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Very young children's reflections as indicators of metacognition.

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Very young children's reflections as indicators of metacognition

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Thesis submitted for the Degree of

Doctorate in Education

Durham University

2017

Declaration

This thesis is the sole work of the author and has not been submitted to any other institution or for any other previous qualification. References to the work of others have been appropriately acknowledged.

Statement of copyright

Acknowledgements

I would like to thank the children, staff and parents of the participating schools, without whom, this research project would not exist. Their enthusiasm for learning and eagerness to take part was inspirational and touching.

I would also like to thank my supervisors, Professor Lynn Newton and Professor Douglas Newton who provided much needed guidance, advice and understanding.

My colleagues, friends and family similarly deserve acknowledgment for their encouragement and belief in me, which has at times been my key motivation.

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Glossary of abbreviation

BSc   Batchelor of Science

C.Ind.Le   Child Independent Learning checklist

ECERS-3   Early Childhood Environment Rating Scale-3

EPPE   Effective Provision of Pre-School Education

EY   Early Years

EYFS   Early Years Foundation Stage

FD   Foundation Degree

FE   Further Education

FS   Foundation Stage

HE   Higher Education

LEA   Local Education Authority

MA   Master Arts

MCK   Metacognitive Knowledge

MCK-K   Metacognitive Knowledge-knowledge

MCK-S   Metacognitive Knowledge-self

MCK-U   Metacognitive Knowledge-understanding

PGCE   Post Graduate Certificate Education

REPEY   Researching Effective Pedagogy in the Early Years

SEN   Special Educational Needs

VSRD   Video stimulated recall dialogues

Abstract

Research title: Very young children's reflections as indicators of metacognition.

This study explored the relationship between young children's reflections and their metacognitive knowledge (MCK). Whist there is reluctance to accept that metacognition and reflection are skills possessed by young children, the Early Years (which is the context of this research) is considered to be crucial in determining a range of outcomes for children and the foci for many early intervention practices. The objective of this mixed methods research was to examine young children's reflections qualitatively and using quantitative data to explore whether any relationships exist between their reflections and their metacognitive knowledge. Initial findings from the analysis show that these children reflected on a range of different topics, in different dimensions of time and possibly used different styles of reflection. Their reflections contained categories of metacognitive knowledge behaviour, especially metacognitive knowledge of self. Findings also appear to suggest that differences between children's reflections on objects and their metacognitive knowledge behaviour may not be explained by chance.

Summary of chapters

This thesis comprises of several chapters which provide a transparent account of the research processes. Chapter 1 gives an introduction to the research and contextual information, which offers opportunity for the reader to explore the relationship that I have with the research approach adopted. Chapter 2 summarises my search of relevant literature. Focusing initially on the social constructivist perspective of child development, This section will illuminate how the basic tenets of this philosophy align with my own perspective towards child development, my research design and later how social constructivism might help interpret identification and discussion of young children's metacognitive knowledge and reflection. I also provide an analysis of recent research which has explored the concepts of young children's metacognitive knowledge and reflection. It is intended that this chapter will illustrate what is currently known about the topic areas and identify gaps within the knowledge. I also used this search of the literature to define the key constructs used in the study. Chapter 3 is an account of and rationale for choosing the methodological approach adopted. I describe the actual research process, how the methods and approaches were executed and adapted. The intention here is to offer transparency, not with the aim of it therefore being repeatable, but to allow for the debate about robustness, as well as any potential limitations of the research. Chapter 4 highlights the results of the research and Chapter 5 provides the analysis and discussion of my findings. The final chapter, Chapter 6, offers my conclusions, identification of the limitations and reflections on the process.

Chapter 1: Introduction to the research.

1.1 Introduction

It is the intention of this chapter to introduce you to my research and its general aims and findings. I will provide a contextual academic overview of the key concepts which are metacognitive knowledge and reflection, by drawing upon research and literature. I also offer a discussion of my own professional and academic background to foreground my report, mindful of the fact that all research, when begun is immediately influenced by the context of the research and researcher (Thomas, 2013).

1.2 General aims and key findings

My general research aims were to:

- Explore young children's metacognitive knowledge behaviour
- Examine young children's reflections

The above research aims illustrate the general direction and broad context of my research which was a small scale research project that explored the relationship between young children's reflections and their metacognitive knowledge (MCK).

My specific research aims are below, though discussed again in Chapter 3:

- Use a mixed method approach to explore the relationship between young children's cognitive reflections and their metacognitive knowledge behaviour.

- To investigate if the type/mode of such reflection influences one or more particular aspects of metacognitive knowledge behaviour.

From the outset I felt that metacognition, specifically metacognitive knowledge behaviour was an interesting area; it is current and to some extent contentious. There is unquestionable interest both nationally and globally, in the abilities of very young children, evidenced by the growing amount of research activity in this field, proliferation of research journals specialising in both Early Years education and cognition, and references to thinking skills and learning to learn across different curricula.

My study is based on the previous work of Whitebread et al (2009) who established that young children demonstrated metacognitive behaviours and that they demonstrated this behaviour when an adult was present, possibly because the adult encouraged reflective activity (Whitebread et al, 2009). This suggestion aligns with the social constructivist perspective, which emphasises the significance of interactions between a learner and others (Pritchard, 2014).

My findings concur with the work of other researchers in the field, who state that young children do show metacognitive knowledge behaviours (Annevirta and Vauras, 2006, Larkin, 2006, Marulis, et al., 2016, Robson, 2016, Veenman and Spaans, 2005 and Whitbread et al, 2007, 2009), however I found no significant relationship between gender and metacognitive knowledge. My findings appear to reveal that children's reflective utterances had a specific focus in relation to topic and time and, that children potentially have a particular reflective style. There was some correlation between some of the reflective topics, principally objects, and children's metacognitive knowledge behaviour. Finally, I found that

the learning environment influenced the amount of reflective talk and metacognitive activity within the classroom.

1.3 Introduction to key concepts within this study

Metacognition is to some degree a contentious term, first introduced by Flavell (1979). It is defined as a process during which an individual thinks about his or her own thinking and learning. Metacognition is usually described as consisting of two components: metacognitive knowledge (MCK), and, control or application of metacognitive knowledge through monitoring and regulation (Shamir et al, 2009). The debate surrounding metacognition is complex, as researchers, psychologists and educators postulate its structure, individual components and how it can be measured. To add to the confusion, metacognition and self-regulation are terms often used inter-changeably (Dowling, 2013). Despite this interchangeability, I have focussed on metacognitive knowledge but not on self-regulation, to ensure that the research project remained feasible, given the time available.

There are, in fact, many different definitions of metacognition and metacognitive knowledge, which are discussed in more depth in Chapter 2. It is important however, to stipulate which definitions I have used for this study to avoid any misunderstanding and to ensure clarity.

The definition adopted by this research is that identified by Whitebread et al (2005b):

Metacognition and self-regulation are made up three aspects:

1. *metacognitive knowledge*

2. *regulation of cognition;*

3. *motivational and affective aspects* (see Figure 2.1 in Chapter 2).

It was never my intention to add to the debate about the nature of metacognition or its relationship to self-regulation, rather I intended to explore specifically metacognitive knowledge (MCK), one of these three aspects of metacognition. I have used the concept definition for MCK provided by Whitebread et al. (2005b), because they offered clear descriptions for each category or aspect of MCK and these researchers had devised a framework of metacognition (Appendix 1) and a tool for identifying these behaviours, known as the Child Independent Learning checklist (CIndLe) (Appendix 2). A more detailed discussion and critical evaluation of these categories of MCK and the strengths and limitations of the framework and tool is provided later in Chapter 2.

The definition of metacognitive knowledge (MCK) therefore adopted for this research is that provided by Whitebread et al (205b) which refers to:

the individual's knowledge of their personal strengths, weaknesses and preferences (personal), knowledge about the task attributes (task), and knowledge about strategies and procedures (strategies) (Flavell, 1979) as well as knowledge of environmental features that facilitate learning (Pintrich, 2000) (see Figure 2.2 in Chapter 2).

Reflection is the second key concept relating to this study. It stems from the Latin word 'reflectere' (De Vries et al 2005), and is attributed to the work of Dewey (1933a) who stressed its significance for personal and intellectual

growth. Like metacognition, it has a number of definitions and is informed by several theoretical viewpoints (Williams and Grudnoff, 2011). Several definitions are discussed in more depth in Chapter 2, but most allude to it as a process which involves gaining knowledge from experiences. Whilst there are many definitions of reflection, I wanted one which could especially relate to children, so I have based the definition below on that of Epstein's (2003).

Reflection is '***the conscious thought processes in which a child begins to identify and use knowledge from their experiences***'.

As noted earlier, reflecting was referred to by Whitebread et al (2009) as a potential factor influencing young children's metacognition, though many others have acknowledged a relationship between these two key concepts. More explicitly, however, reflection, according to Chernokova (2014b) and Desautel (2009), is the difference between cognition and metacognition; metacognition being the conscious reflection by a child on their own thinking processes (Morgan, 2007). I have attempted to illustrate this relationship between metacognition and reflection diagrammatically, later in Chapter 2 (Figure 2.2), but offer below a brief discussion to illustrate some of the literature which refers to this.

Mercer and Howe (2012) claimed that engaging learners in reflective discussion promotes learning, constructs understandings and develops independent learning skills, akin to metacognition. Brunton and Jeffrey (2010) described reflecting as a qualitative technique that can provide insight into how competencies such as metacognition are applied and it can act as a guide to behaviour and attitudes of individuals. This affective dimension to reflective practice was referred to by Mezirow (1998) as 'introspection'.

Considering reflection from a social constructivist perspective, Palinscar (2005) suggested that assessing or attending to young children's reflections can lead to greater knowledge of a child's Zone of Actual development and their Zone of Potential development. Indeed one of the purposes of listening to children's reflections could be to monitor aspects of metacognition which aids teachers' awareness of children's knowledge, provides them with feedback which in turn will assist them in aligning teaching and learning opportunities which are child centred (Moon, 2004).

Alterio (2004) states that narrative based experiences such as reflective dialogue which can be adult or child initiated can create new knowledge and transform self-image. Children therefore who can reflect on their own social world and skills are more likely to reflect on academic tasks which could promote and support metacognitive knowledge (Prescott, 2001). Working in the Early Years, practitioners can strategically adopt reflective dialogue techniques which will scaffold children's metacognitive development at the same time as valuing their sociocultural backgrounds. The context and background of these children are diverse and are becoming increasingly complex as they are immersed in a constant flow of information both within and without of school (Engstrom, 2005). Providing children therefore, with the opportunity to reflect on their environments at home and at school and the opportunity to critique their activity will enable them to reframe the context of their learning, breaking down any potential barriers between school and home (Engstrom, 2005). This awareness of context aligns with Whitebread at al's (2005b) aspect of metacognitive knowledge which relates to the child's awareness of how the environment facilitates learning.

In addition to acknowledging the relationship between reflection and context, metacognition and reflection both have a relationship with time. They each have a purpose in informing the present and how children engage with tasks but they can also guide a child's future concept of themselves as a thinker and learner (Desautel, 2009).

Dialogic processes of teaching and learning such as reflection are rooted in sociocultural theory and have been studied by many such as Kyriacou and Issitt (2008) who believe that quality teacher-student talk can enhance development of reasoning and improve academic performance (Mercer and Howe, 2012). This suggestion however implies that listening to children's reflections is more likely to be an adult initiated activity, which is slightly at odds with another perspective where reflective dialogues are considered an event which can '*honour the 'other' as an equal knower with autonomy and skill*' (Roche, 2011; 339). Whichever perspective considered, it is evident that even with explicit teacher intervention it cannot be taken for granted that all children will be able to talk about their own knowledge and 'mental activities' (Desautal, 2009), which makes 'listening' to reflection challenging.

The above discussion draws on a range of literature to provide an introduction to the main concepts within this research and the relationship between them. It sets the scene and highlights the significance of these aspects of young children's learning and development. I believe that in the context of what is already known, that my research contributes to the debate and offers further insight into the potential relationship between metacognitive knowledge and reflection, but more importantly, I hope that it motivates Early Year practitioners to find time and space for listening to young children's reflections. In addition to

this academic knowledge however, my research has also been informed by other factors which are discussed below.

1.4 Contextual factors

- Current climate within education

All research is influenced by the social, economic and political factors of the time (Thomas, 2013), and educational research has been the subject of much debate and influence. It is appropriate to note that this research will similarly be influenced by contextual factors, including the current climate within education. I discuss this in more depth later in this Chapter; though take this opportunity to briefly discuss how the climate within education in the UK has changed throughout the last twenty to thirty years.

Education in the UK has endured increasing scrutiny as chools and communities have been identified by policy makers and various political parties as the conduit for social change and improving the outcomes for individuals. This attention has been driven by the ambition of governing political bodies, who have striven for educational policy and practices to be evidenced based (Pollard, 2007). However, where and how this evidence is obtained continues to be contested. Some would say that this evidence should be generated through quality educational research, undertaken by a range of different professionals. Increasingly though, it is more likely that the research evidence considered by policy makers to be the most credible, is that funded by programmes such as the Teaching and Learning Research Programmes (TLRP) (Pollard, 2007) and

more recently the Education Endowment Fund (EEF), which themselves have links to the policy makers.

An example of this is illustrated by the need for schools to measure the impact of pupil premium funding, which is funding given to schools to support specific groups of children. Feeling under some pressure to measure how these funds are improving the outcomes for children, schools may resort to spending funds on 'tried and tested' interventions such as those identified within resources created by the Education Endowment Fund (EEF). As mentioned above the EEF is an organisation which funds research, devises tools to evaluate research and resources and intervention strategies for schools to buy to maximise impact (Education Endowment Fund, 2018). It was established by the Sutton Trust in 2011 but, it is partly funded by the Department for Education. It states on its website that it is the government-designated 'What Works Centre for Education' (EEF, 2018); a bold claim. Critics could suggest that this claim creates a culture of performativity and one which reduces children within schools to quantifiable objects, all in the name of educational research.

Prior to the creation of the TLRP and the EEF however, a rather damning lecture given by Hargreaves (1996) suggested that teaching could be more effective if it became a research-based profession, but that significant changes would need to be made for educational research to be considered 'worthwhile'. Ironically, what is considered to be 'worthwhile' research could now be influenced by the consumers of the research themselves. Consumers are arguably looking for knowledge or a quick fix solution, such as how to improve outcomes for children receiving pupil premium; which potentially reduces research output to a commodity. This, according to Brown (1994), suggests that

consumers can influence the function of the research, as the researchers are persuaded to undertake enquiry where the results are what consumers want to hear. Whilst I cannot claim that my research is impervious to these issues but hope that the nature and authenticity of it has ensured that my findings are of value to those working with very young children.

The above discussion regarding education would once have been irrelevant when discussing very young children in the UK. However, very young children now typically attend some form of preschool education or care from age two or even earlier. In the UK there are different types of Early Years provision such as private, voluntary and independent care providers and maintained schools, all of which are closely regulated and monitored. This scrutiny has created what could be described as a performative environment, described by Ball (2013) as a regime in which individual performance becomes a measure of that individual's worth. Ball was in fact referring to teachers within the context of education, but it is not a huge leap to apply this notion to a child within the classroom, where young children are measured and assessed by EY practitioners.

To support or guide those working with young children, a wave of policies and guidance has been created. Practitioners are instructed within curricula and guidance documents, such as, the Early Years Foundation Stage and the recently revised National Curriculum, how to assess children and what milestones or targets children should be reaching by certain key stages. They are encouraged to recognise young children as autonomous, independent learners, capable of metacognition and self-regulation. This guidance reflects the philosophy of social constructivism as teachers and Early Years educators

are seen as agents in creating environments where collaborative learning and metacognitive awareness are emphasised (Palinscar, 2005). The significance of these metacognitive skills is acknowledged as significant in the EYs but also from a lifelong perspective, as it is associated with children's immediate learning and development but ultimately their longer term outcomes and performance in school (Whitebread and Basilic, 2012).

- My background: Professional and academic

Another factor potentially influencing any research is the researcher themselves; his/her perspective, values, attitudes, skills and knowledge will play a part in influencing the design, execution of the research and, significantly the interpretation of the data gathered. The researcher-research relationship is interpersonal and this subjectivity ought to be examined (Tashakkori and Teddlie, 2012). Therefore some background information about my professional and academic development will help a reader to identify the potential reflexivity within this research.

Using the analogy of a journey, my academic and professional journey began with a BSc degree in Chemistry from Kings College, London University, before embarking on a training career as a Chartered Accountant. Whilst I enjoyed the academic aspect of this training and the relationships with colleagues, I left to pursue a career in sales and accountancy recruitment. This culminated in me managing two city centre offices and a significant client portfolio. I left work to start a family, not anticipating that this would lead to second career. My second career involved establishing and running voluntary community groups such as toddler groups and sessional pre-schools and retraining as an Early Years educator. This rewarding experience then led to a third career, where I have

worked in further (FE) and higher education (HE) as a Lecturer in Early Years practice for seventeen years.

Alongside this professional development, I pursued academic qualifications, completing a level 3 qualification, a Diploma in Pre-School Practice. I went on to do a Post Graduate Certification Education (PGCE) (Post-Compulsory Education and Training) and subsequently a Master Arts (MA) Early Years. I completed the MA Early Years in 2011, and as part of this, began to undertake academic research, which focussed on practice. I examined practitioner's use of reflection within Foundation Degree (FD) programmes across two distinctly different disciplines; Early Years and Business. My findings showed that the participants on both programmes felt supported in the development of their reflective skills but identified opportunities for improvements to both teaching and learning. I also established that participants considered that a more collaborative approach to assessing reflection could enhance its development. Significantly there was a difference in views in relation to reflection being concerned with the views of others, with the FD in Early Years students appearing to show a greater awareness of this than the FD Business students. This research had a positive impact on the development of reflective practice across both of the degree programmes and led to the creation of an assessment tool which could be used for collaboratively assessing reflection. It also fuelled my interest in reflection and how it appears to be a skill used by some with confidence and ease, and for others, one which is challenging. This experience was valuable in terms of knowledge gain relating to the processes of research, as well as the preferences of student groups when being asked to undertake reflection.

I started doctoral study in September 2011 and have enjoyed designing and executing this mixed methods research into young children's metacognitive knowledge and in particular their use of reflection. I set out to examine children's reflections, and to explore whether there are any relationships between reflecting and metacognitive knowledge. Doctoral study was commenced for personal reasons, however, since beginning to work as a University Lecturer; it has also become a vital aspect of my role as an academic.

As already discussed, the landscape and climate of education over the last few decades may have influenced this research. Research could now be considered desirable and an expected activity for a range of professionals, including lecturers and teachers. It would appear that the current political landscape within HE portrays high impact research activity and engagement as being that of a 'gold' standard. However, when I commenced this doctorate there was no expectation or incentive for me to do it, other than for myself. The recent changes within my role, and specifically in HE, now offer a different panoramic view. I now need to demonstrate successful research engagement and activity, in recognition that appetites within academia have changed.

I would describe myself as an early career researcher. However, I believe that during the six years as an Early Years practitioner I regularly carried out action research as I sought to establish and develop Early Years practice to keep up with what was then, a dramatically changing, educational landscape. This period of time saw the rise of managerialism, and performativity and regulation became the drivers of practice and to some extent professionalism. Research in

this climate was responsive and very local which felt worthwhile and authentic. However it was usually informal and not disseminated.

Teaching in FE and HE at that time was similarly challenging, as funding mechanisms were reviewed, which led to pressure on teaching staff to retain students and ensure high levels of attainment. Reid (2009) argued that changes within HE have seen HE Institutions (HEI) being increasingly managed as though they were businesses. This, inevitably, lead to an increase in teaching hours and an increased focus on the curriculum content rather than empowering student and staff to undertake exploratory research.

In addition to this, the climate in the Early Years changed dramatically as New Labour sought to reform the work force. Individuals were offered financial bursaries to take qualifications in order to up skill the Early Years' workforce and increase the quantity and quality of Early Years provision. Research came back into focus, as many of the changes were purported to be based on large scale research projects such as Effective Provision of Pre-School Education (EPPE) and Researching Effective Pedagogy in the Early Years (REPEY). For practitioners, being able to examine existing practice and to look at the guidance and regulatory requirements through theoretical and practical lenses was vital and action research as well as reflective practice became an essential element of everyday practice.

This thesis is presented as the product of my part time Education Doctorate at Durham University. I began studying in 2011, though the research phase did not commence until 2013. It is the product of a lengthy, small scale, mixed methods research project which intends to contribute to the debate about young children's metacognitive knowledge. This research stretched and challenged my

own knowledge and skills as an early career researcher. As an Early Years practitioner I had an ambition to research in this field. I envisaged that this research would generate an opportunity to explore 'what was going on' and that my findings would provide insight and possible guidance for effective practice for those working in the Early Years and supporting metacognitive knowledge (MCK) development in young children. I also hoped that the knowledge gained from the process would transfer into my current role as Lecturer and Manager within a Higher Education (HE) establishment.

1.5 My worldview

I believe that this combination of academic and professional knowledge, experiences and drivers underpins my epistemological stance in relation to knowledge. Appreciating the complexity of humans and desiring to make sense of their views and contexts, persuades me that a qualitative approach to research and educational enquiry is both valuable and robust. However an underlying appreciation of the story and implications that statistical and numerical data offer in a quantitative approach is an added dimension, which I believe complements the qualitative approach. Arguably the emergence of mixed-methods approach therefore has deconstructed the hypothetical barrier that separates the two methods. A mixed method approach allows me to explore and immerse myself in the layers of data and to interpret these from the different paradigm positions. I would describe myself as a pragmatist and as such, an obvious approach to take when deciding on a research approach is to consider what I want to look at and explore and to use tools which are appropriate for that journey (Flick, 2015, Johnson, Onwuegbuzie and Turner,

2007). 'What works' seems to be a sensible attitude (Flick, 2015) and I feel that whilst some knowledge may be 'fixed' or out there and seen as indisputable, how we interpret and relate to that knowledge is subjective, and from that perspective, more exciting Educational research however is a contested practice (Bassey, 2007, Carr, 2003).

