involvement in the project. If you agree I will explain to the children how the project operates and what their involvement will be. I will also make it clear that their participation is voluntary and they are free to withdraw at any stage. Should they decide to withdraw, all their raw data collected will be destroyed and will not be used in the study.

I shall contact all parents at the end of the writing programme in order to give a first hand report. In addition I shall supply written details of the results when I have finished the project together with my contact details should you need to contact me in the future. I shall be pleased to supply further details if you would like to contact me at [redacted]

If you agree to your child's involvement in the project I would be grateful if you could complete the enclosed form and return it to the school office as soon as possible.

Yours faithfully

Maeve Gold
Educational Psychologist for

[redacted] Primary School

Letter – August 2009

School address, telephone numbers, website address and email contacts removed

Consent Form

Paired Writing Project –

Primary School, Autumn Term 2009

I give permission for my child..... to participate in the paired writing project to start in August 2009. I am aware that my child will be working with the Educational Psychologist, Maeve Gold and her colleague, and that video recording will be used.

Signed _____ (Parent/guardian)

Print Name _____ Date _____

Head Teacher

Letter – March 2010

School address, telephone numbers, website address and email contacts removed

Dear

Paired Writing Project

I trust I have kept you informed about the project and that you received my written report which I sent to you before Christmas.

I was delighted with the increase in motivation, confidence and standard in writing which all the children showed. The next stage is the write up of the project. This involves the detailed analysis of the video tapes and will be a lengthy process. I wanted to ensure that you are fully aware, as previously mentioned, that I will be analysing the interactions between the pairs of children and the results will be anonymised before they are included in the write-up.

You have kindly given your permission for the children's photos in the presentation on display, in the school, to be included in the thesis. In addition, I would like to make a poster using the photos and text from the display which would be then displayed both in the school and in Education Buildings in Edinburgh.

Yours sincerely

Maeve Gold, Educational Psychologist for

Primary School

Consent Form

I have read the above and I am happy that Mrs Gold has explained how the analysis will be documented in her thesis; that the results will be anonymous. I also consent to photos and extracts from the project being reproduced in Mrs Gold's thesis and in poster form.

Sign _____ Date _____

Name _____

Appendix 6 Pupil progress report

Example of pupil's progress report

A's confidence has increased during the PAW sessions. At the start of the programme she was happy to rely on her partner to do much of the work but she has now started to make some good contributions of her own. Her work shows that she has good ideas and she has shown that she can write using a range of interesting words.

A must plan her work with care and take time to work out what she would like to say. I would like to see A continuing to check her work and take particular care with punctuation.

I have been pleased with the progress that A has made during the early part of the Peer-Assisted Writing programme. A has shown that she can produce exciting and thoughtful stories. A has also shown that she can work well with other pupils and shows consideration for their thoughts and views.

Appendix 7 Example of marking criteria

West Dunbartonshire Council
Raising Standards in Writing

Aug 09
Dec 09

LEVEL C

For Level C2 and above script must be approximately 200 - 250 words or more.