1.6 Conclusion

This chapter identifies the general aims of the research and offers a brief account of my main findings. It elucidates the background to the study by identifying the key concepts being explored, the relationship between them and how these are currently perceived within the literature. Potential contextual factors which may have influenced the design and execution of the research are acknowledged. I intended this Chapter to provide transparency and an insight into my journey and set the scene for the following chapters, which will illuminate further the key concepts to be examined through a review of relevant literature, describe the research methods and process undertaken and discuss of my findings and conclusions.

Chapter 2: Review of the literature

2.1 Introduction

This chapter will review a range of literature, specifically relating to young children's metacognitive knowledge and their reflections. Firstly, however I will briefly discuss social constructivism, as this theoretical perspective underpins my research approach and current pedagogy across Early Years provision in the United Kingdom. Secondly, I will explore some of the literature on young children's metacognitive knowledge and reflection across a spectrum of texts. This review will provide an academic background and the context to my research. It supports the construction of my conceptual definitions and framework and it enables me to demonstrate the validity, relevance and authenticity of my study.

2.2 Social Constructivism

The development of theoretical perspectives relating to cognition can be traced back centuries. Social constructivism is one such perspective and it is the focus of this review, as it reflects the philosophical nature of this research, the epistemology of the researcher and there are parallels between this approach and the concepts being examined. Social constructivism generally attributed to Vygotsky, who was a Russian psychologist and academic in the early 19th century (Dowling, 2013), is based on the belief that thinking extends beyond the mind and it is linked with other minds (Berk and Winsler, 1995). Vygotsky offered a dialectical perspective of cognition (Daniel, 2005) and considered mental functioning to be a social event. He emphasised the importance of

interaction between a learner and others (Pritchard, 2014), stating in 'The development of the higher mental functions' (1960) that mental functions occur in two separate 'planes'; firstly between individuals, known as 'inter-psychological categories' and secondly as internal categories, or 'intra-psychological' (Daniel, 2005). It is these social interactions which mould an individual's thinking and their interpretation of them (Berk and Winlser, 1995). Vygotsky's theory also supported the notion that there are variations in the cognitive development of children and that those working with children require therefore an appreciation and knowledge of the child's social world (Berk and Winsler, 1995).

Vygotsky's theory encouraged us to focus attention on the process of cognition rather than the product (1978), emphasising the relationship between learning and development (Palinscar, 1998). He described the benefit of an adult or more knowledgeable other (MKO) being aware of a theoretical space, understood to be the gap between a child's Zone of Actual Development and the Zone of Potential Development. This gap between what a child can do unaided when solving a problem and the higher level of development seen when solving the problem with a MKO, he referred to as the Zone of Proximal Development (ZPD) (Daniel, 2005, Wood and Wood, 2009).

This concept is reflected in the contemporary educational practice of 'scaffolding' (Valsiner and van der Leer, 1988), a phrase coined by Wood and Middleton (1975) and Wood, Bruner and Ross (1976). Scaffolding is described as a style of interaction which promotes cognitive development and enhances attainment. It can include a range of adult or MKO activities including; collaborative problem solving, development of shared understanding

(intersubjectivity), promoting self-regulation, maintaining the child's focus on the task within the ZPD, and significantly, being warm and responsive towards a child (Berk and Winsler, 1995). There have been many attempts to clarify the activities associated with scaffolding but not all have considered the nature of the relationship or communication methods involved and some have focussed on single tasks (Wood and Wood, 2009). It remains a contested area, though most agree that it is the 'how' rather than the 'who' which impacts on the successfulness of the social exchange.

Another aspect of Vygotsky's theory is associated with language and symbol use. He purported that language is central to concept development (Palinscar, 1998), a view which contradicted to some degree that of Piaget. Piaget referred to a child's private speech (self talk) as being egocentric and evidence of a pre-operational mind (Berk and Winsler, 1995), whereas Vygotsky argued that private speech was useful for children when working through challenging tasks and that its primary focus was self-regulation. Some children use private speech simultaneously with actions, others, as reflections on their actions or even speaking about they are about to do (Berk and Winsler, 1995). Winsler and Diaz (1995) found that private speech was associated more with problem solving and academic activities than in other contexts. Vygotsky's work illustrated that private speech increases throughout the pre-school years, declining as a child starts school, becoming less intelligible as the child appears to abbreviate it and internalise their thoughts (Winsler and Diaz, 1995). He suggested that language begins within social interactions but it becomes a tool for thinking when children use it as a means of reflection (Vygotsky, 1978).

The whole ethos of social constructivism chimes with the recent drive towards increasing the metacognitive awareness of children, the promotion of collaborative learning and the role of teachers and Early Years educators in designing appropriate contexts for learning and facilitating learning and development by scaffolding (Palinscar, 1998). The approaches that teachers and Early Years educators take in developing metacognitive awareness and thinking skills often reflect social constructivist perspectives, though McGuiness (1999) suggests that there can be complications, as techniques can be either 'infused' (built into everyday situations) or 'discrete' (specific teaching of strategies). Interestingly, research by the National Foundation for Education Research (NfER) established that infusion appears to be more successful as it fosters a broader array of skills (Taggert et al. 2005), whereas a discrete approach appears to suggest narrower outcomes which do not appear to be transferable (Coles and Robinson, 1991).

Social constructivism has implications for assessment too, as assessment strategies which are more dynamic and prospective are required to measure performance of the children when they are guided by another who determines their potential to profit from that assistance (Feuerstein, 1979). This however, is at odds with the preoccupation with universal cognitive milestones evidenced with our schools today (Berk and Winsler, 1995). Despite this, social constructivism is considered by many to be relevant today and it is embedded within Western educational systems. It can also be used as a lens when critiquing practices, specifically those relating to intervention, progression and inclusion (Palinscar, 1998). For example, if a child or group of children do not appear to be making progress, we can consider if there is a misalignment

between the values, culture or communication practices of the child/group and those of the school?

There are relatively few criticisms of Vygotsky's work, with the exception of references to the influence of communist ideology, though context will be a feature and potential influence on any theory. Many compare Vygotsky's ideologies to those of other classical theorists but van der Veer and Valinser (1991) state that subsequent research has not led to any explicit appraisal of Vygotsky's theories.

2.3 Establishing the concept of metacognitive knowledge (MCK)

Introduction

Metacognition, a term first introduced by Flavell (1979), can be defined as a process during which an individual thinks about his or her own thinking and learning. Essentially it consists of two parts: metacognitive knowledge (MCK), and, control or application of metacognitive knowledge through monitoring and regulation (Moseley et al., 2005, Shamir et al, 2009). Since Flavell, others have striven to define metacognition and have placed varying emphasis on the degrees of either the mechanism or the process. For example, Paris and Winograd (1990) taking a process perspective stated that metacognition has two components which are self-appraisal and self-management of cognition. More recently Efklides (2008) broadened Flavell's two part original definition, which highlighted metacognitive processes and outcomes, to encompass further aspects of metacognition: knowledge, monitoring, strategies and skills.

This definition has similarities to that offered by Veenman and Spaans (2005) in the explicit reference to metacognitive knowledge and skilfulness.

To add to the confusion, metacognition and self-regulation are terms often used inter-changeably (Dowling, 2013). Flavell (1976) himself stated that cognitive processes facilitate learning and metacognitive strategies monitored the process, but he said that these two can also be interchangeable and can coexist. Whichever definition is adopted, Boekaert (1997 cited in Moseley et al, 2005) cautioned against an all-encompassing one, as this could result in weakening of the clarity of the construct. This notion is to some extent supported by a systematic review of literature concerned with research approaches intent on assessing metacognition by Gascoine et al (2016). They conclude by acknowledging that whilst the debate surrounding what metacognition is and how it can be measured may have widened, it is even more pertinent that researchers clarify definitions and key constructs to avoid any misunderstanding or misinterpretation (Gascoine et al, 2016).

Definition

The definition adopted by this research is that ***metacognition and self-regulation are made up three aspects: metacognitive knowledge; regulation of cognition; and motivational and affective aspects*** (see Figure 2.1 below) (Whitebread et al, 2005,b).

Figure 2.1 Components of metacognition and self-regulation
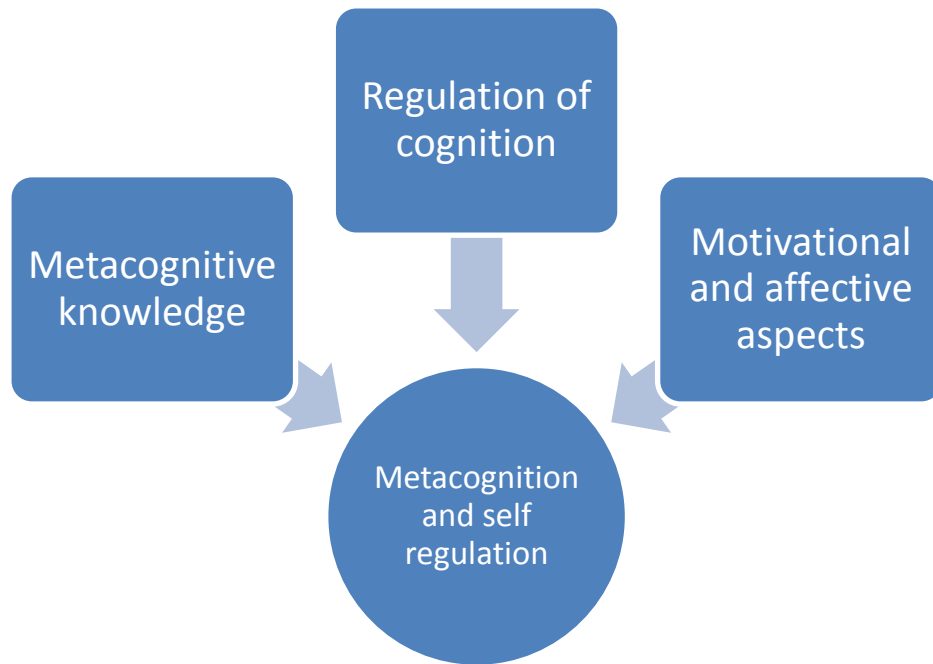
This is similar to the three component definition proposed by Efklides (2008), metacognitive knowledge, strategies and experiences.

As previously stated, the specific focus of this study will be on metacognitive knowledge (MCK), which, according to Whitebread et al. (2005b), refers to the individual's knowledge of personal strengths, weaknesses and preferences (personal), knowledge about the task attributes (task), and knowledge about strategies and procedures (strategies) (Flavell, 1979) as well as knowledge of environmental features that facilitate learning (Pintrich, 2000) (see Figure 2.2 below). Figure 2.2 below also shows the bi-directional relationship between metacognitive knowledge and reflection. Young children reflect on aspects of metacognitive knowledge, such as the task or a strategy which reinforces their metacognitive knowledge and having metacognitive knowledge, children use reflection to review their understanding and evaluation of the tasks and strategies.

Figure 2.2: Components of metacognitive knowledge (adapted from Whitebread et. al 2005b) and the relationship with reflection
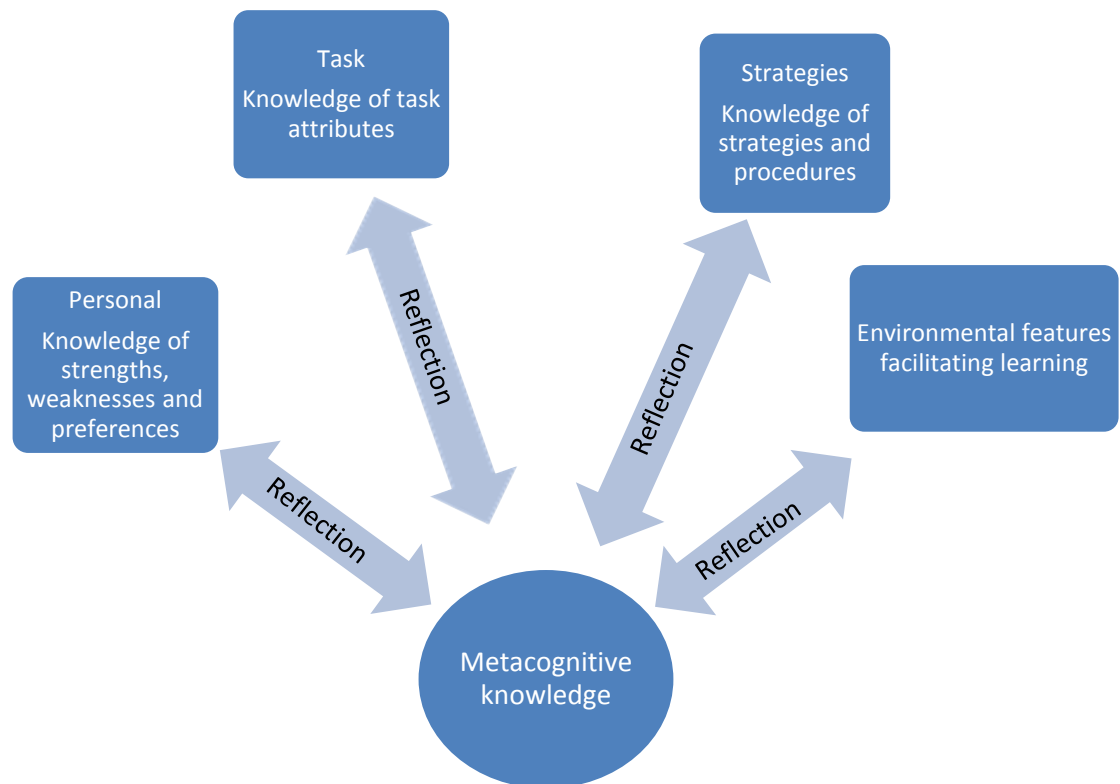
I have not focused on self-regulation within this study, to ensure that the research project remained feasible given the time available. I have used Whitebread et al's Child Independent Learning checklist of 22 independent learning behaviours (CIndLe) (Appendix 2) and their framework of aspects of metacognitive knowledge (Appendix 1) to collect and analyse data. The CIndLE categorises 22 independent learning behaviours across four aspects of self-regulation which were originally proposed by Bronson (2000) and many of which correlate to metacognitive behaviour. The checklist and framework are helpful in that they identify specific examples of children's independent learning and metacognitive behaviour, however Whitbread et al did not demonstrate how their 22 statements of behaviour were mapped to Bronson's categories of self regulation. Indeed they could also have offered a clearer explanation of the relationship between MCK and independent learning categories, rather than

appear to contribute to the continued acceptance of the interchangeable nature of MC and self regulation. I would also query why the fourth component relating to an individual's awareness of environmental features does not appear to be included within the framework or CIndLe.

That said, Neuenhaus et al (2011) similarly defined three aspects of MCK as consisting of: person - relating to self; task - relating to knowledge of the demands of a task; and, strategy - relating to knowledge of strategies. There are similarities between Neuenhaus et al's (2011) definition and that proposed by Brown (1987) and also Schraw (1998), both of whom subdivided MCK into three components: declarative knowledge- knowing about things and 'what'; procedural knowledge- knowing how to do things; and, finally, conditional knowledge- knowing about the circumstances and the why and when aspects of a task.

Existing literature

Reviewing the existing literature relating to MCK, it became apparent that there are many different studies concerned with the development of thinking skills and metacognition, mostly however concerned with older children. Cross referencing my initial literature search to a recent systematic review (Gascoine et al, 2016) confirmed that relevant and appropriate literature have been considered, though additional journals were examined. It has to be acknowledged that there is a scarcity of literature regarding young children which could be related to the debate about whether young children are even capable of experiencing metacognitive activity, a view often accredited to Piaget (1976). He, according to Flavell (1992), suggested that egocentrism is responsible for a young child's inability to be introspective, which is to think

about thought as an object. His 'reflective abstraction' theory stated that children need to be able to hypothesise, test, evaluate and to imagine different perspectives and outcomes to be able to reflect (Flavell, 1992), and this required formal operational thought, a process which he said emerges after 11-12 years of age. This view was reinforced by the work of Adey et al (1989) who found that girls aged 11 benefitted from intervention lessons incorporating metacognitive elements but not boys. Their findings suggested therefore that girls had acquired formal operational thought before boys.

Research which focused on younger children includes that of Doran and Cameron (1995) and more recently Chernokova (2014a) who found that whilst pre-school aged children started to develop metacognitive structures including metacognitive knowledge, this was not developed fully and was associated with their ability to reflect and communicate. A similar view to that was proposed by Larkin (2010). Chernokova (2014a) suggested that only dialectical thinking and verbally mature children were able to make long term strategic plans and therefore to construct metacognitive structures. The work of Bartsch et al (2003) found that by age four children could report procedurally what they have learnt with greater frequency than reporting on new knowledge. This work was based on young children's talk in a natural setting rather than an experimental one. Desautel (2009) and Annevirta and Vauras (2001) also noticed a difference between those children who could and those who could not talk about their metacognition, suggesting that verbal students had obvious 'ah ha' moments and quieter ones shared opportunities when talking to peers (Desautel, 2009). The findings from Desautel's study also showed that a good vocabulary helped children's development of metacognition, and that they needed opportunity to practice thinking about their learning (Desautel, 2009).

This apparent reluctance to acknowledge young children as being capable of metacognitive thinking may also be associated with their limited memory and to the research task complexity (Whitebread et al., 2009). The belief that metacognitive abilities do not emerge until eight years remains attributed to the early work of Flavell and colleagues who stated that before the age of seven children were unable to produce known memory strategies appropriately (Flavell et al, 1966). Brown however (1987) muddied the water by suggesting that Flavell's metacognitive aspect of knowledge of cognition is stable but age dependent as it requires the ability to 'step back' and to recognise their cognition as an object of thought. Once aware of their thought processes, a child will find it difficult to ignore them (Robson 2006). Brown (1987) also states that the second aspect, regulation of cognition, is the opposite as it comprises of an unstable activity which is age independent. A child can choose to adopt certain behaviours and to regulate them (Brown, 1987). This implies that age dependent metacognitive knowledge may be more measureable than metacognitive regulation, a perspective similar to Kuhn's (1999) who suggested that metacognitive knowledge is evident earlier than metacognitive skilfulness.

Whilst the debate remains regarding young children's ability to demonstrate metacognition (Gascoine et al, 2016), at the 2012 biennial meeting of the European Association for Research on Learning and Instruction (EARLI) Special Interest Group in Metacognition, it was noted that metacognition should be considered from a life span perspective (Cantoia et al, 2012). Indeed more studies are emerging which illustrate that younger children do show metacognitive behaviour (Annevirta and Vauras, 2001, Whitebread et al. 2007, 2009, Wall, 2008, Leutwyler, 2009). Further evidence to support the view that young children are more capable than first thought, also emerged when Adey et

al (1989) revisited their original work with younger children, five-six year olds. Having previously found that 11 year old girls appeared more able to demonstrate metacognitive thought that 11 year old boys, they found that even five-six year olds made significant cognitive gains, following intervention lessons, suggesting they too were capable of operational thought. In addition Gunstone (1994) stated that all students have metacognitive ideas and beliefs and the work of Lipman (SAPERE, 1982) found that primary school aged children were able to engage in philosophical thinking (Tanner and Jones, 2007). Even Flavell himself (1987) made the point that young children have a developing sense of self, are active cognitively and that this can lead to an increase in their ability to plan ahead.

The current challenge is perhaps how metacognitive behaviour is observed (Winne and Perry, cited in Whitebread et al., 2009) though the systematic review findings of Gascoine et al (2016) claim that at least eleven different methods to assess young children's metacognition have been identified from peer reviewed journals. One such journal reports on the study by Whitebread et al. (2009) who focussed on the development of self-regulatory skills and metacognition in children aged three-five years and suggested that there was evidence that children as young as three could show metacognitive behaviour, especially when involved in self-initiated activity within pairs or small groups. This two year longitudinal study involved over 1,400 children and videoed events which were analysed using a model based upon three areas of metacognition and self-regulation (Figure 2.1): metacognitive knowledge; metacognitive regulation; and, emotional and motivational regulation (Whitebread et al, 2009). The previously mentioned framework to assess these

areas of metacognitive knowledge and the Child Independent Learning checklist (C.Ind.Le) were designed and validated as part of this study.

The creation of this framework or model for metacognitive knowledge is helpful but ought to be considered through a critical lens or as Dinsmore (2017) suggests, a 'meta-theoretical' lens. Dinsmore (2017) cautions that models often neglect to specify the inclusive and exclusive nature of each category and rely on Cartesian Split Mechanistic Tradition (CSMT) assumptions. CSMT assumes that categories are separate and that development is linear, compared to Relational Tradition (RT) assumptions, which state that categories are not separate and development is non-linear (Dinsmore, 2017). It is not clear within the work of Whitebread et al (2005b, 2009) if these meta theoretical assumptions have been acknowledged and whilst there appears to be distinctiveness between categories, it is fair to say that there is some overlap between the categories identified within the CIndLe (Appendix 2) and the categories in the framework for metacognitive knowledge (Appendix 1). Though in later work, Bryce and Whitebread (2012) do comment on these assumptions when referring to metacognitive sequence models as being ones which view components from a social cognitive perspective, whereas models which focus on the process of metacognition adopt a more information process perspective. A final critique of the work of Whitebread et al was offered by Chernokova (2014b), who claimed that they did not appear to research the specific content of metacognitive structures. Bryce and Whitebread (2012) did however suggest that the context of metacognitive behaviour is worthy of further examination as limited research of naturally occurring metacognitive skills exists.

In addition to the identification of metacognitive behaviour, this study sought to examine children's reflections and reflective talk, with and without adults. Though it was not a specific aim of the Whitebread et al (2009) study to explore this, they found that children showed a higher level of MCK behaviours when adults were involvement in events and suggested that this could be due to the adult stimulating children to reflect more frequently and to articulate what they know about their learning. The work of Desautel (2009), similarly suggested that children may be more able to direct another child rather than articulate their own thinking, which supports the notion of shared cognition and suggests a relationship between metacognition and reflective dialogue. Providing opportunities for collaborate play, involving learning and reflecting or socially shared cognition (Vygotsky, 1981, Palinscar, 2005), may therefore be beneficial in developing metacognition and offer a researcher the chance to witness it, contributing to this debate.

Interestingly however, in another study Robson (2016) suggested that MCK was more likely to be displayed when children have the opportunity to reflect following an activity, rather than during it, which could suggest that naturalistic observation may result in fewer observations of MCK behaviours. Self regulation and planning though was more evident within play situations rather than in reflective discussion (Robson, 2016). This study by Robson (2016) sought to explore the impact that adult presence or absence had on children's behaviour and learning and specifically their self-regulation and metacognition. This quantitative study found that both adult presence and absence supported children but when an adult was present children appeared to absolve themselves from undertaking certain aspects of metacognitive behaviour, especially goal setting, self-monitoring of progress and resolving disputes. One

aspect of metacognition which adult presence promoted was procedural knowledge.

The journal offers clarity and transparency in describing the methods and approach of the research. Robson used the Child Independent Learning checklist (C.Ind,Le) mentioned above to assess and analyse 128 video recorded observations, recording good inter-rater agreement. There was a good degree of transparency as key constructs were defined including units of conversational turns and the essential components of ethics, reliability and validity were identified. There was limited information however, about data storage and how confidentiality and anonymity were addressed.

The findings and results offered detail and indicated that children were more likely to show self-regulation and metacognition when an adult was absent, suggesting that children appeared to give responsibility to adults when they were present (Robson, 2016), which appears to contradict the findings of Whitebread et al. (2009). Though, Robson (2016) contests that the heavy focus on curriculum content in classrooms may possibly result in children adopting a passive role and therefore being less confident in expressing their knowledge. Robson (2016) also suggested that children were more likely to express emotional and motivational regulation when an adult was absent. An area of concern expressed by Robson relates to the limited evidence for metacognitive knowledge behaviour, however she attributes this to the challenge associated with identifying metacognition and the reliance on the ability of children to express themselves, which accords with the views of Desautel (2009) and Larkin (2010).

The discussion draws on the findings well to some extent, though there is an imbalance in the attention given to the different aspects of metacognition. Despite having less data relating to metacognitive knowledge, Robson could have offered more explanation of the findings and could have expanded more on the discussion about emotional and motivational regulation. In addition, Robson refers to a greater diversity of children's comments about strategies when an adult is absent but few examples of these are described (2016). One final question which may be relevant to this study relates to the influence that the two adults had when present. One was a teacher and therefore presumably more qualified than the nursery nurse. It is possible therefore that these two individuals may not have had the same influence on children's metacognitive behaviour.

The previously mentioned systematic review by Gascoine et al (2016) explored 80 pieces of literature which claimed to assess children's (aged 4-16) metacognitive behaviour. Its publication was timely and enabled cross referencing which confirmed that this literature review has considered a good range of relevant and appropriate literature. It was helpful in reaffirming that appropriate methods for assessing young children's metacognitive knowledge have been identified and in identifying potential limitations. This review confirmed the significance of metacognition as an area of study and offered an interesting discussion surrounding the debates relating to it, the construct itself and associated definitions which appear to challenge many, including this researcher.

Operationalising the construct of metacognitive knowledge (MCK).

The definition of MCK adopted for this research is that offered by Whitebread et al. (2005b:5, 2007:438, 2009). MCK is the *individual's knowledge of personal strengths, weaknesses and preferences (personal), knowledge about the task attributes (task) and knowledge about strategies and procedures (strategies) (Flavell, 1979) as well as knowledge of environmental features that facilitate learning (Pintrich, 2000*).

This definition requires clear operationalisation and the constructs used throughout this research are based upon those aspects of MCK identified by Whitebread, et al. (2007). As previously stated the framework in Appendix 1 provides details of the aspects of MCK identified below and it includes examples of behaviour typically seen in observations associated with each aspect. Aspects of MCK include: self (personal variables of metacognition), understanding (metacognitive knowledge of goal and task) and knowledge (knowledge of strategies and comparison of effectiveness) (Whitebread et al, 2007).

In addition to these behaviours mentioned above, I decided to use Whitebread et al's (2005a) 22 item checklist which identified elements of independent learning; it is called the Checklist of Independent Learning (C.Ind.Le) (Appendix 2). The elements are based upon the four areas of self-regulation: emotional, prosocial, cognitive and motivational, identified by Bronson (2000 cited in Whitebread et al (2005a). Bronson (2000) discussed the different aspects or categories of self-regulation, reminding that they are age and stage dependent. Emotional elements of self-regulation consist of the child's ability to attend, monitor their own progress, talk about the consequences of behaviours, persist

and tackle tasks with confidence (Whitebread et al 2005a). The prosocial category refers to the skills for negotiating with others, sharing and turn taking, resolving issues with peers and awareness of the feelings of other (Whitebread et al 2005a). The cognitive category identifies several skills including: awareness of individual strengths and weaknesses, decision making, use of strategies and language, talking about an activity or learning (Whitebread et al 2005a). The motivational aspect of self-regulation includes; initiating activities, planning and developing own tasks and enjoying challenge and solving problems (Whitebread et al 2005a).

I used these tools because they identified and conceptualised behaviours aligned with metacognitive knowledge. Whitebread, et al's (2005a) framework (Appendix 1) referred to examples of behaviour which were videoed and available as a resource which served as guidance to the researcher when analysing transcriptions and to the teacher when completing the Child Independent Learning Checklist (C.Ind.Le, Appendix 2). That said it is pertinent to acknowledge that the limitations associated with Whitebread et al's framework and CIndLe, referred to earlier in this Chapter, will also apply to my own findings.

2.4 Establishing the concept of reflection
Introduction

Reflection, from the Latin word 'reflectere' meaning to bend back (De Vries et al 2005), stems from philosophical traditions, in particular the work of Dewey (1933a) who stressed its significance for personal and intellectual growth. The concept of reflection has a number of definitions and is informed by several

theoretical viewpoints (Williams and Grudnoff, 2011). Dewey (1909:6) often accredited as the originator of the concept of reflection, defined it as: "*Active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends.*" Though a more contemporary definition of reflection suggests it is the..."*rational analytical process through which human beings extract knowledge from their experienc*e" (Jordi, 2011:181).

Reflection is said to be a neurocognitive skill which individuals utilise at two levels. Operating at a neural level, children will take information and reprocess it to generate new knowledge. Operating at a functional level they will reflect on a specific aspect or problem (Zelaza, 2015). Reflection is a process which '*lies somewhere around the notion of learning and thinking'* (Moon, 2004:80) and like the chicken and egg there is debate about whether we reflect to learn or we learn and therefore reflect.

Definition

There are many definitions of reflection and as mentioned in the earlier Chapter. I wanted one which specially related to children. Epstein (2003) suggests reflection is a thoughtful activity in which a child considers their actions and what they have learnt. Based upon Epstein's definition, the definition I have created and which forms the basis of this research is that:

 Reflection is '***the conscious thought processes in which a child begins to identify and use knowledge from their experiences'***.

Existing literature

As with metacognition, there are few references to research concerning reflection and reflective dialogue with young children. This could be a hangover of the Piagetian view or a consequence of the belief that reflection is an underused strategy in the Early Years, which appears to contradict the perceived view that the pre-school period is a particularly sensitive period of development of reflection, as executive functioning improves and Theory of Mind develops (Zelaza, 2015). Or, like metacognition, this paucity could also relate to the children's oral capabilities.

My search of the literature for references to young children's reflection was frustrating at times. There appears to be some consensus within text books that young children do reflect. This is illustrated by Dowling (2013) who discusses how early recall which involves the young child drawing upon working memory evolves into reflection as it becomes more elaborate and includes references to what they have learnt, or are interested in, or how they may extend what they are doing. The research literature however, more typically referred to reflection as a means of exploring children's learning or development, rather than investigating the process of reflection itself. Whilst this is interesting it does suggest that reflection is an area which merits further investigation.

Significantly there were examples of research which examined reflective dialogues and how they may demonstrate metacognitive skills. One such piece of research involving reflection and young children is by Robson (2010). She used 'reflective dialogues' to explore children's self-regulation and metacognition. She emphasised the relationship between reflection and children's learning, stating that reflective dialogue is as helpful to children's

learning as the process of actually 'doing' (Robson, 2010). Whilst Robson (2010) acknowledged that further research is required to ascertain the impact of children's age and gender upon this process, Wang et al (2009) had previously found that the level and pattern of reflection in young children did not appear to be related to gender but was closely related to age. They suggested that using resources such as PowerPoint presentations actively encouraged young children's reflections and extended their thought processes (Wang et al, 2009). Other research by Pratt (2006) which focussed on eight-eleven year old children's views on their learning, found that using video stimulated reflective dialogue (VSRD) not only provided greater access to their learning but also demonstrated that they had clear ideas about 'how' the learning took place as well as what and why they learnt. VSRD's were also used by Lewis (2017), who found that young reflective and metacognitive learners were better able to identify their strengths and weaknesses when thinking. Similarly the research by Bhosekar (2009) who used photographs to elicit reflections from 'street kids' in Mumbai claimed that the photographs enabled the children to reflect on their lives, analyse and question their reality and to learn from those reflections. The above examples indicate that previous researchers have had success in prompting children's reflections by using a range of strategies, including reflective dialogues, powerpoints, VSRD and photos

Two other published pieces of research which explored young children's reflections and their learning were undertaken by Carr (2011) and Morgan (2007). Although different, they offer a useful insight into methodologies associated with collecting data about reflection. First, the work of Carr reports on a longitudinal action research project which explored classroom strategies that provided opportunities for children to reflect on their learning (2011). The

journal was helpful in articulating specific teacher strategies and particularly conversation strategies which prompted reflection. Strategies such as spontaneous conversation, revisiting conversations and using resources such as learning journeys with accompanying photographs and videos were identified as being effective (Carr, 2011). In addition Carr (2011) noted the importance of acknowledging co-authorship between children and an adult when deciding the topic of conversations which were both school and home related.

Acknowledgement of the importance of children choosing the topic of reflection accords with the work of Meadows (1993) which examined children's use of social scripts. Meadows described these as generalised event representations which help children to make sense of their worlds and to develop feelings of control and the ability to predict (Meadows, 1993). Social scripts can include a range of topics, but we must acknowledge that the social scripts of pre-school and older children may well be influenced by the media and popular culture (Dowling, 2013). Whilst these influences may originate in the home environment, practitioners and teachers need to be mindful of them and accept and encourage children's exploration of them in schools ad settings (Coles and Hall 2002).

The Carr paper also offered a very good account of the challenges which the researchers faced in maintaining the authenticity of the child's voice and co-authorship when using audio recordings (Carr, 2011). It was however limited in its discussion of the details about methodology, data analysis, validity, reliability or ethics. The format of the paper was unusual and there were some claims which were not always substantiated with examples from the data collected. For example, Carr concludes that with in the study there was a likelihood of children

asking questions and taking initiative in conversation and that this was linked to them becoming interested in a topic and this likelihood was enhanced when a practitioner noticed this and applied appropriate listening strategies (Carr, 2011). Examples, however, of evidence to support these assertions are not explicitly evident.

In the journal by Morgan (2007) a series of data gathering tools have been used to understand young children's perspectives of learning in a classroom setting. This qualitative research project with three-seven year olds explored the use of video-stimulated recall dialogues (VSRD), alongside teacher interviews and lesson observations. The reported findings suggested that the VSRDs were successful in teachers being able to develop understanding of children's' perceptions (Morgan, 2007). These findings referred to a data analysis tool but as with the Carr journal, little reference was made to reliability, or validity of the tools. The report acknowledged the notion of children's rights within the research process and commented interestingly on how the VSRD enabled children to elucidate and reflect on their memory of the emotional responses to a task which occurred a few weeks before (Morgan, 2007).

The Carr and Morgan research offer insight into ways of measuring reflection and children's' thinking. If we are to think critically about critical thinking and reflection then according to Roche (2011), we need to believe that individuals have an infinite capacity to be critical thinkers and that when they use these skills they do so in the sphere of their own context and belief systems to generate personal knowledge. If we can understand children's social and cultural contexts, we can begin to understand them (Berk and Winsler, 1995). This leads us to consider the context of the research and of teaching and

learning. The context will influence all aspects of a child's learning and development, but specifically their disposition to think (Dowling, 2013). Claxton and Carr (2004) identified four types of environment or backgrounds which include; a prohibitive one, where children struggle to respond within an adult led classroom; an affording environment, where involvement by children is determined by their level of determination; an inviting environment which nurtures children's play and inquisitiveness; and finally a potentiating one, where power is shared between adults and children. The relationship between the environment and a child's emotional experience or disposition was also acknowledged by Vygotsky (1994). He stated that the environment has to be changeable and dynamic to respond to the needs of children as they develop (Vygotsky, 1994).

If educational provision is to reflect these issues discussed above, then schools need to become learning communities in which children have the chance to design their own learning and to take ownership and responsibility for it (Palinscar, 2005). One way to achieve this, as Carr (2011) intimated, is for children to have the opportunity to decide the topic of reflective conversations and dialogues and for adults to take their lead. Within reflective dialogues, questioning by the adult can be used to encourage the children to make explicit their thoughts, feelings, reasoning and knowledge (Mercer and Littleton, 2007), but there has to be a consideration of the balance of power within adult child reflective dialogues. If a child perceives that an adult is leading the conversation then the child is more likely to be compliant (Dowling, 2013). Conversely peer dialogues include conversations about a broader array of topics and are more likely to afford children opportunity to express their honest opinions, illustrating a more accurate picture of their mindfulness (Dowling, 2013).

Children also need space to think. This space is not explored by many researchers and could be a worthwhile future study. Cremin et al (2006), state that children also need time which is elastic and stretchable to facilitate exploration of ideas and concepts. This study by Cremin et al (2006) also recommended that teachers adopt a 'stand back 'approach when assessing children to be able to 'hear' them appropriately. Time and space for children to be able to reflect can be challenging for schools and Early Years settings, especially when there is such a strong emphasis on curriculum content. Nevertheless, some suggest that it is imperative, as reflection offers children the opportunity to develop a deeper understanding and chance to internalise their thought processes (Pritchard, 2014).

As with metacognitive knowledge, we need to consider how reflection can be observed. Naturalistic observations can provide evidence of reflection, usually recorded as children's narratives or even their actions. The association between language and cognitive development has been explored for many years. Vygotsky (1962), an advocate of this symbiotic relationship between language and intelligence suggested that there are two phases of knowledge development which rely on a child's language skills. First, the child acquires knowledge unconscientiously and second, they consciously develop control over it. It is during phase two that a child will talk aloud and reflect on their knowledge. Young children playing alone are frequently observed demonstrating private speech, as described by Vygotsky. There is a good deal of research into private speech and it is associated with self-regulation as well as reflection on action (Berk and Winsler, 1995), especially when young children are in problem solving, goal setting or doing academic activities (Berk and Winsler, 1995).

Research which examines metacognition and reflection often relies to some extent on being able to 'hear' children and being able to assess their language and vocabulary ability. Commonly used approaches to collect data such as self-report measures and think aloud protocols both require a child to reflect back on an event and to articulate what they know (Gascoine et al, 2016). Teachers recognising the value of this may well rely on asking questions, but, as Whitebread and Coltman (2010) implied, asking questions is not straightforward. Their findings suggested that teachers found asking questions which promote reflection challenging, especially in Early Years classrooms (Whitebread and Coltman, 2010). It is a skill which requires consideration to avoid what Dillon (1988) and Wood (1992) both cited Mercer and Littleton (2003) described as inhibitive dialogic practice. These inhibitive practices involved questioning which elicited brief answers and ones which required the 'right' answer (Mercer and Littleton, 2003).

Many believe that young children's vocabulary offers an insight into their metacognitive ability and this concept was explored by Bartsch et al (2003). They found that children's vocabulary use tended to reflect behavioural issues of knowledge 'how to' rather than the knowledge itself 'what' or 'why' (Bartsch et al, 2003). However if young children learn to reflect on their actions using 'how to' vocabulary, this can develop their ability to make connections between cause and effect, which can support the development of self-regulation and understanding of it (Dowling, 2013).

Children's vocabulary in reflections may also be influenced by the context or environment; the social constructivist premise that ways of thinking are socially situated (Berk and Winsler, 1995). To illustrate this we can consider the impact

of exposure to 'instructional questioning', which are questions posed to children and which an adult already knows the answer to. It has been shown that children, typically from a middle class background who may have had more exposure to this type of questioning, are better prepared for school and classroom dialogue which intends to assess children's knowledge (Berk and Winsler, 1995). The impact of this is that teachers need to be aware of those children who 'know the game' and those who do not. Whilst questioning can offer some insight into children's reflections and their knowledge, it may not be the most appropriate strategy for all children.

That said questioning is frequently used in schools and also within reflective dialogues. The challenge for teachers and practitioners is to get the right balance. If, for example, the adult asks fewer questions, it is more likely that children will make more significant contributions to the dialogic process. Research into dialogue and use of questions with children is prolific. The work of Gjems, (2010) identified the importance of using conversation to develop concepts and especially to promote use of mental verbs which accompany metacognitive development. Rojas-Drummond et al (2014) and Rojas-Drummond and Mercer (2003) highlighted the importance of devising questions which guide development of understanding and help children to organise their ideas and express their views. They also recognised that reflective dialogue would involve the researcher showing their own thought processes with the children, to affirm the process as a social and collaborative exercise. At the same time, however, Carr (2011) cautioned against too much formality when undertaking a reflective conversation and recalls how the introduction of audio recording led to more direct questioning which resulted in 'yes', 'no' and an

interrogative feel to the interaction and that paraphrasing by the adult can sometimes cause misunderstanding.

Another aspect of reflective dialogue which expands children's knowledge is that it can lead to collaborative learning. Indeed Hubbs and Brand (2005: 68) claim that collaborative reflection is a social process and a more informal style of learning, which enables students to test beliefs and assumptions that can be "*beyond their personal filters*". It gives freedom and recognition of the social significance of learning from others (Eraut, 2004). Collaborative reflection should provide an opportunity to '*interthink' rather than just 'interact'* (Mercer and Littleton, 2007:57). Whitebread et al (2009) suggest that development of metacognitive ability may be enhanced when children collaborate as a result of sharing the cognitive workload or when they are required to articulate their ideas to others. This type of metacognitive talk however, was, according to Bartsch et al (2003), not commonly observed in Early Years pedagogy.

Researchers such as Wild (2011) are also beginning to see metacognition as a social process (Efklides, 2008). However the work of Tunnard and Sharp (2009) found that whilst children enjoyed collaborative learning, they were unconvinced about what they achieved during the process. The Iiskala et al (2011) study investigated how metacognition occurred as a socially shared phenomenon, introducing the concept of 'socially shared metacognition'. They suggested that metacognitive reflection is a product of interaction between a person or persons and a surrounding context. Iiskala et al (2011) also suggested that there are three levels of cognitive regulation: 'self', where the individual monitors and controls his or her own performance; 'other', where one partner masters an element but the others do not, they then instruct ; and finally, 'shared' where

egalitarian complimentary monitoring and regulation takes place. They believe that through collaborative reflective dialogue children may well have opportunity to regulate in more than one level.

Reflection, whether individually or collaborative has been identified as a function which ought to be targeted by cognitive enrichment programmes (Ben-Hur and Feuerstein, 2011). Such programmes improve outcomes and children's performances according to a meta-analysis of the implementation of thinking skills approaches in school by the Thinking Skills Review Group (Higgins et al, 2005). This is a view shared by Whitebread and Coltman (2010) who discussed several meta-analyses which investigated the impact of intervention strategies on children and felt that two main points emerged. First, it is crucially important to give children opportunities to reflect, to enable them to attribute success to the strategies they have used and so transfer this knowledge. Second, it is necessary to promote the creation of social environments which support metacognition. Despite this however, the challenge may be how to motivate children to reflect (Valkonova, 2004) as well as ensuring that they have time and space to do so.

Operationalising the construct of reflection.

As discussed above there are many definitions of reflection and I wanted one which specially related to children. Epstein (2003) suggests reflection is a thoughtful activity in which a child considers their actions and what they have learnt. Based upon Epstein's definition and that of Dowling (2013) discussed earlier, the definition I have created and which forms the basis of this research is that reflection is 'the conscious thought processes in which a child begins to identify and use knowledge from their experiences'.

I have operationalised and conceptualised reflection as *'utterances, comments or actions which show a child recalling a previous event or experience which provides detailed information about an event/ experience and also how they felt, or what they have learned and/or why they did something'*.

This is based on the premise that reflection is a neurocognitive skill which can be used at two levels: a neural level, where children will take information and reprocess it to generate new knowledge; and a functional level they will reflect on a specific aspect or problem (Zelaza, 2015).

2.5 Conclusion

Doran and Cameron (1995) proposed that metacognition does emerge in the Early Years but that the skill of being able to intentionally transfer one strategy to another context, does not develop unless children are taught that this is possible. Purposeful development of metacognition therefore has to be intentional and planned by knowledgeable teachers. Vygotsky's social constructivist perspective would remind teachers and practitioners that there is more benefit in focussing on the process of development rather than the product (1978) and it is possible that by attending to children's reflections we may have greater insight their understanding and their potential (Dowling, 2013).

Having strategically explored the relevant literature there is a sound rationale for this study as it should contribute to understanding of metacognitive knowledge development and possibly help illuminate the role that reflection may play in this

process. As it is important that researchers contemplate the contribution their work will make to both local and wider contexts, as well as ensuring its originality (Wisker, 2001), this study aims to explore further young children's metacognitive knowledge development and to establish whether there is a relationship between reflective dialogue and metacognitive knowledge behaviour.

It is appropriate to be aware that theories such as those discussed above are useful and informative but to be mindful that they should act as a lens rather than a container (Pillow, 2002 cited in Merriam and Associates, 2002). Listening to children's reflections and monitoring their metacognition may offer insight into a child's understanding and knowledge, which according to Moon (2004) will facilitate alignment of an appropriate curriculum. The findings may provide teachers within the participating schools with an insight into the types of reflection occurring within typical classroom sessions and if metacognitive behaviour is evident during reflective episodes. It is hoped that this work may contribute further to the current debate of recognising the importance of metacognitive awareness for young children, as an aspect of learning but also for generating awareness of self as an active thinking being (Desautel, 2009).

Chapter 3: The rationale for a mixed methods approach

3.1 Introduction

This study explored the relationship between young children's reflections and their MCK. The objective to examine young children's reflections qualitatively and to explore whether any relationships exist between their reflections and their metacognitive knowledge suggested that a mixed methods approach was appropriate and relevant. This chapter discusses the requirements of educational research and provides an account of the research design, its aims and processes; key issues are identified and evaluated. The pilot phase is reported and evaluated as a precursor to the final section of this chapter which outlines the main research phase.