1.	Can use interesting and varied word choice (MUST pick up on ' <i>ambitious</i> ' from B1 and use a minimum of three examples)		
2.	Can extend sentences using a wider range of connectives to clarify relationships between points and ideas (e.g. when, until, if, after, while, also, as well, although, before, besides...).		✓
3.	Can consistently vary sentence openings to interest the reader. (Must be more than simple pronouns)		✓
4.	Can use sentence punctuation accurately: full stops, commas, and question marks. (Pupils may be experimenting with other punctuation although use may not be accurate including exclamation marks, inverted commas, ellipsis, dashes, brackets and apostrophes).		✓
5.	Can spell most common words accurately. (Fry's List and/or High Frequency word list.)	✓	✓
6.	Can use phonetically plausible strategies to spell, or attempt to spell, unknown polysyllabic words.	✓	✓
7.	Can develop and extend ideas logically in sequenced sentences (may still be very detailed or brief).		✓
8.	Can use a designated form appropriately and consistently (e.g. letters – formal and informal, reporting, diary, dialogue) to suit purpose	✓	✓
9.	Can develop use of adjectives and descriptive phrases for detail and emphasis (consciously selects the adjective for purpose, rather than using a familiar one e.g. – 'the big Billy Goat Gruff').		✓
10.	Can make writing lively and interesting as appropriate to the genre by consciously attempting to vary sentence length.		✓
11.	Can adapt chosen form to interest the audience (e.g. by providing information about character or setting or making a series of points.)		✓
12.	Can link ideas and events in a clear sequence, using strategies to create 'flow' (e.g. last time, also, after, then, soon, at last, another thing, as well as, to add to this, later, firstly, lastly, often ...).	✓	✓
13.	Can use some words which are appropriate to the genre (e.g. to express feelings and emotions -may be implicit- in personal writing, the use of formal language and appropriate terminology in functional writing.)		
14.	Can usually use correct grammatical structures in sentences (nouns and verbs generally agree).		✓
15.	Can produce work which is organised, imaginative and clear, including beginning to attempt paragraphs (e.g. beginning, middle, end; letter structure; dialogue structure).		✓
16.	Can use accurate, consistent and neat handwriting, (can consistently use upper/lower case, ascenders/descenders, size and form) and is beginning to use linked script.		
Total Score:			4/16 13
Level:			C1 C3

ASSESSMENT THRESHOLDS:

5 - 8 = C1

9 - 12 = C2

13 - 16 = C3 / Assess for Level D

Appendix 8 Example of pupils' work

24.08.09

20 Mrs

In the summer holidays I went to Mull and Iona. First I went camping in Mull and I was there for a week and one of the days I went to Iona. It took 1 hour to reach the end of Iona.

07.12.04

Mr Mos

I am writing to you about what happened to me and my class just before we started to go to Orlando, Florida. We went to the high school to do some science. It was fun because we were allowed to play with liquids and fire. My group were myself, [unclear] and [unclear]. When I had a fire on a lollypop stick the man said I had to put it in a test tube. The first time I went pop the second time I had to blow the flame out then stick it in and it relit. A week before we started swimming lessons at the high school. This year we had a demonstration of all the stuff we learned from Mrs [unclear]. Every day we went we had to swim for 4 minutes for 3 weeks. It was all work but on the last day we played all the time. The funny thing was when Mrs [unclear] put on her swimsuit and dived with us. Mr [unclear] and [unclear] were on a boat. Mrs [unclear] came up from underneath the water and tipped the boat over which meant that me and [unclear] brought salt off and at the same time all the boys including me and [unclear] were playing baseball. I throw a ball to the back of my head. Everyone who was playing

is. Game was laughing so was I. We are
waiting for arc swimming
activities. Last week we done a walk for
charity called 500 miles. Then after that
we went to a art bus outside it was
missing you but still happy to be me
hope you enjoy orlando, Florida.

Yours sincerely

P617 DT

2008-09

2408-09

Dear Mrs
Summer Holidays

I am writing to tell you about the
I went to Kings Ln

7/2/09

Dear Mrs.

Dear you in joying your retirement because we are missing you but Sharlay Mrs will be just as good as you.

We went to the night school to do science with Lyquits and Jyer and we where talking about brothers and sisters if the sciences teacher knows them he knows my brother but he did not know my sister so I said that is ok she dose not do science so he said I will tell him that you have been in hear I said ok but then we had to go back for lunch but I wanted to stay when we got back we had to go to lunch in to with Sreasan.

I thing Mrs will be as good as you but you are the best something else we have to bring our shoes up and put them in the classroom and we have to bring our jacket up store to in if we get our jim shoes on and we have to get bath down the store to point over jacket back and we went to the night school to do summer but I must hast off it

Yours sincerely Ly