3.2 Requirements of educational research and rationale for mixed methods approach

All research must be, *"critical, systematic, transparent, evidential, theoretical and original"* (Coe, 2012; 10). To be critical, a researcher needs to engage with all aspects of the research process with healthy scepticism and to be prepared to challenge and to consider issues from different perspectives. Criticality allows for a degree of creativity and many see research as a channel for exploration and interpretation which are all attributes associated with creativity.

I adopted a mixed methods approach; this is the common name given to an approach sometimes called the third methodological movement (Gorard et al 2004, Tashakkori and Teedlie, 2011). Mixed methods research is said to have developed from the practice of triangulation where evidence from qualitative

and quantitative methods was used to enhance and strengthen the research (Biesta, 2012). It is a research approach which is an alternative to the more traditional positivist or quantitative and interpretive or qualitative approaches, which have tended to be accepted as two opposing approaches. This dualistic perspective has limitations (Flick, 2015) however, and some claim that mixed methods resolves the conflict and tensions which exist between quantitative and qualitative approaches (Tashakkori and Teddlie, 2003). Mixed methods research is referred to as an accessible approach (Creswell and Plano Clark, 2011); it involves the collection or analysis of both quantitative and qualitative data in a single study, where the data are collected concurrently or sequentially, and are given a priority and it involves integration of data at one or more stages (Creswell et al 2003). The definition of mixed methods research has evolved over the years with the focus changing from what was being mixed, where the mixing occurred, the scope of the mixing and the purpose of the mixing (Creswell and Plano Clark, 2011). The definition more recently proposed by Creswell and Plano Clark (2011) states that mixed methods research involves the collection and analysis of quantitative and qualitative data, it gives priority to one or both forms of data and states where mixing occurs. In addition mixed methods research is framed within a philosophical arena (Creswell and Plano Clark, 2011).

I decided from the beginning that a mixed methods approach was the most appropriate for this study. Philosophically, I felt that this approach allowed me to mix both quantitative and qualitative approaches, enabling a clear understanding of my research aims (Creswell and Plano Clark, 2006, Watkins and Giola, 2015). My rationale for combing both quantitative and qualitative data is due in part to the complexity and breadth of my research aims, but

secondly because I perceived that adopting one of either a quantitative or a qualitative approach would not offer sufficient scope or insight. A mixed methods approach according to Greene (2007: 20) provides multiple ways of seeing and learning about a topic, in this instance, children's metacognitive knowledge and their engagement with reflection. The pluralistic view within mixed methods enables different perspectives to be explored, methods from both qualitative and quantitative approaches to be employed and both formal and informal language can be used (Creswell et al, 2003).

Like Greene et al (1989) and previously stated I found that a mixed methods approach afforded opportunity to triangulate the data. I used and designed data collection tools to identify occurrences of metacognitive knowledge behaviour and to clarify different types and topics of reflection adopted by children. The collection of both quantitative and qualitative data was valuable and one complemented the other as there are strengths and weaknesses associated with each. Essentially, mixed methods offer the best of both worlds (Schrauf, 2016). It was hoped that this research would also benefit from the methodological freedom associated with mixed methods (Creswell and Plano Clark, 2011; 12, Bryman, 2016).

Specifically this research adopted a convergent parallel mixed methods approach, which means that there are two distinct strands; a quantitative and a qualitative strand. Equal emphasis was placed on both types of data collection and they were then mixed at the point when results were interpreted and analysed (Tashakkori and Teedlie, 2010). This approach enabled me to widen the scope of the research and to creatively interpret the different data sets and construct original insight.

Theorising tends to be straight forward when taking either a quantitative or qualitative approach. However, there are some who would debate the theoretical position of mixed methods, suggesting that it reflects neither one paradigmatic perspective nor another. This is based on the premise that paradigms are a pluralistic concept; that one is either of the world view that knowledge is out there, is measurable and quantifiable or that there is more than one interpretation of knowledge and that it is constructed and multi-faceted, more qualitative and subjective in nature. A researcher taking a mixed method approach is not devoid of theoretical perspective, indeed one school of thought suggests there is an inductive and deductive connection between data and theory within a mixed method approach (Tashakkori and Teedlie, 2012), recognising that more than one theoretical stance can inform the research process and that a combined lens may offer a richer and more holistic perspective. I found that the flexibility of mixed methods enabled data to be examined from different perspectives which led to discovery of new ideas and knowledge, though fundamentally this research embraced a social constructivist perspective throughout.

Stenhouse (1975, cited Aubrey et al. 2002) defined research as 'systematic inquiry' where results are placed into the public domain. Shaffer (1990 cited Aubrey et al) defines 'systematic', one of the five characteristics of research, as following an explicit and exact plan. This research approach was systematic and enquiring; it was planned with care, is explicit and the process is transparent, and was deliberately and precisely executed. This transparency reassures the different audiences of the robustness of the research and the genuineness and authenticity of it. Finally, the concept of originality can be addressed and to some degree adopting a mixed method approach is more

likely to result in original work. The constraints of following one method or another for it to be construed as legitimate is removed under the umbrella of mixed methods.

Mixed methods research is associated with a pragmatic approach where methods adopted should be influenced by the aims, objectives and research question (Biesta, 2012). The research practice is placed at the centre of the process as the researcher acknowledges the many different aspects of the research (Denzin and Lincoln, 2008). The pragmatic researcher considers what is necessary to be able to gain a comprehensive understanding of the issues being investigated, what is possible in the given circumstances (Flick, 2015).

I have a pragmatic worldview which has allowed me to focus on the outcome of the research, consider and reconsider the research questions, whilst remaining mindful of what works in practice (Creswell and Plano Clark, 2011). Taking a pragmatic approach I decided on the 'best fit' when choosing the methods to collect evidence and also which methods of analysis to apply. It is more important to establish what I seek to inquire about rather than to dwell on the research approach and its constraints.

It is important however to acknowledge that there are critics of mixed method approaches because it is a relatively new approach (Creswell and Plano Clark, 2011). Authors such as Bogdan and Knopp Biklen (2007) believe that because quantitative and qualitative approaches are based on such different assumptions, mixed methods could therefore result in reports which do not meet the criteria for 'good work' in either discipline. In addition it is fair to acknowledge that mixed methods requires the researcher to have skills in gathering and analysing data which is both quantitative and qualitative

(Creswell and Plano Clark, 2011). This approach can also be time consuming and provide resources challenges, yet it was the approach used by Sylva et al (2006) for the EPPE project.

3.4 Research plan with timescales

Table 3.1: Research Plan

Dates	Research phase
September 2013-April 2014	Planning the research Review of literature Meeting with D Whitebread to discuss research tool.
April – July 2014	Pilot study
January 2015–June 2015	Main research: Stages 1 & 2
June 2015-January 2017	Stage 3:Transcription and analysis of data
January 2017-May 2017	Report writing

3.5 Main research aims.

- To use a mixed method approach to explore the relationship between young children's cognitive reflections and their metacognitive knowledge behaviour.

- To investigate if the type/mode of such reflection influences one or more particular aspects of metacognitive knowledge behaviour.

The research rests upon a number of assumptions which are based on previous research and classical theoretical perspectives:

- Young children are capable of displaying metacognitive behaviour and self-regulation in contexts which are meaningful to them (Whitebread et al, 2009).

- Reflective dialogue provides a context which allows 'listening' to children (Carr, 2011, Cremin et al, 2006)

- Using photographs and pieces of children's work during dialogue acknowledges the child as the expert in their own lives (Bhosekar, 2009).

- Children construct knowledge through social interactions (Vygotsky 1962, 1978)

3.6 Participants

The schools

As with most research, this study has been governed by accessibility to participants. For practical and logistical reasons an opportunistic sample was used. Whilst this type of approach can be criticised, Delamont (1992) suggests that an honest and reflexive approach is acceptable. Nine primary schools in the North East of England with similar demographics and Ofsted ratings were invited to take part in this research (Appendix 3). They were all located within an approximate fifty mile radius of each other and within one of two local education authorities (LEA). Five schools responded positively and the Head Teachers at each school were interviewed. As all five schools had similar demographics and Ofsted ratings, three were chosen randomly by drawing them out of a hat

(Thomas, 2013); school 7 renamed as A, school 3 renamed as B and school 5 renamed as C. It is therefore considered that there is no systematic bias within the sample (Thomas, 2013). As gatekeepers, these head teachers were instrumental in this research. They facilitated meetings between myself and the teaching staff and allowed parental permissions letters to be distributed and collected via school. This collaboration reassured parents as well as the children, that the school supported the research and were very keen to participate.

School A was identified as the pilot school as it was geographically nearest to the researcher, and the other two participated in the final study. These schools each had a statutory provision nursery attached to them and whilst there can be no typical school or class; each school had similar statistics relating to size, catchment and demographics. These schools therefore meeting appropriate inclusion criteria (Creswell and Plano Clark, 2011). The following statistics were taken from the individual school Ofsted reports which were publically available online. They are all medium sized primary schools, based within towns in the North East of England. Two had a slightly below average proportion of children receiving pupil premium and one (School B) had an average number. All had a below average number of pupils representing minority ethnic groups, a demographic which is typical of primary schools of this size in the North East of England. The proportion of pupils with Special Educational Needs (SEN) was reported to be average in two schools and slightly above average in one (School B), the catchment areas and towns for all three are not deemed to be areas of deprivation according to the English National Income Deprivation Affecting Children Index (IDACI).

At the time of the research each school was rated overall as 'Good' by Ofsted and children were entering the schools with typical development for their age and made good progress in all areas as they progressed through the school. The teaching staff were all well established and had several or many years teaching experience and each classroom had one qualified teacher and at least two teaching assistants. Two of the schools had free flow access to the outdoor area from the main classroom; the other did not (School B). However, at some point during each observed session the children in school B were taken outside. The participating schools agreed for the research to take place in the nursery class (age three-four) and the reception class (age four-five). Class sizes in each were between 25 and 30.

The Children

I would describe this research as being partially participatory as this, according to Kellet (2010) results in knowledge being produced rather than gathered. In the nursery classes children aged three-four years old attended for either half day or full day sessions, either full time or part time each week. In the reception classes children aged four-five years old attended for full days. Detailed information relating to the aims and processes of the research was sent to every parent and member of staff. All individuals were invited to give informed consent for their children/class to take part in the research (Appendices 4,5,6). Once these permission slips were returned I was able to meet with the teaching staff to identify a small sample of mixed ability children, from the whole sample of children whose parents had given informed consent. This sample was again chosen randomly (picked out of the hat) (Thomas, 2013), as the teacher picked five children out of three piles categorised in three ability groups. This process

is known as stratified random sampling where the population is divided into categories, in this instance ability (Coe, 2012). Once these small groups of children were identified the children themselves were invited to participate. Initially I introduced myself to the whole class and explained that I wanted them to do some investigating with me and I asked them if they would like to share ideas about their play and learning with me. I explained what I would do each week and that I would ask them each week if they were still happy for me to observe them and talk to them. I showed them a permission sheet which used a simple 'thumbs up' or 'thumbs down' image to ascertain their consent to take part (Appendix 7). Each indicated on a permission sheet if they were happy to take part at the outset and I explained that each week I would ask them to show me thumbs up or thumbs down to signal if they were happy to take part. I also took my cue from their body language each week. If it was obvious that they were not happy to be observed or if they turned away from me or walked away, I did not continue with the observation.

A total of five children of mixed ability were observed over a period of eight weeks as part of the pilot study in school A and a further 30 children of mixed ability across two further schools, school B and school C, were observed over three consecutive months between January 2015 and July 2015. Initially 9 children from each class were randomly chosen to take part by the class teachers (36 total) (Table 3.2 below). These samples were picked using the same method in the pilot study and resulted in a sample with a spread of ability. The sample sizes reduced after week one in school B when I had to change the day of the observation and several children altered their day of attendance.

Table 3.2: Child participant data

School	Class	Ability	Female	Male	Total
School B	Nursery (3-4 years)	High	0	1	5
		Medium	1	1	
		Low	2	0	
	Reception (4-5 years)	High	2	1	7
		Medium	0	2	
		Low	0	2	
School C	Nursery (3-4 years)	High	1	2	9
		Medium	1	2	
		Low	2	1	
	Reception (4-5 years)	High	2	1	9
		Medium	2	1	
		Low	1	2	

3.7 Data tools

Flavell (1979) suggested that observing cognitive behaviour in communication and other social contexts is useful for anyone who intends to develop metacognition, and yet, historically, metacognition was measured using lab based and/or self-report methodologies. A review by Veenmann (2005 cited in Whitebread et al 2009) identified that there are problems with all methods including questionnaires, ''think alouds', interviews and observation. More recent work has focussed on naturalistic methodology and Whitebread et al (2005b) advocated the use of observation, photographs and video recordings. In Whitbread et al's study a checklist to record observable metacognitive behaviour was devised and validated. I met with David Whitebread to discuss my research and bought a copy of the Child Independent Learning Checklist (C.Ind.Le) on a CD so that I was able to use the proforma and consider the examples of metacognitive behaviour in more detail (Whitbread et al , 2009) (Appendix 2).

This mixed method design involved the collection of both quantitative and qualitative data using five instruments: (1) observations; (2) observation field notes; (3) artefacts such as photographs taken by observer and copies of childrens' work; (4) records of reflective dialogues; and (5) a tick list of observed metacognitive behaviours (C.Ind.Le).

- Observations

Observations can be a good data sources as they can be done flexibly and holistically (Newby, 2014). I recorded naturalistic observations of the whole class and small groups of children taking part in their normal classroom activities with their usual class teacher and teaching assistants. Angrosina (2008) argued that observations in natural settings however can be problematic, especially when the setting is one where unnatural or unbalanced power relationships exist, such as those between teacher and child or observer and child. An example of an observation is included in the appendices (Appendix 9) though the whole data set is available, if required. The observation example has been redacted to maintain anonymity. Naturalistic observation can be advantageous as it does not place expectations on a child to complete a task or to verbalise his or her thought processes (Gascoine et al 2016).

Where possible, research ethics would suggest that observation should be open and visible, so that the children are aware that they are being watched (Flick, 2015). These observations took place both inside and outside of the classroom. They were recorded on a proforma which was based on a design used previously; this provided important structure and ensured an appropriate protocol (Newby, 2014). In addition to space for recording events, speech and actions of the children, the observation proforma had prompts along the left

hand side which identified the aspects of metacognitive knowledge and on the right hand side, a column to record field notes and later researcher reflections.

These naturalistic observations were reactive at times, as I took opportunities to intervene in my role as a social scientist (Angrosino, 2012). Thomas (2013) described these as participant observations where the researcher is not limited to pure observation and can legitimately intervene. The intervention took the form of engaging in reflective dialogue (see later) with the children. Observations are good tools as they offer the chance to observe what children do rather than what they say, it links the behaviour seen with the contexts of the task and in 'standing back' the observer or teacher can offer scope to witness the nature of a child's learning (Cremin et al, 2006). They require the researcher however, to be sensitive to the needs of the children (Thomas, 2013).

There are challenges to observing, associated with recording large amounts of information quickly and ensuring that observers record only what they see rather than what they think that they see. It is possible that researchers can become overwhelmed by the situation (Flick, 2015), and lose objectivity. One way to alleviate this would have been to use videos to record activities but it was considered that video recording was not as convenient as observing, which could be undertaken immediately without requiring any setting up of equipment. Another limitation of observations is that the researcher only has access to what is occurring at that moment in time and has no way of observing what goes before or after (Flick, 2015). I also consider that having worked in Early Years, I am experienced in recording naturalistic observations and I am aware of the danger of researcher subjectivity.

- Observation field notes

These field notes were made during and after the observations and reflective dialogues. They allowed for the collection of contextual information (Flick, 2015). An example is included though a complete set is available if required (Appendix 10). They offered an opportunity for the researcher to record additional information such as the atmosphere in the classroom, the weather, the context of the observation and researcher reflections about the observed sessions. By providing contextual data, the field notes complemented the participants perspective which is obtained through the observations (Angrosino, 2008). The field notes were recorded on the observation proforma (Appendix 9) or in a field work note book (Appendix 10). As with observations, there is the potential for researcher bias to manifest itself within observation field notes. This has been addressed to some extent by providing the contextual information about my academic and professional background in Chapter 1, which illuminates the potential reflexivity within my research.

The observations and observation field notes will provide contextual qualitative information about the children's activities, metacognitive and reflective behaviours and the context of their lessons (Angrosino, 2008). They will also allow for quantitative information to be collected in relation to the number of occurrences of reflective utterances and metacognitive behaviours.

- Photographs

Photographs were taken of children's work by the researcher and used to elicit conversation during recorded reflective dialogues, providing an additional layer of description (Opie, 2004) and to some extent saving time in explaining events

to children (Flick, 2015). These photographs provided a context for discussion but acknowledged children as experts in their own lives. Consideration of the safeguarding issues relating to using visual images in research with children were acknowledged, as well as confidentiality and anonymity, and images contained only examples of children's work. Children were offered the opportunity to take their own photographs, deciding when and what to record, which ought to have mediated against the impact that I may have had in deciding the topic or content of the photographs (Flick, 2015). Photographs were taken using a mobile device with permission of the school. They were immediately printed and then deleted from the device. There were some limitations however, which are discussed later, but Opie (2004) suggests that they can become detached from the context which they were taken in.

- Records of reflective dialogues

Collaborative reflective dialogue is a tried and tested research method used with adults, as described by Moyles et al (2003). It involves encouraging children to reflect out loud, about their experiences, learning and feelings. This approach was adapted and simplified for use with the young children. Broadhead (2006) reminds that educator-pupil dialogue is recognised as relevant in current Early Years practice and it was advocated within the Vygotskian tradition as a powerful cultural tool which children use to change themselves.

In the pilot study, 15-20 minute reflective dialogues were recorded between small groups of children and the researcher following observed classroom activities. These were recorded on a tape recorder, which was convenient and allowed for the collection of a large amount of data and enabled cross checking

of the raw data against bias or misinterpretation (Flick, 2015, Opie, 2004). These dialogues took place either in the cloakroom or in a side room to the classroom. The conversations were transcribed, recorded verbatim and provided rich qualitative data. This protocol was adapted in the main study for several reasons which are explained later in section 3.8.

The second protocol involved in-situ reflective dialogues between the researcher and either small groups, pairs or individual children, and whilst they were spontaneous rather than pre-planned, they were recorded in the same way. The researcher was also led by the children in terms of the topic of the reflective dialogue. An example is included (Appendix 11), though the whole data set is available if required.

A potential limitation of recording dialogues is that the children may say what they think an adult wants them to say (referred to later as the Hawthorne effect (Thomas, 2013)) and that awareness of being recorded inhibits their speech or engagement within an activity. It was felt that the in-situ reflective dialogues were therefore less intrusive and that children were more likely to take part in natural and authentic reflective conversations which contained examples of their genuine thoughts and perspectives. An additional challenge was the level of background noise within the classroom.

- Checklist of observed metacognitive knowledge behaviour

Quantitative measurements of individual children's MCK behaviour (both verbal and non-verbal) were recorded by the class teacher at the start of the research, using a behaviour checklist known as Child Independent Learning Checklist (C.Ind.Le) (Whitebread et al,2005, 2009) (Appendices 2 & 8). This checklist

identifies four categories of independent learning which includes categories of metacognitive behaviour: emotional, pro social, cognitive and motivational.

The teacher was asked to rate each child on a four point scale, from 'always' through to 'never' and examples of behaviour associated with each category were provided as guidance. These checklists provided information about the MCK behaviours of the sample of the children. The same tool was then used to record instances of MCK behaviours displayed during observations and the reflective dialogue recordings. This data collection tool has previously been validated by Whitebread et al (2005) and it is specifically for children aged three-five years. It is important to acknowledge however, that teacher rating tools have limitations as they rely on the teacher's experience and knowledge which can be subjective (Gascoine, et al, 2016). A more detailed discussion of the limitations of this tool was discussed previously in Chapter 2, but I acknowledge again that there could be some overlap between the behaviours identified within the different categories and aspects of independent learning, and so therefore they may lack distinction (Dinsmore, 2017). In addition, Whitebread et al's tool does not offer any opportunity to examine the structure of metacognitive knowledge, just the behaviours associated with it (Chernokova, 2014).

3.8 Ethical issues

Ethics, described by Kant as 'categorical imperatives' or the 'formula of universal law' is where we ask, 'what if everyone were to do that?'; they give society a moral code (cited Blackburn, 2003). According to British Educational Research Association (BERA) underpinning principles of all research should include "ethical respect for; the person, knowledge, democratic values, the

quality of research and academic freedom" (BERA, 2004:p5). Ethical approval to undertake this study was obtained from Durham University (Appendices 13 & 14).

Ethics remains a vital principle of the pilgrimage that is educational research, especially if there are child participants. This relates to the view that children may be considered to be a vulnerable group, potentially unable to give informed consent because of their age or ability (Flick, 2015). It could also be said in this field, that the children, and indeed teaching staff, were 'captive audiences' (Powell and Smith, 2009). However following a meeting with the Head Teacher, detailed consent forms were given to each of the key gatekeepers including the head of school, each class teacher/ teaching assistant and the parents of each child so that they could make an informed decision about taking part in the research (Appendices 4, 5, 6).

Informed consent whether from an adult or a child, requires good judgement (Salkind, 2013) and as mentioned above, the issue of consent is especially complex when working with children (Thomas, 2013). When addressing how to gain informed consent from children, I considered both the question of their inherent and structural vulnerability (Lansdown, 1994). Whilst children in the study are young, I felt that the nature of their participation did not warrant the need to protect them from harm because of their immaturity. Indeed I would suggest that there was evidence to indicate that all participants were comfortable in the environment, and appeared to accept my place in their classroom as a participant observer. I sought their permission to take part in an age appropriate fashion at the start of the research and throughout as previously discussed (Appendix 7).

Ensuring that the voices of the children were heard was of paramount importance throughout the research, but it was also important to listen and respond to them and their behaviour. After the pilot study I reflected on the protocol adopted to take the children out of the classroom to record the reflective dialogues. This felt invasive and contrived, in that the children had to stop doing an activity to talk with me or they had to miss out on doing something with their peers to take part. I also recognised that control during this part of the research became that of the researcher, as I would instigate the timing and to some extent the topic of the reflective discussions (Flick, 2015). Amending the protocol for the main study reflected the need for the children to feel comfortable and to exercise choice in how they participated. This demonstrates my ethical reflexivity as I considered the balance between vulnerability and competences (Komulainen, 2007).

All participants were assured of their right to withdraw at any stage (Thomas, 2013) in the process and if at any stage the children appeared to be reluctant to be observed or take part in a dialogue or did not indicate with a 'thumbs up' that they were happy, then I did not make any recordings and moved away, if appropriate.

Every effort was be made to ensure that data were collected and stored in accordance with the Data Protection Act 1998 (Gov.uk). As this research took place in several small settings, it was especially important to ensure confidentiality and anonymity (Flick, 2015); both important considerations within the research process (Wiles, 2013). I adopted a consistent approach to anonymising the data (Flick, 2015). The schools are referred to as schools A, B & C and children were allocated codes to maintain anonymity. These codes

were a combination of letters, which represented the gender of the child (M-male, F-female), the class (N-nursery, R-reception), the school name (D, A, or M), and the individual child (number). To minimise any risk to participants and to indicate due care and show concern for the subjects of the research (Wisker, 2001), time was spent within each class getting to know the children and class teacher so that they were comfortable in my presence. It is considered that there were no longer term effects on research participants and therefore there are no risks associated with this research.

3.9 Validity

Validity can be considered to be the degree to which a method or research tool actually measures what it is supposed to measure (Scaife, 2004). According to Feldman (2007) this instantly presents a problem to qualitative researchers as they do not measure, they seek to describe or interpret. Similarly, Flick (2015) reminds us that validity emphasises the standardisation of procedures, excluding communicative influences, which can be challenging for qualitative approaches. It is important however, for the researcher to be aware that it is their responsibility to make a judgment based on the findings within the context of integrity (Edwards, 2010). This can be challenging and Kellet (2010) argues that the validity of the work and findings could be compromised as 'insider perspectives' are a driver not just of the types of research methods chosen but also of the type of research undertaken.

There are four threats to validity listed in the seminal texts of Campbell, Stanley and Shadish (Campbell & Stanley 1963; Shadish, Cook and Campbell, 2002).

One threat is data analysis validity, where the data may be unreliable or insufficient, or inappropriate methods of statistical analysis have been used. In this study 33 observations and 20 reflective dialogues were carried out and analysis of them was organised, piloted and based upon previously validated statistical methods. One of the weaknesses of observations is the degree of subjectivity which can occur as researchers are swayed to record certain incidences (Flick, 2015). To avoid this, I adopted a naturalistic approach, recording everything seen and heard. This was challenging as it was difficult to record quickly. I used short hand codes to facilitate this and the proforma was helpful in enabling me to circle some information when seen, rather than record it every time. The scope of the research limited the amount of data I was able to record. 16 observations and nine reflective dialogues in school B and 17 observations and eleven dialogues in school C were recorded and analysis of these ensured sufficiency of data which will be explored in chapters six and seven. I used the SPSS package to analyse quantitative data statistically when examining the relationship between different elements. The test applied was the Chi square test for significance. Appendix 15 provides further information about this statistical measure.

Validity was also considered when analysing the quantitative data from the reflective dialogues. Two researchers coded this data using the C.Ind.Le checklist and there was inter-rater agreement of 78%. This assesses the extent to which two researchers allocated the same examples of behaviour to the same categories in the framework and CIndLe (Flick, 2015). It is sometimes known as the Kappa Coefficient, where 78% is deemed to be a high agreement. Appendix 16 indicates how this measure was made. Similarly Braun and Clarke (2006) remind us that the researcher plays an active role in the identification of

themes as well as the reporting on them, as they do not just passively emerge from the data. Whilst extending the use of two researchers to the analysis of the observations and field notes was outside the scope of this research, to overcome the threat to validity when identifying the emerging themes I looked for any negative cases or incidents to give a balanced view on any analysis. This is known as disconfirming evidence (Creswell and Plano Clark, 2011). Similarly given the nature of the research, the very many variables in educational research as well as the confines of the sample size it is unlikely that generalisability is feasible. Indeed Lincoln and Guba (1985 cited Coe, 2012) stated that the only generalisation can be that there can be no generalisation. I would be hesitant to make any bold transfer claims (Coe, 2012). It is more appropriate therefore to consider the concept of relatability as described by Bassey (2000). Relatability is the degree to which knowledge gained from one context is relevant or applicable to another context or in another timeframe, perhaps after adaptation (Dzakiria, 2012).

3.10 Reliability

Reliability is important in all research, however, it is less straight forward than validity with mixed methods. It refers to the consistency and stability of the results over time (Thomas, 2013). For quantitative data this will be achieved through the use of statistical checks for consistency and trustworthiness of data. The statistical test used was Chi square and a software package SPSS was used to facilitate this. I also used a metacognitive behaviour checklist which has been validated for reliability and validity in research by Whitebread et al (2009). Reliability is however considered to be less significant for qualitative data and

mostly refers to the reliability of multiple coders within research teams (Creswell and Plano Clark, 2011). As stated earlier inter-rater agreement was 78% in the analysis of the reflective dialogues. Reliability is also concerned about the authenticity of the data (Seale and Silverman, 1997), it was important therefore that observations and detailed field notes were transcribed accurately and authentically to ensure reliable records. Data have also been read and reread and recoded to double check consistency.

Finally the question of positionality should be considered and I recognise the need to 'position myself' in all stages of the research process. Positionality concerns acknowledging the relationship the researcher has with the research and the participants (Thomas, 2013).Reflexivity which refers to the notion of oneself enables explicit recognition of the fact that I and the act of researching are part of the investigation (Gough and Finlay, 2003, Hammersley and Atkinson, 1983, Wellington, 2015). Awareness of researcher reflexivity and impact upon the study was important. The power relationship between myself as an observing adult and the children was a concern as this could have resulted in an increased risk of acquiescence bias, a standard bias in question and answer processes (Christensen and James, 2009).

Another aspect of this research which I need to acknowledge is my professional background. I am a University Lecturer and I teach on several programmes including Early Childhood Studies and professional development FD and MA programmes. My previous research experience involved investigating mature learners' use of reflection whilst studying on FDs. It is possible, that this experience and interest may have led to bias or have influenced my approach and indeed my susceptibility to the themes and patterns which emerged from

the qualitative analysis. However, I feel that my experience as an Early Years practitioner will also positively influence my research and specifically my role as co-researcher and participative observer.

I have considered a possible Hawthorne effect (Newby, 2014) and whether the children sought to behave or answer questions in a way, which would suggest their desire to please the researcher (Thomas, 2013). This is always a possibility, however, it was mitigated by the amount of time spent with the children and by the fact that children are used to being observed on a daily basis. The change in protocol for the reflective dialogue also mitigated against this, as the children dictated what they wanted to reflect on and led the discussions around this.

3.11 The pilot study

The pilot study took place in school A between April and July 2014, once informed consent was gained from the children's parents, staff and the children. This was the summer term so the children were well established within the class and school and were frequently accessing both indoor and outdoor provision in the reception class.

A total of eight observations with accompanying field notes, eight reflective dialogues, 15 photographs, and a C.Ind.Le checklist for each of the five children were collected. It offered the opportunity to trial the reflective dialogue process, the observation proforma and the C.Ind.Le checklist. The C.Ind.Le checklist was completed by the teacher and she reported that it was not an onerous task. She felt comfortable about deciding which category to allocate to each child within

each category of independent learning and MCK. An example is included in the appendices (Appendix 8).

The observations were recorded on the proforma (Appendix 9). It was helpful and the design was appropriate. I was able to develop a set of codes to record certain information, such as initials of the children, C or A to note child or adult, arrows to show direction of speech, initials to indicate provision areas such as WT for water tray. I was also able to record the categories of MCK seen by circling this on the observation proforma or by writing initials of children next to it when witnessed. Detailed notes were recorded and later transcribed. The side column to record field note comments and later reflections was helpful, though at times there was insufficient space.

The reflective dialogue sessions were successful to some extent, as I was able to record the full dialogue. It was agreed that I would do my observation, take photographs and then take a small group of children into either a side room or the cloakroom to record the reflective dialogue. I had some key stem questions to prompt their reflections and used the photos to elicit conversation where appropriate. However, I had to identify opportunities to take the children out which did not interfere with the teachers' planned sessions, or the children's break time, and it became apparent that this disrupted the children's engagement with participating in the play and learning going on the classroom. Whilst they agreed to take part, I was not convinced by the authenticity of the experience. Similarly, because I instigated these sessions and directed the talk, there was an issue relating to the validity. Taking the reflective dialogue out of the moment and focussing on a topic which the observer saw as significant, was not going to engage children in the same way as letting them reflect at a

time and place that was meaningful to them. This was significant and led to an amendment in the main research phase; reflective dialogues were later subsequently recorded in situ.

The photographs were helpful in eliciting conversation, but only when I was able to share these immediately. I found that when showing these the week after, the children were not interested in talking about them and in some cases could not remember what they were. Similarly, when the children were offered the opportunity to take their own photographs they appeared to be more engaged with the process of taking the photograph than the actual product.

Pilot study results.

The processes for both the quantitative and qualitative data collection and analysis in the pilot were trialled.

- **Quantitative data analysis**

The C.Ind.Le checklists, completed by the teacher, showed that all of the five children demonstrated independent learning behaviour, including MCK behaviour. Appendices 2 and 8 show the C.Ind.Le which the teacher used to assess the children's independent learning and metacognitive behaviour across the four categories: emotion, prosocial, cognition and motivation. Table 3.3 below, shows that the two high ability children 'usually' or 'always' demonstrated behaviour in each category with the exception of child MAA who only 'sometimes' demonstrated motivational aspects of metacognition. The two mid ability children 'usually' or 'sometimes' showed metacognitive behaviour in all aspects, except for the pro-social aspect when they both 'always' demonstrated

this type of behaviour. The lower ability child 'sometimes' showed evidence of all aspects of metacognitive behaviour.

Table 3.3: Pilot Study children CIndLe analysis

Child	Gender	Ability	Independent learning assessment CINDLe
FAC	Female	Medium	Usually or sometimes (all except prosocial-always)
MAB	Male	High	Usually/always (all)
FAE	Female	Lower	Sometimes
MAA	Male	High	Usually/always (all except motivation)
FAD	Female	Medium	Usually or sometimes (all except prosocial-always)

The observations and reflective dialogues were analysed for occurrence of reflective utterances. Reflective utterance being considered to be '*utterances, comments or actions which show a child recalling a previous event or experience which provides detailed information about an event/ experience and also how they felt, or what they have learned and or why they did something'*. 35 reflective utterances were identified.

Each utterance was then analysed and incidences of independent learning behaviour from the C.Ind.Le categories were identified along with incidences of the three further categories of MCK behaviour identified by Whitebread, et al (2005, 2007a, 2009) which focussed on additional aspects specifically relating to metacognitive knowledge. These additional categories included:

<u>Self</u>: emotions, likes and dislikes, reference to own strengths and weaknesses, indicating tentativeness and reference to others;

<u>Understanding</u>: comparing across tasks, identifying similarities and differences, making a judgement about a level of difficulty or rates task on basis of pre-established criteria or previous knowledge; and finally,

<u>Knowledge</u>: describing task contents, rating or describing difficulties or problems, comparing, evaluates effectiveness of one or more strategies.

A set of codes was used to analyse these occurrences within reflective utterances (Appendix 17). The observational and reflective dialogue data indicated that all of the five children demonstrated metacognitive behaviour. There were 146 recorded incidences of metacognitive behaviour across the 35 reflective utterances. These were recorded on a spreadsheet (see excerpts in Appendix 18). Figure 3.1 shows the actual number of occurrences of the categories of independent learning and MCK found in the utterances and Figure 3.2 the percentage occurrence. These charts illustrate that the most prolific categories were pro-social (25%), cognitive (27%) and the three aspects of metacognitive knowledge (29%). Motivation (5%) and emotional (14%) aspects were witnessed less frequently. The sample size was insufficient to use referential statistical analysis so simple descriptive analysis took place.

Figure 3.1: Pilot study occurrences of metacognitive behaviour
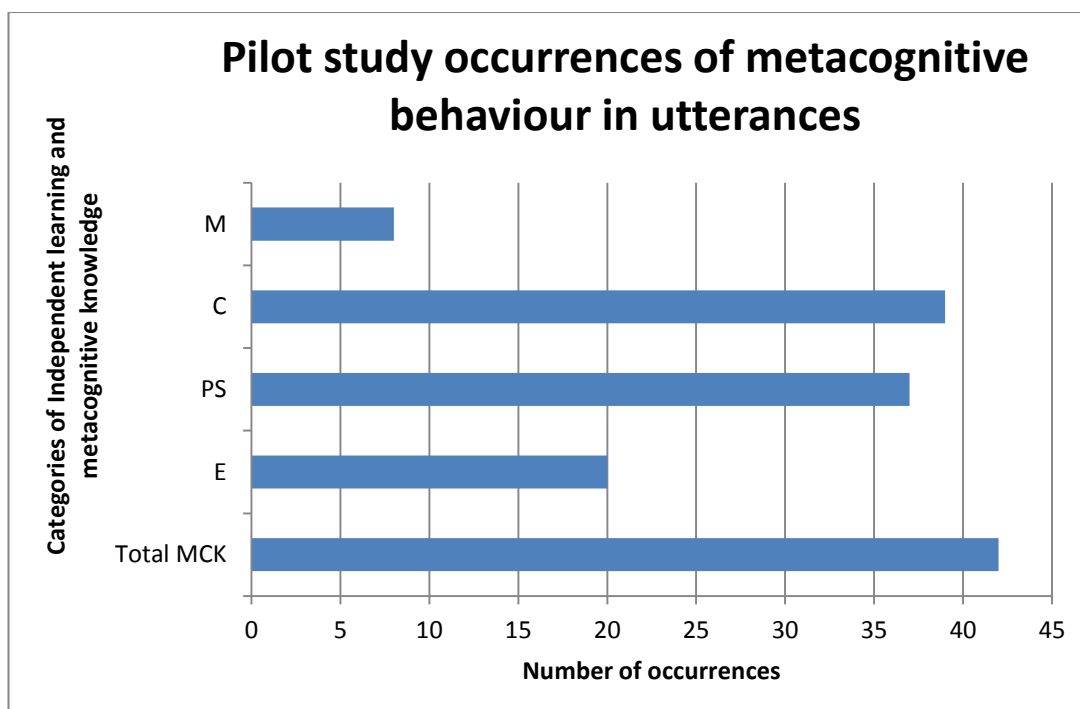
Pilot study occurrences of metacognitive behaviour in utterances

Key

M=Motivation; C=Cognitive; PS=Prosocial; E=Emotional; Total MCK= Total Metacognitive knowledge categories

Figure 3.2 Percentage occurrences of independent learning and metacognitive knowledge

Percentage occurrence of independent learning and metacognitive knowledge categories in utterances

■ Total MCK ■ E ■ PS ■ C ■ M
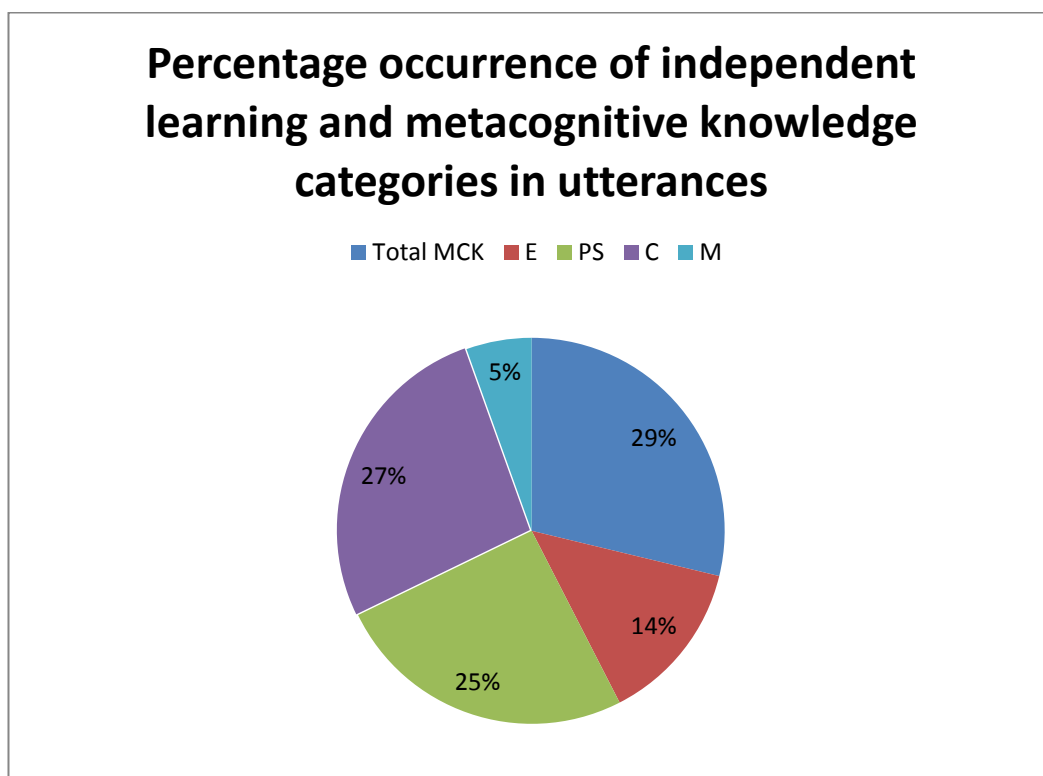
- **Qualitative data analysis**

The reflective dialogue transcripts and observations were transcribed and scrutinised. When analysing the observations and dialogues, I used the conceptualisation that reflection is an '*utterance, comment or action which shows a child recalling a previous event or experience which provides detailed information about an event/ experience and also how they felt, or what they have learned and or why they did something*'. There were a total of 35 utterances across the data sets. Reading through them on several occasions it became apparent that reflective incidences were occurring in many different situations by children individually, collaboratively with peers or an adult. Qualitative analysis using thematic analysis led to the identification of two groups of reflective themes; one theme concerned the timeframe which children's reflections related to, and the other, the topic of their reflections.

Appendix 18 shows the reflective utterances and the themes for time and topic within the utterances.

Thematic analysis: deductive themes

<u>Theme 1: Reflection timeframe; temporal aspect of reflection</u>

It became apparent that children reflected on events and experiences which related to different periods of time (Table 3.4).

Table 3.4: Reflective timeframe and codes

Reflection time frame or mode	Code
Past events	R1
Present or immediate past events	R2
Future events.	R3

- R1: Past events

It is probably unsurprising to discover that some children reflected on historic or past events. As their memory is developing so too is their ability to recall and to reflect on these experiences. In reflecting on past events and experiences, vocal children use a range of different vocabulary like past tense action verbs and prepositions such as 'before'. Children also demonstrated past reflection in their actions as they repeated actions apparently learned earlier. For example,

> *FAC: 'I've seen batman before in America…Batman is better than Spiderman. Batman hit Spiderman and he had more powers.'*
>
> Dialogue P1

> FAD: '*Last day we went to see the sheep and Grandad lost his jacket, but he got it back today coz it's raining. I need my gool when it rains'*
> Observation P1

- R2: Present events or immediate past events

The children in this sample frequently reflected on present or immediate past events and experiences. This was illustrated in their speech as well as their actions. They talked about what they were doing or had just done, as well as appearing to amend their behaviour in response to either a problem solving opportunity or a request from a peer or adult. For example:

> '*Child FAE was upset as she was unable to play at the water tray because there were too many people there. She attempted to play but was told by another child that she was not allowed to play there because only four people can and there are only four aprons. For while, she cried, but eventually she moved to sit near the snack Table, and had a drink of water. She was asked by the teacher to make a card and went to the creative Table. About half an hour later FAE returned to the water tray and she checked to see if there was an apron hanging up. There was an apron which she put on and she began to tip and pour water from a jug into a water wheel.*'
>
> Observation P4

> FAC: '*FAE you can't play before here because we are too many. Four is not too many but now you can and we are getting wet. Look mine is wet; I can make it go round. Do you want to get wet too?*'
>
> Observation P4.

- R3: Future events

Some of the reflective utterance referred to events which were going to happen at some point in the future and the children were able to articulate what they were going to do, why and how they were feeling about it.

> MAA: '*I am going to Child X birthday party next week. We are having a bouncy castle and I am going to wear my trainers so that I can bounce highest. I am very good at bouncing. My mum says I have to bounce before I have cake*'. A asks '*Why do you have to bounce before having the cake*'. '*Coz cake might make me sick. I was sick before but not because I bounced, I had a bug*'.
>
> Observation P2.

Theme 2: Topic of reflections

Within the dialogue and observations a variety of topics were reflected on and these could be categorised into sub themes with distinct foci. Initial coding of these themes is listed in Table 3.5 below.

Table 3.5: Topic of reflection and codes

Topic of reflection	Code
Objects	RO
Events	RE
Person	RP
Feelings or emotions	RFE
Character/ cartoon	RC
Actions	RA
Strategies of learning	RS

- RO: Objects

An inanimate object was frequently the focus of reflective discussion or actions. Many of these objects were evident within the classroom environment, but some referred to objects which the children had at home or at friend's house or that they had seen outside. The children would talk about the object, describing its properties or their relationship to it. They sometimes talked about it using past, present and future tenses.

> MAB: '*My daddy's car is fast and it has 'lectric window. I am not allowed to do the windows but X can. X is bigger than me and sits in the front. X pushes the button. When I am big I am going to have a faster car with a sun roof and it might be red. Daddy's car is black but it has no sun roof so I can't see the sky*.'
>
> Observation P3

- RE: Events

Events and experiences significant to the children prompted many incidences of reflective discussion. These events ranged from personal and family events, to

those experienced in school. As with objects some children reflected on events using all three tenses.

> FAC: '*On Sunday I am going to dancing with XX. I am going with her mummy coz my mummy has got to look after YY. YY is too little to dance. At dancing we are practising for a show, I have pink tights and my hair has to look like this. I can't do my hair so mummy has to do it. XXs mummy might do it too. Me and XX will do lots of dancing and we might get tired.*'
>
> Dialogue P3.

- RP: Person

People frequently figured within the children's reflections and these individuals were usually family members or friends of the children or significant others. Some children clearly had conceptual knowledge of relationships and roles and would describe the individual in terms of their role in the family. Others used the name of the person but did not elaborate on their relationship to them but did talk about what the person did or said or even how they felt.

> MAA: '*ZZ has got to go to the doctors because he has got a rash. He was crying last night and he is grumpy at breakfast. ZZ might have to have medicine. ZZ tummy is like this now.*'
>
> Observation P2

- RFE: Feelings or emotions.

Feelings and emotions figured within some reflective utterances, and these were sometimes the children's own feelings or sometimes the feelings of others.

MAB: 'I *was excited last night coz my daddy put up our new tent. We haven't got a tent before and I am allowed to sleep in it on the weekend. If it doesn't rain. I am not going to be scared coz I am taking my batman and daddy is sleeping too. Mummy says that X is too scared but I am a big boy.*' Observation P4

- RC: Character or cartoon

Within the dialogues and observations characters from television programmes, games and books were referred to and reflected on.

FAD: '*Peppa pig has a George. Peppa pig is on my bed and I like him. George and Peppa are friends.*'

Dialogue P3

- RA: Actions

The reflective dialogues and observations allowed for the recording of children's reflections on actions. Some of the children were able to talk about these actions in all three tenses.

MAB: '*I am riding fast on this bike, it has got big wheels and my feet go faster and faster. Look… I am faster than VV watch. I am going to round there and over the bridge and then back here. How long am I going to take? You watch me*'.

Observation P5

- RS: Strategies

The reflective dialogues as well the photos of children's work, offered opportunity for the researcher to ask specific questions relating to strategies which the children had used. Similarly some teachers scaffold the discussion of strategies within whole class plenary sessions.

> Teacher: '*Well done everyone, can we make sure that we are all sitting quietly and that we can all see. How do we do that?'.*
>
> *MAA raises his hand and T1 says 'yes MAA?'*
>
> *MAA: 'You have to go like this' MAA places his finger on his lips 'and you need space round you, not squashed' MAA moves his hands in a circle motion around his body to indicate the space he needs.'*
>
> Observation P4

Quantitative analysis of these themes.

Figure 3.3 below shows the occurrence of reflective topics identified within the 35 utterances. Initial scrutiny of the themes illustrated in Figure 3.4 shows that children in the small sample appeared to reflect more on 'objects', RO (32%) than on other topics of reflection and the most prolific reflective timescale was the present or immediate past experiences, R2 (66%). The full data were recorded on a spreadsheet and converted into tables (Appendix 18). Figure 3.5 highlights the occurrences of the reflective timeframes within the utterances and Figure 3.6 demonstrates that R2 was the most prolific reflective timeframe, occurring in 66% of utterances.

Figure 3.3: Occurrence of reflective topics

Occurrence of reflective topics within utterances
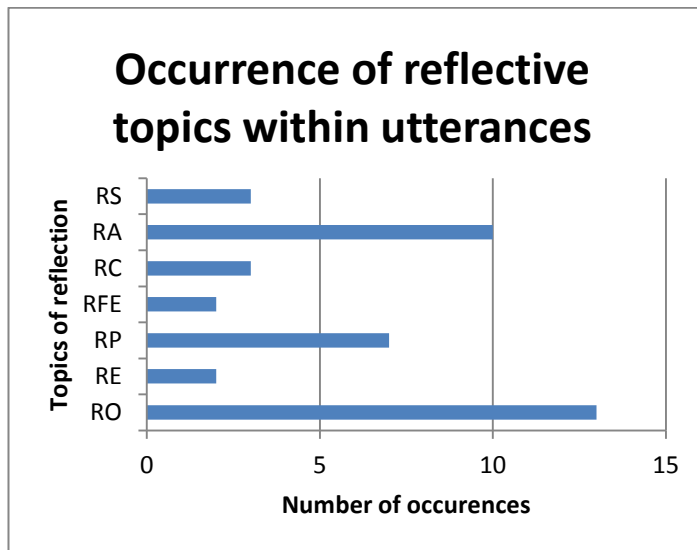
Key

RS= Reflection on Strategy; RA= Reflection on Action; RC= Reflection on Character or cartoon; RFE= Reflection on Feeing or emotion; RP= Reflection on Person; RE= Reflection on Event; RO= Reflection on Object

Figure 3.4 Percentage occurrences of reflective topics

Percentage of occurrence of reflective topics within utterances
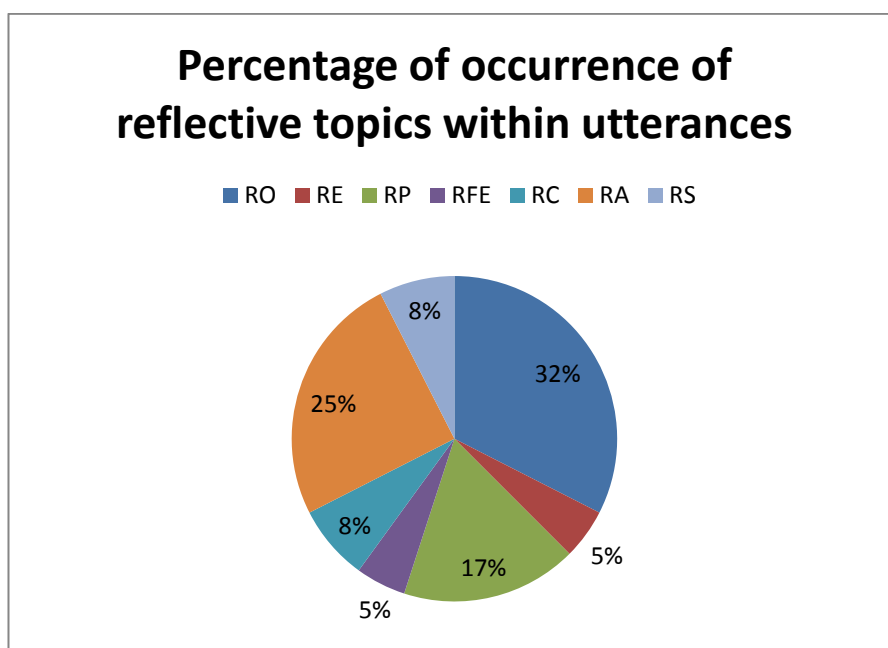
Figure 3.5: Occurrence of reflective timeframes

Occurrence of reflective timeframes in utterances

(bar chart: R1 ≈ 11, R2 ≈ 31, R3 ≈ 5; x-axis "Occurrence of reflective timeframes in utterances" 0–35; y-axis "Reflective timeframes")
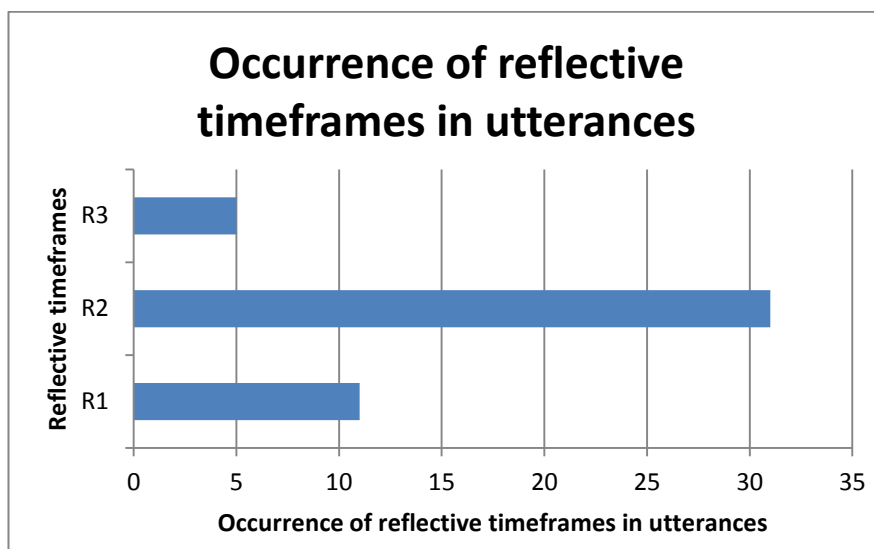
Key

R1= Reflection on past; R2= Reflection on recent past or present; R3= Reflection on future

Figure 3.6: Percentage occurrences of reflective timeframes

Percentage of occurrences of reflective timeframes within utterances

Legend: R1, R2, R3

(pie chart: R1 = 23%, R2 = 66%, R3 = 11%)
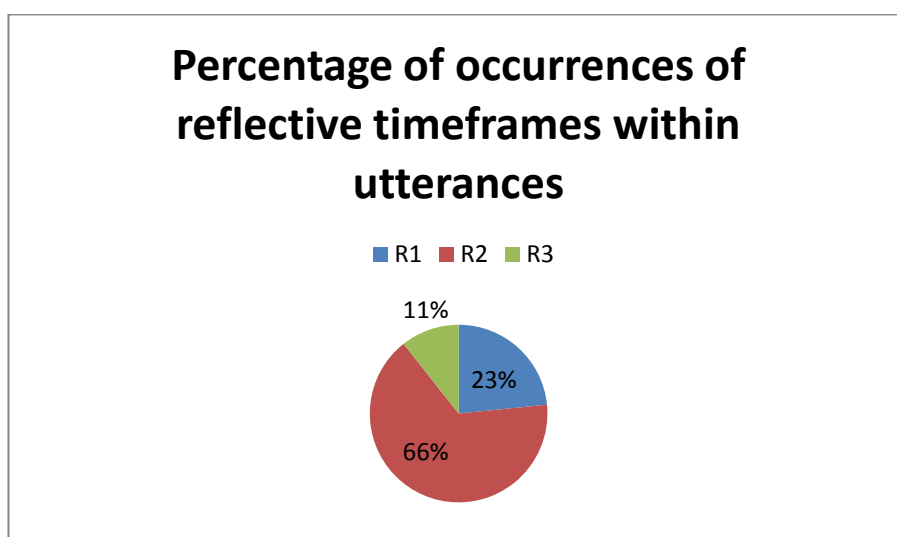
As discussed above it was possible to extract data which showed that reflective utterances also included MCK behaviours. In fact, almost all utterances included an aspect of metacognition. It was not possible, however, to identify any conclusive data in respect of any correlation between reflection and metacognitive knowledge, because of the sample size.

Pilot evaluation

The data collection tools were adequate and appropriate with the exception of the protocol for the reflective dialogues. As stated earlier, to avoid removing children from their classroom and to allow them to direct and control the reflective dialogues, these were undertaken in situ as and when the opportunity arose in the main study.

The findings from this pilot study suggested that MCK behaviour is evident in the reflections of this group of young children and it could therefore be expected that further research would allow continued observation of these behaviours. These pilot results suggest that it is possible to record the reflections of young children and there may be opportunity to look for potential relationships between metacognition and reflection in a larger sample size. Reflecting on and analysing the field notes highlighted the possibility that the actual learning environment may also influence children's metacognitive behaviour and reflections. It was decided to include this, if possible, in the main phase of the research.

3.12 The main research phase.

The main research phase was planned to take place in three stages. It is useful to acknowledge that research design is emergent and it is acknowledged that at each phase of the process changes may be instigated (Creswell, 2007). Following the pilot study, changes were made to the focus and design of the research, reflecting some organisational, practical and theoretical constraints. At this stage of the research it is not evident that any external factors have affected choice of methodology however, Garner et al (2009) would suggest this could still have occurred.

Stage 1

This stage began in January 2015. It was decided to avoid starting in September 2014 because this is a period of major change for the children and I wanted them to feel confident and assured of their environment. It is also a busy time for staff as they work to establish relationships with children and parents.

Two schools participated in the main phase of the research: School B and School C. Stage 1 of the main phase was in School B which has a nursery and reception class with access to outdoor provision, though this is not open access at all times. The nursery unit was a large T-shaped room with typical Foundation Stage (FS) provision areas. The reception class was a large square room with FS provision areas.

I decided to include an evaluation of the environment so that any environmental factors which could potentially influence the data gathered could be identified. I completed an evaluation of the indoor and outdoor environment using the Early

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Childhood Environment Rating Scale (ECERS-3) (Harms et al 2015). This is a validated assessment scale which is used widely around the world (Harms et al 2015, Clifford 2010) to evaluate the quality of Early Years environments. This measure was devised to provide opportunity for a range of aspects of the Early Years classroom environment to be evaluated (Harms et al 2015). The rating scale is divided into six subscales; space and furnishings, personal care routines, language and literacy, learning activities, interaction and programme structure. Following an initial three hour observation, the score sheets were analysed and revealed that the classes within the school had average subscale scores between 4.36 and 5.40 where 3 is 'minimal', 5 'good' and 7 'excellent. School B scored well on the subscales language and literacy (5.4). The subscale which the school scored the lowest was 'learning activities; 4.36 (see Table 3.6 below).

Table 3.6: ECERS-3 Profiles

School	Space and furnishings	Personal care routines	Language and literacy	Learning activities	Interaction	Programme structure
B	5.10	4.75	5.40	4.36	4.60	5.00
C	5.70	5.00	5.60	4.54	5.00	5.00

The above scores indicate that there is a high degree of similarity between the two schools within this study. This rating scale offered some insight into the overall quality of the Early Years settings and its authors claim that the scale has a high level of internal consistency, and that in field tests, indicator reliability was good with average inter-rater scores of 88.7% (Harms 2015). However it is not without limitations and there are suggestions for further research to be undertaken to establish the validity of this measure (Goldstein and Flake, 2016).

- **Gathering data**

During the subsequent 10 weeks, I conducted a series of eight observations within each of the nursery and reception classes (16 in total) in school B and when the opportunity arose; I recorded reflective dialogues in situ (nine in total). Observations, field notes and researcher reflections were recorded on an observation proforma and later transcribed verbatim. The reflective dialogues were recorded on a digital recorder and later transcribed verbatim. Discussing this with the teaching staff and also the children, it was decided to record reflective dialogues as and when the opportunity arose within the classroom itself. These reflective dialogues were more meaningful, spontaneous and provided opportunity to record children's' individual and collaborative thoughts and ideas.

Photographs of children's work were taken and printed to share with children, care being taken not to include images of the children themselves. All photos were deleted once printed. Scott (2000) suggested that using a stimulus to promote a child's involvement in reflective dialogue would promote thinking and reflection. At times photographs, copies of children's work and a soft toy were used to illicit dialogue. Using these was both effective and demonstrated a respectful attitude towards children, though the soft toy did at times elicit behaviour which was more directed to the soft toy itself, rather than being used as conduit to help children to act out their own feelings and thoughts (Brooker, 2001).

Stage 2

In April 2015 the second stage of the research began in School C. This school had a nursery unit with typical Early Years Foundation Stage (EYFS) provision areas, open access to in and outdoor provision and a reception class which did have outdoor provision, but this was only available a set times during the morning.

I completed an evaluation of the indoor and outdoor environment using one set of criteria based on the Early Childhood Environmental Rating Scale (ECERS-3) (Harms 2015). Following an initial three hour observation, the score sheets were analysed and revealed that the classes within the school had average subscale scores between 4.54 and 5.70, where 3 is 'minimal', 5 'good' and 7 'excellent (Table 3.6 above). The rating scale is divided into six subscales; space and furnishings, personal care routines, language and literacy, learning activities, interaction and programme structure. School C scored well on the subscales language and literacy (5.60) and Space and furnishings (5.70). The subscale which the school scored the lowest was 'learning activities; 4.54.

- **Gathering data**

During the next nine weeks I conducted a series of nine observations within the nursery and eight in the reception classes (17 in total) of school C, and when the opportunity arose I recorded reflective dialogues (eleven in total). Observations, field notes and researcher reflections were recorded on an observation proforma and later transcribed verbatim. The reflective dialogues were recorded on a digital recorder and later transcribed verbatim. The teaching

staff were happy for me to record reflective dialogues as and when the opportunity arose within the classroom itself.

The same protocol regarding photos was applied to school C.

Stage 3

- **Data transcription**

This stage began in September 2015 with the transcription of the observations and reflective dialogues. It coincided with being awarded funding for an undergraduate intern. This is a scheme run by the HEI where I work and it aims to provide opportunity for students to co-create knowledge and to develop research skills. Whilst under my tuition and guidance, this was a genuine collaboration, which was fruitful and rewarding for me and the student intern. The intern was a psychology student with a good grasp of developmental psychology and previous experience of undertaking research. We each transcribed the same two reflective dialogues and then compared transcriptions to check for consistency. The degree of accuracy to the recording was excellent with only odd words being missed, when the clarity of the recording was not good. Once confident the intern transcribed the rest of the reflective dialogue recordings. When the intern did not know what was said, she highlighted the section of the transcript so that I could go back to the recording to check. I sampled two further transcriptions to check again for consistency and accuracy. At the same time I transcribed the observations and observation field notes. This was a lengthy process but I decided not to pay for transcription service as there were many benefits linked to immersion in the data itself.

This period of data collection and transcription was time consuming but profitable, as well as rewarding. The privilege of being able to work alongside the intern as well the young children and the professionals who support them was immense. I found my reflective field notes invaluable and these have served as a reminder of contextual factors, which has proved to be an unexpected area of interest.

- **Data analysis**

The data sets were analysed in three phases: the quantitative data analysis; the qualitative data analysis; and, thirdly, the mixed quantitative and qualitative analysis. This approach is acknowledged by Creswell and Plano Clark (2011) as merging or mixing during the data analysis stage.

- **Quantitative data analysis**

As in the pilot study the C.Ind.Le sheets for each child were reviewed. The reflective dialogues and observations were scrutinised, reflective utterances were identified and any evidence of independent learning categories and MCK behaviour within reflective utterances was coded and recorded on a spreadsheet. Descriptive statistics were computed.

- **Qualitative data analysis**

Reflective themes.

The reflective dialogues, observations and field notes were read and re read and themes, both inductive and deductive, were identified. The same themes identified in the pilot study relating to the time and topics of reflection were identified again, although additional topic themes also emerged. Themes were

coded and later reviewed and recoded. Reflective utterances which fit the criteria identified earlier, 'utterances, comments or actions which show a child recalling a previous event, or experience which provides detailed information about an event/ experience and also how they felt, or what they have learned and or why they did something' were recorded on a spreadsheet and each given a unique number. Details relating to the gender of the child, the time and topic of reflection and any MCK behaviour were also recorded for each utterance. A total of 438 utterances were recorded.

Additional themes

Additional themes emerged from the analysis of these data. One theme related to style of the reflective utterances. Of the 30 child participants, 14 of the children were recorded reflecting frequently within the observations and dialogues. These children's reflections were considered to fall into one of two distinct reflective styles. This became a new theme and the whole data set was reviewed again to check consistency.

Another induced theme was associated with the environment and this theme became most obvious when reviewing the field notes made by the researcher during and after the observations and dialogue recordings.

- **Mixed quantitative and qualitative data analysis.**

The larger volume of data associated with this main research phase facilitated the opportunity to look for relationships between the reflective themes identified within the qualitative analysis and the gender of the child, as well as aspects of MCK recorded as quantitative data. It was decided to employ a nonparametric statistical test, as a normal distribution of the data could not be assumed. This

would allow for the analysis of occurrences and to establish if what was observed occurred by chance or not. The test used was the Chi Square Test of Significance and using the computer software SPSS, the data on the spreadsheet (Appendix 18) was used to examine some of the occurrences of events and to establish if any relationship between occurrences was by chance or not.

3.13 Conclusion

The above chapter provides an accurate account of the research process intended to offer transparency and sufficient detail to enable a reader to decide on the relatability of the research. I have included description of the events and included an evaluation of some of the design methods and approaches used. It was more challenging than I had anticipated because of the time which had elapsed from the planning, execution and writing up of the project. I under estimated my ability to recall some of the minor changes made and I recognise the importance of keeping a research diary to make this process of reporting easier.

Chapter 4: Research study results

4.1 Introduction

This chapter provides an accurate account of the results of the main research phase. In line with a convergent parallel mixed methods design, the quantitative and qualitative data sets are identified separately before the mixed data set. I have used graphs and tables to illustrate key findings and I have used thematic analysis when analysing the qualitative data. My results are later interpreted in Chapter 5.

4.2 Quantitative analysis

Analysis of data will utilise many research skills and requires a clear strategy. The strategy adopted here was to analyse the data sets individually; i.e. the C.Ind.Le checklists, the transcripts and then the observation data and then the field notes. The C.Ind.Le checklists completed by the teachers showed that all of the children demonstrated metacognitive behaviour, including MCK behaviour. Appendix 2 shows the C.Ind.Le checklist which the teachers used to assess the children's metacognitive behaviour across the four aspects; emotion, pro-social, cognition and motivation.

As with the findings of the pilot study, the majority of the higher ability children 'usually' or 'always' demonstrated behaviour in each of the metacognitive behaviour categories. There was a more varied response to the category of motivation. The middle ability range children 'usually' or 'sometimes' showed metacognitive behaviour but there were some variations in the categories of pro social and motivational behaviour. The lower ability children 'sometimes'

showed evidence of all aspects of metacognitive behaviour. See Table 4.1 below.

Table 4.1: Child ability and CIndLe assessment

Child	Ability	Independent learning and Metacognitive knowledge assessment CIndLe
FNA004	Medium	Usually/sometimes
MNA002	High	Always/ usually
FNA002	Low	Sometimes/never
MRA002	Low	Sometimes/never
FRA004	High	Always/ usually
FRA005	High	Always/ usually
MRA004	Medium	Usually/sometimes
MNM005	High	Always/ usually
MNM003	Medium	Usually/sometimes
MNM001	Medium/ Low	Usually/sometimes
FNM003	Medium	Usually/sometimes
MNM006	Medium	Usually/sometimes
FRM006	High/Medium	Always/ usually
FRM004	High	Always/ usually
FNA006	Low	Sometimes/never
MNA001	Medium	Usually/sometimes
MRA006	High	Always/ usually
MRA007	Medium/Low	Usually/sometimes
MRA005	Medium	Usually/sometimes
MNM007	High	Always/ usually
FNM001	High	Always/ usually
FNM002	Low	Sometimes/never
FNM004	Medium/Low	Usually/sometimes
FRM003	High	Always/ usually
FRM002	Low	Sometimes/never
FRM001	Medium	Usually/sometimes
MRM001	Low	Sometimes/never
MRM002	High	Always/ usually
MRM006	Low	Sometimes/never
MRM007	Medium	Usually/sometimes

Analysis of the observations and reflective dialogues

Each observation and dialogue transcript was examined and reflective utterances were identified by using the following definition: '*utterances, comments or actions which show a child recalling a previous event or experience which provides detailed information about an event/ experience and also how they felt, or what they have learned and or why they did something'*.

There were 33 observations and 20 reflective dialogues. A total of 438 utterances were identified, 241 in the observations and 197 in the dialogues.

- Metacognitive behaviour

Each utterance was then analysed and incidences of independent learning behaviour from the C.Ind.Le categories were identified along with incidences of the three further categories of MCK behaviour identified by Whitebread, et al (2005, 2007a, 2009) which focussed on additional aspects specifically relating to metacognitive knowledge. These additional categories defined by Whitebread et al (2005) included:

Self: emotions, likes and dislikes, reference to own strengths and weaknesses, indicating tentativeness and reference to others;
Understanding: comparing across tasks, identifying similarities and differences, making a judgement about a level of difficulty or rates task on basis of pre-established criteria or previous knowledge; and finally,
Knowledge: describing task contents, rating or describing difficulties or problems, comparing, evaluates effectiveness of one or more strategies.

A set of codes was used to analyse these occurrences within reflective utterances (see Appendix 17).

As with the transcription of the dialogues described in Chapter 3, the intern and I each analysed three dialogue transcripts. Inter-rater agreement across these three transcripts was 78%. We then proceeded to code the remaining dialogue transcripts. I coded the observation transcripts without assistance.

After this initial coding, some basic, descriptive statistical analysis was undertaken to look at the occurrences of MCK across the transcripts.

- Dialogue occurrences of MCK and independent learning categories.

Independent learning categories and MCK behaviour was seen within the majority of reflective utterances in the dialogues. Figures 4.1 and 4.2 below illustrate the occurrences of whole category areas. Analysis of the sub categories showed that S6 'Reference to others' and U1 'Understanding' were the most prolific, with 48 occurrences, C2 'Can speak about how they have done something or what they have learnt', had 41 occurrences. The categories, E3 'Can control attention and resist distraction', PS1 'Negotiates when and how to carry out tasks', PS2 'Can resolve social problems with peers', and M3 'Initiates activities' showed no occurrences.

Figure 4.1: Occurrence of independent learning and metacognitive knowledge in dialogues
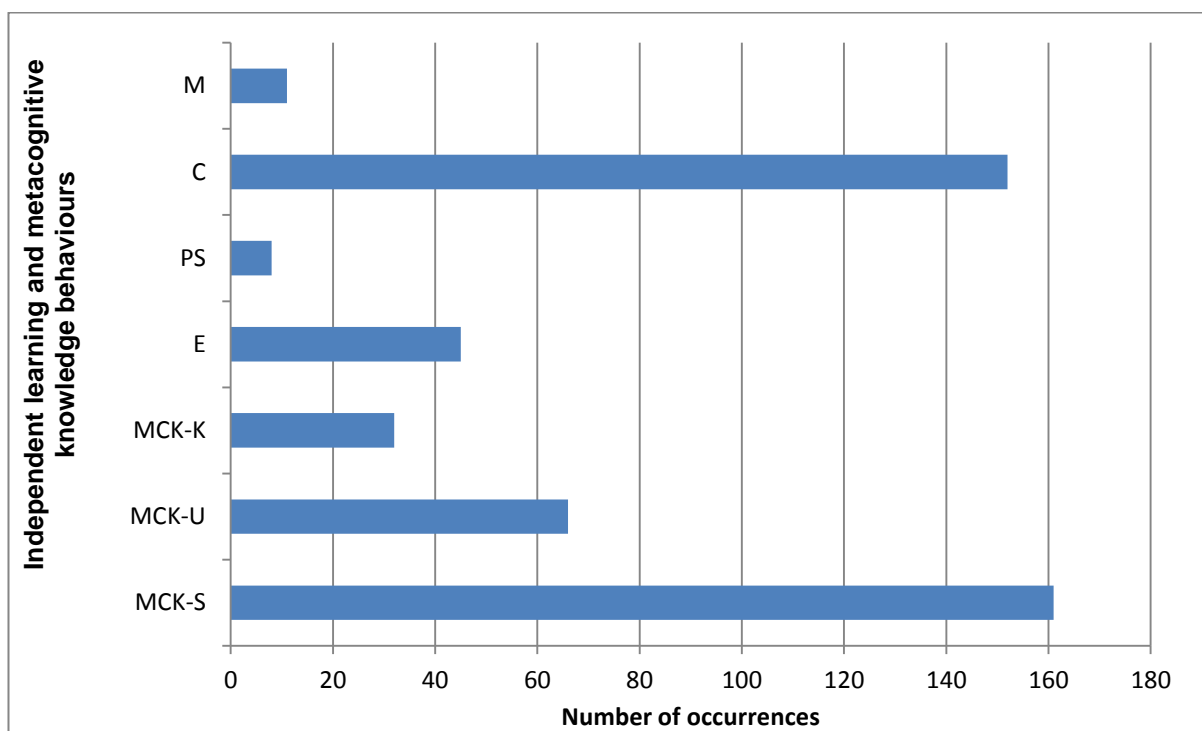
Figure 4.2: Percentage occurrence of independent learning and metacognitive knowledge in dialogues.

Key

M=Motivation; C=Cognitive; PS=Prosocial; E=Emotional; Total MCK= Total Metacognitive Knowledge categories
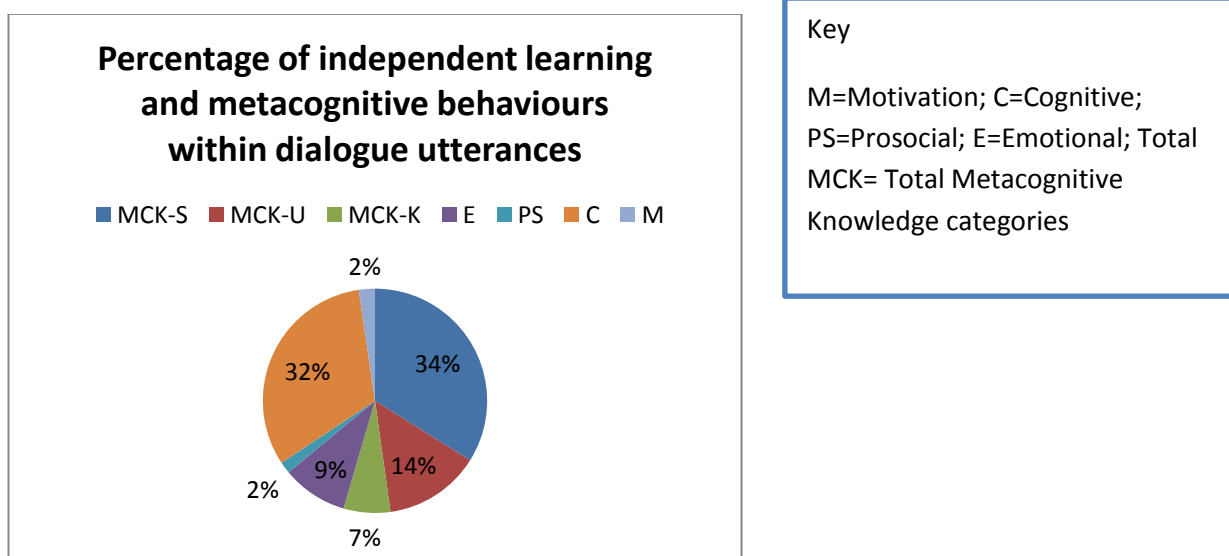
- Observation occurrences of MCK and independent learning categories.

Independent learning categories and MCK behaviours were seen within the majority of reflective utterances in the observations. Figures 4.3 and 4.4 below illustrate the occurrences of whole category areas within each observation. Analysis of the subcategories showed that U1 Understanding', C2 'Can speak about how they have done something or what they have learnt', and E1 'Can speak about own and others behaviour and consequences', were the most prolific categories. K4 'Evaluates effectiveness of one or more strategies', PS4 'Engages in independent cooperative activities with peers', and M5 'Enjoys solving problems' were the least prolific.

Figure 4.3: Occurrence of independent learning and metacognitive knowledge in observations
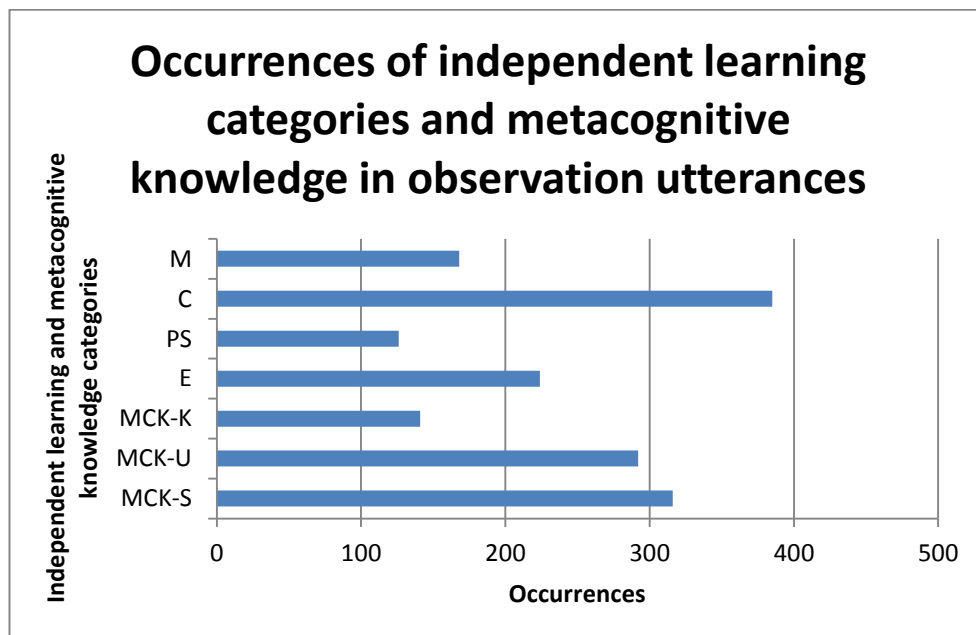
Figure 4.4: Percentage of occurrence of independent learning and metacognitive knowledge in observations

Percentage of occurrences of independent learning and metacognitive knowledge categories in observations

■ MCK-S ■ MCK-U ■ MCK-K ■ E ■ PS ■ C ■ M

19%
18%
10%
23%
8%
14%
8%

Key

M=Motivation; C=Cognitive; PS=Prosocial; E=Emotional; Total MCK-S= Metacognitive knowledge- self; MCK-U= Metacognitive knowledge-understanding; MCK-K= Metacognitive knowledge-knowledge.
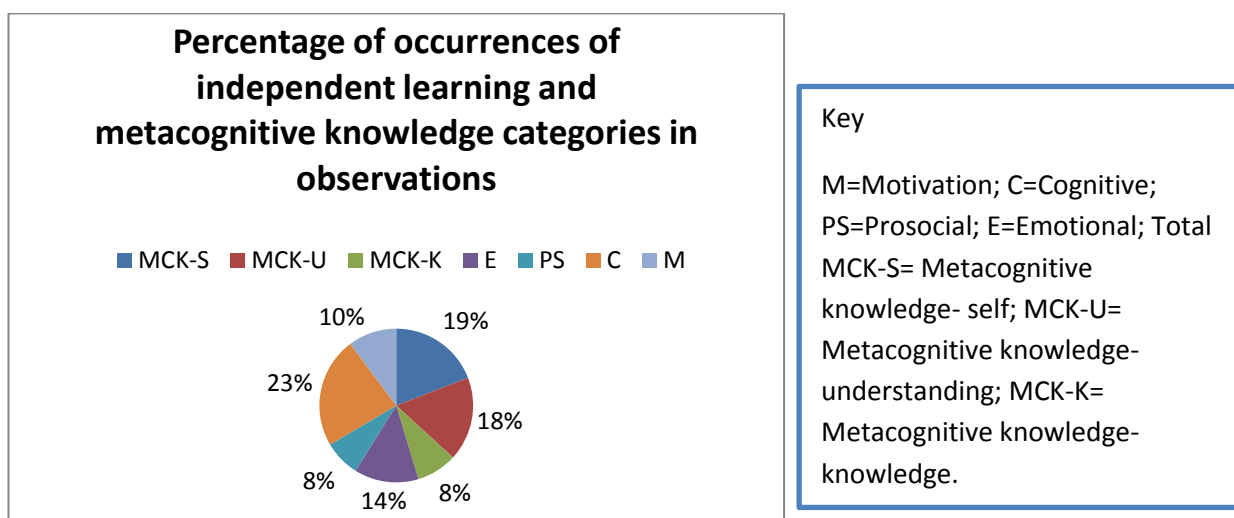
The above Figures show the total occurrences for each category group which are a sum of each sub category as shown in Appendix 17. Whilst this is useful, the number of sub category groups could potentially impact on the number of occurrences recorded. For example, the category Metacognitive Knowledge-Self (MCK-S) has six sub categories compared to Metacognitive Knowledge-Understanding (MCK-U) which has only three. To mitigate against this I decided to re-examine the utterances and to record occurrences of whole category areas rather than individual sub categories. For example an utterance would show as having evidence of MCK-S whether it had one or all six sub categories.

Figures 4.5 and 4.6 below show the percentage of occurrences per category area in both dialogues and observations.

Figure 4.5: Percentage occurrence of whole categories of independent learning and metacognitive knowledge in dialogues

Key

M=Motivation; C=Cognitive; PS=Prosocial; E=Emotional; Total MCK-S= Metacognitive knowledge- self; MCK-U= Metacognitive knowledge- understanding; MCK-K= Metacognitive knowledge- knowledge.
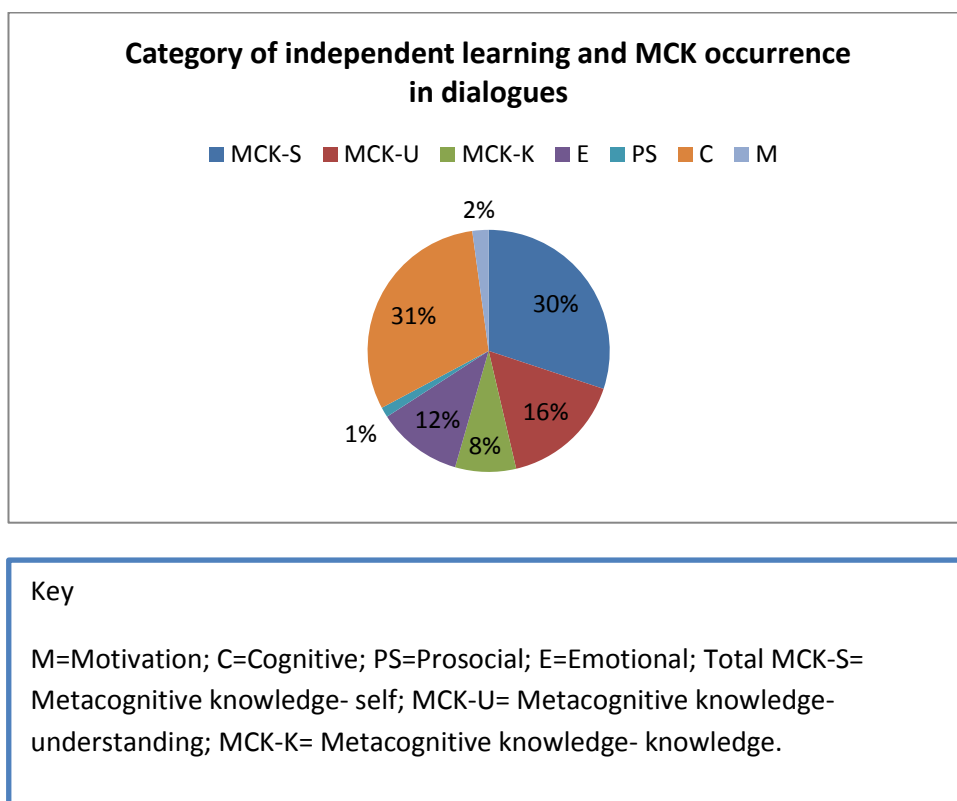
Figure 4.6: Percentage occurrence of whole categories of independent learning and metacognitive knowledge in observations.
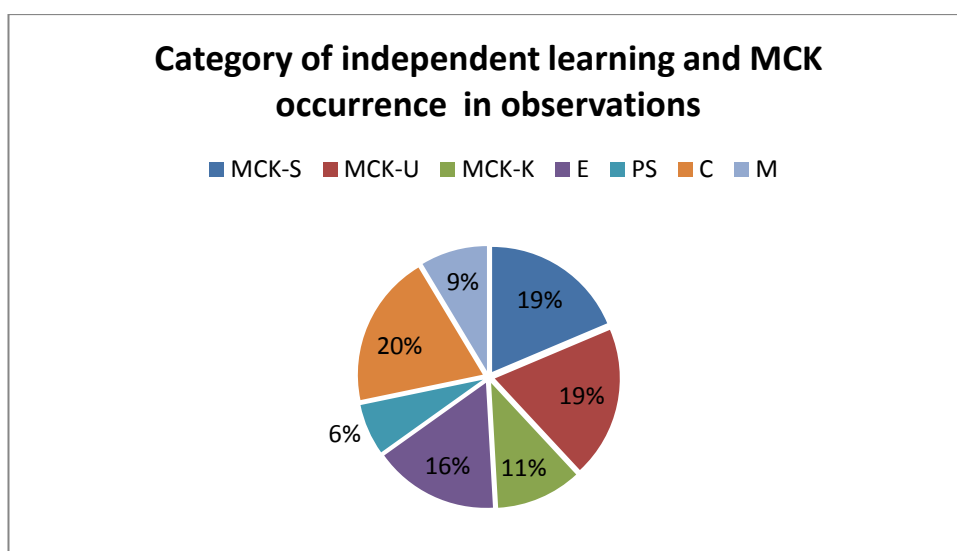
The table below (Table 4.2) below shows that there appeared to be little impact

on the percentages when examining the data by individual sub category and by

whole category areas. I decided therefore to use whole category areas in analysing occurrences.

Table 4.2: Comparison of percentage occurrence by whole and sub category sets

Category	Dialogues-% occurrence by sub categories	Dialogues-% occurrence by whole category	Observations-% occurrence by sub categories	Observations-% occurrence by whole category
MCK-S	34	30	19	19
MCK-U	14	16	18	19
MCK-K	7	8	8	11
E	9	12	14	16
PS	2	1	8	6
C	32	31	23	20
M	2	2	10	9

Key

M=Motivation; C=Cognitive; PS=Prosocial; E=Emotional; Total MCK-S= Metacognitive knowledge- self; MCK-U= Metacognitive knowledge- understanding; MCK-K= Metacognitive knowledge- knowledge.

- Metacognitive behaviour and gender

Analysing the data set by utterance enabled me to examine potential patterns between the different genders. Figure 4.7 and Table 4.3 below shows the occurrence of aspects of metacognitive behaviour for each gender. Most aspects were evident in each child's utterances with the exception of prosocial, and motivational aspects which were evident in only 13 and 12 respectively, of the 14 females. Knowledge, emotional, prosocial and motivation were evident in 13, 15, 13 and 14 respectively, of the 16 males.

Figure 4.7: Number of children displaying independent learning and metacognitive knowledge
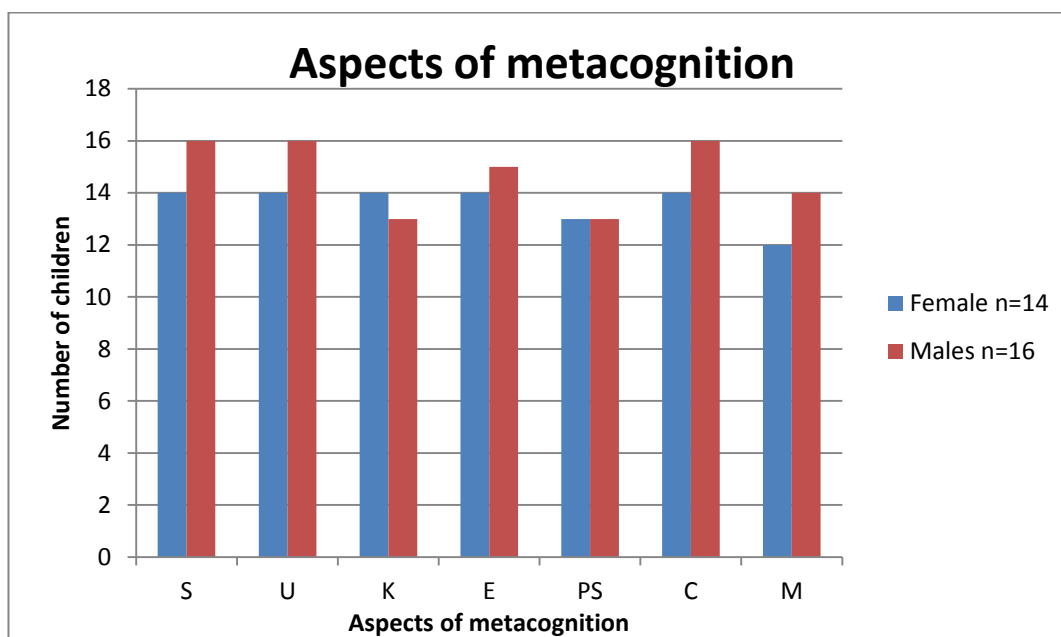
Key

M=Motivation; C=Cognitive; PS=Prosocial; E=Emotional; Total MCK-S= Metacognitive knowledge- self; MCK-U= Metacognitive knowledge- understanding; MCK-K= Metacognitive knowledge- knowledge.

Table 4.3: Occurrence of aspects of independent learning and MCK per child

CHILDREN	Gender 1=Male 0= Female	MCK -S	MCK- U	MCK- K	E	C	PS	M
MRM001	1	2	1	0	0	1	1	1
MRM002	1	14	5	2	7	12	3	1
FRM001	0	4	1	3	4	6	3	0
FRM002	0	1	1	3	3	6	2	0
FRM003	0	10	3	3	3	11	3	4
MRA002	1	7	2	0	6	7	0	0
MRA004	1	7	6	4	3	6	1	4
MRA005	1	4	4	3	2	4	1	2
MRA006	1	10	7	2	5	8	0	1
MRA007	1	9	10	2	5	11	3	3
FRA004	0	8	8	6	5	10	2	3
FRA005	0	16	10	6	10	14	2	5
MNA001	1	5	8	5	5	12	3	5
MNA002	1	22	21	18	16	26	3	10
FNA002	0	9	11	6	6	11	4	3
FNA004	0	20	23	11	14	20	3	4
FNA006	0	2	3	2	1	3	0	1
MNM001	1	31	28	13	20	29	6	11
MNM003	1	7	8	2	5	6	3	4
MNM005	1	27	26	14	22	25	8	7
MNM006	1	3	4	0	2	4	2	0
MNM007	1	7	8	2	5	7	3	1
FNM001	0	4	5	3	4	6	2	4
FNM002	0	1	1	1	1	2	1	1
FNM003	0	9	8	8	8	10	1	1
FNM004	0	14	8	2	9	11	3	3
FRM004	0	15	11	8	13	13	5	7
MRM006	1	12	9	4	10	13	4	5
FRM006	0	8	8	4	5	9	3	3
MRM007	1	9	7	3	7	6	0	2

The occurrences of metacognition and independent learning by gender set (Figure 4.8) show that some aspects of metacognition were more prevalent than others.

Figure 4.8: Occurrence of independent learning and metacognitive knowledge by gender
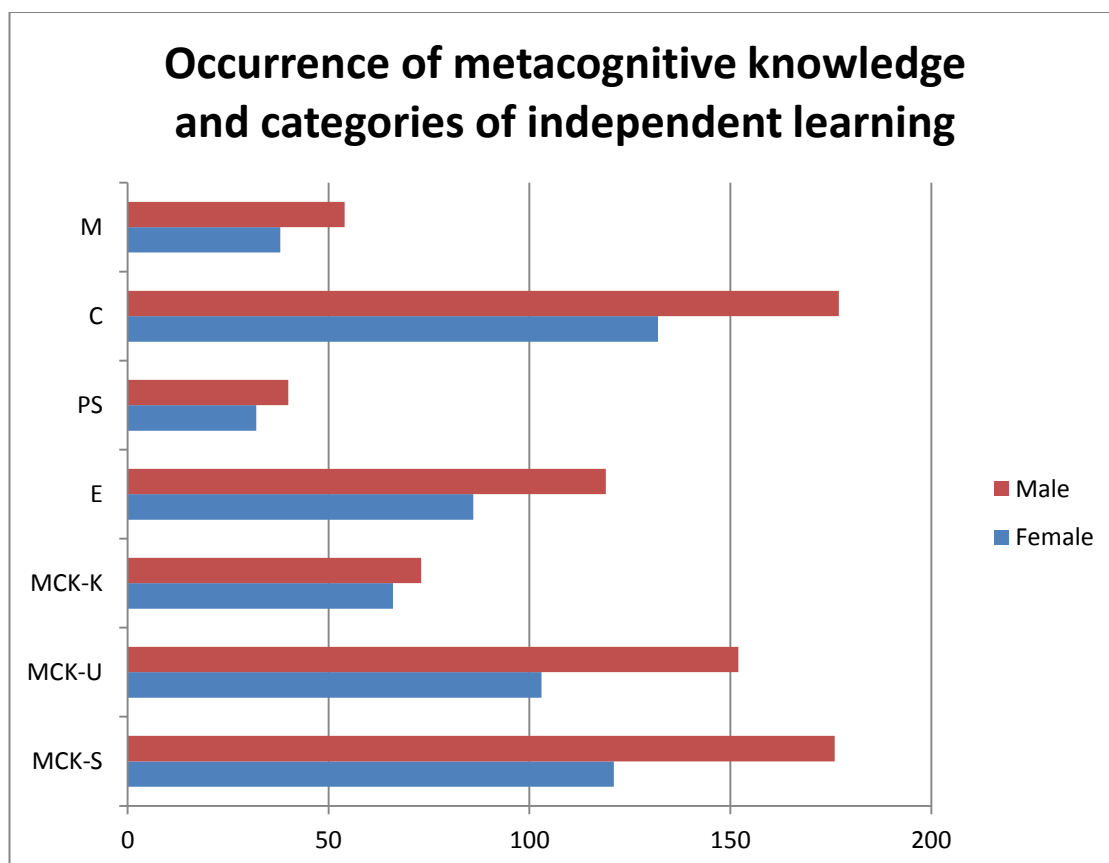
Occurrence of metacognitive knowledge and categories of independent learning

Key

M=Motivation; C=Cognitive; PS=Prosocial; E=Emotional; Total MCK-S= Metacognitive knowledge- self; MCK-U= Metacognitive knowledge- understanding; MCK-K= Metacognitive knowledge- knowledge.

It would appear that there was some similarity between the genders in the pattern of occurrence of categories of MCK and independent learning behaviours across the utterances. Metacognitive-self (MCK-S) and the category of independent learning-Cognitive behaviour were more prevalent than other categories for both male and female children. However, the independent

learning categories-Prosocial and Motivation were least prevalent, for both genders. However, the actual occurrences of each sub category of metacognition and independent learning behaviour across the whole data appears to show that there were some differences between the genders (Figure 4.9). Males apparently displayed significantly more incidences of S2 (aware of own capabilities), S3 (refers to own strengths and weaknesses), U1 (understanding of task), U2 (compares across task, compares similarities and differences), E1 (can speak about own and others behaviour and consequences), E3 (controls attention, resists distraction), C1 (aware of own capabilities) and C2 (speaks about how done something or what learnt) than females (Appendix 17). Females appear to have displayed more S4 (indicates tentativeness) and PS5 (aware of feelings of others, helps and comforts) than male children.

Figure 4.9: Occurrence of independent learning and metacognitive knowledge sub categories by gender
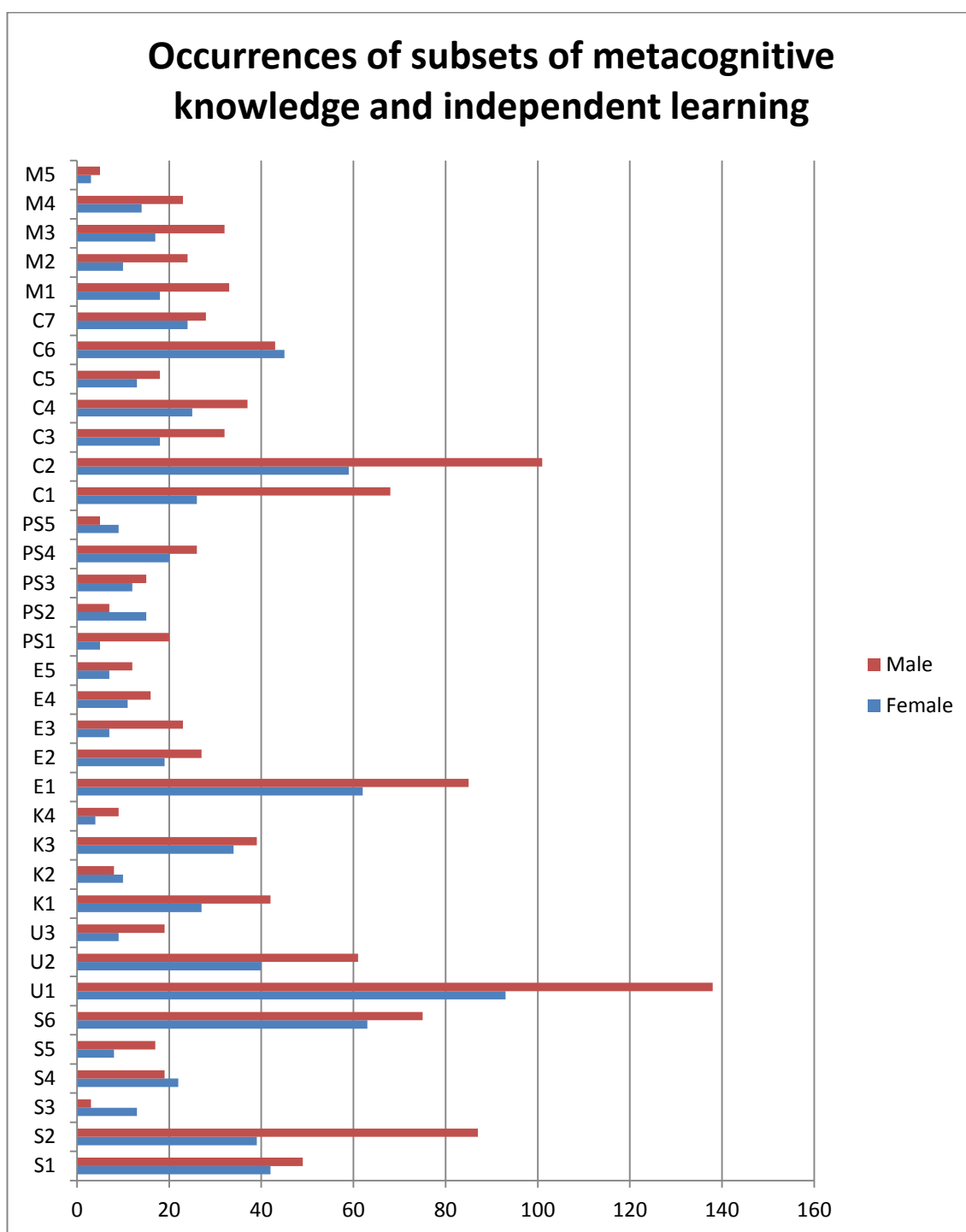
It is significant to note however, that these results are potentially skewed by the different number of male and female utterances within the data set. For example of the 438 utterances, 193 are made by females and 245 are male utterances.

To mitigate against this, I reanalysed the data using the first four utterances per child from the data set. Four was chosen as this represented the lowest number of utterances recorded per individual child. Figures 4.10 and 4.11 below suggest that metacognitive –self and cognition remain the most prevalent categories when looking at the first four utterances only. However, metacognitive –understanding had a similar occurrence to metacognitive-self, within the first four female utterances.

Male children demonstrated significantly more metacognitive-self behaviour (50) in the sample than females (37). This analysis also suggests that female utterances were more likely to contain prosocial behaviour than males with 16 occurrences compared to the 9 male.

Figure 4.10: Occurrence of aspects of independent learning and metacognitive knowledge in first four utterances
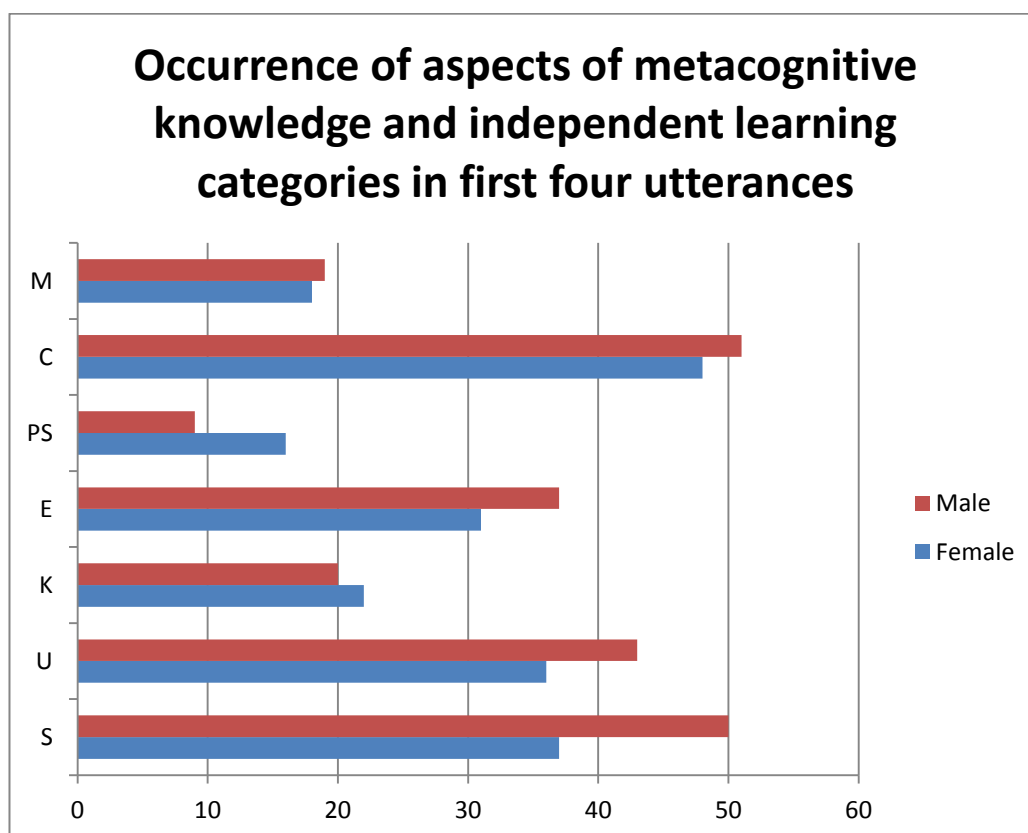
Figure 4.11: Percentage occurrence of independent learning and metacognitive knowledge per gender in first four utterances
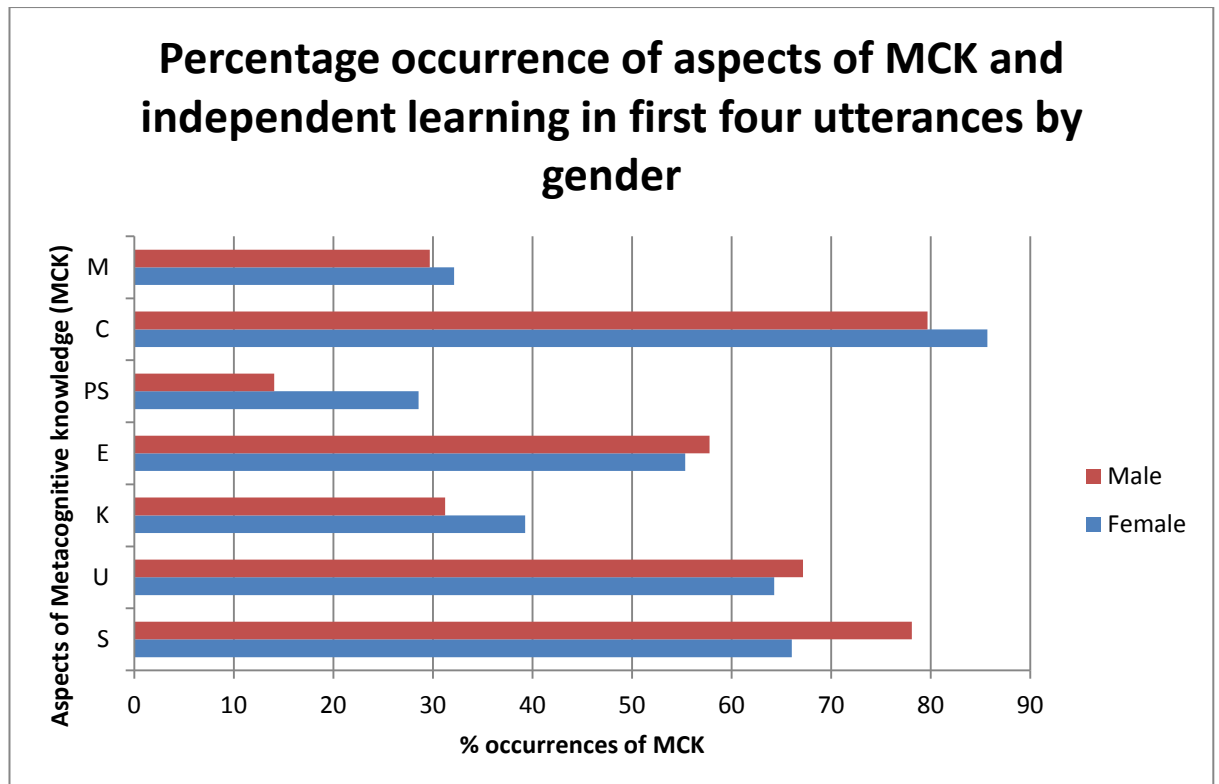
I decided to explore further the possibility of there being potential relationships between various aspects of the data, such as gender and the MCK behaviours. The following hypotheses were identified.

- Hypothesis 1

The null Hypothesis was that there would be no difference in the proportion of males or females demonstrating MCK-U Metacognitive Knowledge-aspect understanding.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1= Male , $P_2 =$ Female , P_3 = MCK-U, P_4 =No MCK-U

The research Hypothesis was that there may be a difference in the proportion of males and females demonstrating MCK-U Metacognitive Knowledge-aspect understanding.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 2

The null Hypothesis was that there would be no difference in the proportion of males or females demonstrating MCK-K Metacognitive Knowledge-aspect Knowledge.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1= Male , $P_2 =$ Female , P_3 = MCK-K, P_4 =No MCK-K

The research Hypothesis was that there may be a difference in the proportion of males and females demonstrating MCK-K Metacognitive Knowledge-aspect Knowledge.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 3

The null Hypothesis was that there would be no difference in the proportion of males or females demonstrating MCK-S Metacognitive Knowledge-aspect Self .

H_o: $P_1 = P_2 = P_3 = P_4$

P_1= Male , $P_2 =$ Female , P_3 = MCK-S, P_4 =No MCK-S

The research Hypothesis was that there may be a difference in the proportion of males and females demonstrating MCK-K Metacognitive Knowledge-aspect Self.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

To ensure a large enough sample size, the whole data set was used. A spreadsheet was created, which identified each reflective utterance, the child/ author, their gender, the topic of it, the reflective time scale, independent learning and metacognitive behaviour (Appendix 19). Table 4.4 shows the occurrence of independent learning and MCK across all utterances for each gender.

These data were entered into SPSS and the statistical measure Chi Square was used to identify potential relationships between set parameters. Chi Square was chosen as it allows exploration of the possibility of variables being dependent or independent of each other. The level of risk was set at 0.05 for all calculations with 1 degree of freedom (df=1), the critical value is 3.84, allowing level of risk of 0.05, using the Chi Square table. Table 4.5 below shows the statistical data taken from the SPSS.

If the obtained value (Chi Square) is greater than the critical value of 3.84, at a 0.05 level of significance, then the null hypothesis that the frequencies are equal to one another is not the most attractive explanation for any differences. It is possible therefore that the research hypothesis is the most likely possible explanation. Where the obtained value is less than the critical value, the null

hypothesis is the most attractive explanation for any difference and that the difference is not simple chance.

Regarding Hypothesis 3, which states that there may be a difference in the proportion of males and females demonstrating MCK-S (Metacognitive Knowledge-aspect-Self), $X^2=4.134^a$ (Tables 4.5 and 4.6), therefore, this suggests that chance is not the most attractive explanation for the difference in occurrences.

There were 438 utterances of which 245 were male utterances and 193 were female.

Utterances contained in some instances evidence of more than one type of metacognitive behaviour.

Table 4.4: Metacognitive knowledge and independent learning occurrence within utterances

	Metacognitive knowledge-self	Metacognitive knowledge understanding	Metacognitive knowledge-knowledge	Emotions	Pro social	Cognitive	Motivation
Male	176	154	74	120	41	177	57
Female	121	101	66	86	34	132	39
Total	297	255	140	206	75	309	93

Table 4.5: Chi square statistical data from dialogues and observations

Variables	N	Chi Square value	df	P value
Gender and MCK-U	438	0.880[a]	1	0.348
Gender and MCK-K	438	2.167[a]	1	0.141
Gender and MCK-S	438	4.134[a]	1	0.042

Table 4.6: SPSS Crosstabs Table

s all occs1 * Gender Crosstabulation

Count

		Gender		Total
		Female	Male	
s all occs1	.00	72	69	141
	1.00	121	176	297
Total		193	245	438

4.3 Qualitative analysis

The second phase of analysis involved thematic analysis of the observations, field notes and dialogues and this resulted in the creation of codes relating to reflective utterances and activity. These reflective codes mirrored those identified in the pilot scheme.

Theme 1: Reflection timeframe or mode; temporal aspect of reflection

It became apparent that children reflected on events and experiences which related to different periods of time. Table 3.4 (see page 85) below identifies the timeframes and Figure 4.12 (page 128) the occurrences within the data.

Table 3.4 Reflective time frame and codes

Reflection time frame or mode	Code
Past events	R1
Present or immediate past events	R2
Future events.	R3

R1: Past events

As in the pilot study, the children reflected on a range of events, some of which were past events and experiences. Vocal children use a range of different vocabulary such as; past tense action verbs and prepositions such as 'before'. Children also demonstrated past reflection in their actions as they

repeated actions apparently learned earlier. To illustrate this, the following vignettes combine excerpts from observation transcript and field notes:

> '*Child (FNA002) came over to the sand tray where an adult was sitting. She indicated to the adult that she wanted to pay the treasure game which they had played the previous week.*
>
> *FNA002 'Looking for treasure' she said and smiled at the adult.*
>
> *She picked up the beads and began to bury them. A boy MNA002 came up to the tray. She smiled at him*
>
> *FNA002 'he close eyes',*
>
> *FNA002 recalling that these were the rules which the same boy had insisted on last week.*
>
> *MNA002 'I will close my eyes FNA002 and you have to bury the treasure. Then I open my eyes and I will find them all. Coz x marks the spot.'*
>
> *MNA002 closed his eyes and FNA002 looked up at me smiling before finishing off burying all of the beads.*
>
> *FNA002 'keep eyes closed' to MNA002. 'finished'.*
>
> *MNA002 opened his eyes and began to scoop the sand away using a sieve. He found three beads*
>
> *MNA002 'x marks the spot'.*
>
> *FNA002 was smiling and clapped. Once MNA002 had found five of the beads he counted them*
>
> *FNA002 'my turn, I shut eyes'.*
>
> *She was excited, jumping up and down and shut her eyes using her hands to cover them.'*
>
> **Observation 7- session 7**

> '*I returned the nursery unit and FNA002 instantly recognised me when she came in. I was sitting at the sand tray where she had played with Child MNA002 and Child FNA008 last week. FNA002 and smiled at me and came to the sand tray. The resources were the same, dry sand and glass beads. FNA002 is a quiet girl and a little shy at first, she can talk but has a tendency to use telegraphic speech at times. I have noticed in previous observations that she sometimes struggles to take turns. She clearly remembered the game from last week and wanted to play it again. She knew that the searcher had to keep their eyes closed to play the game.*'
>
> **HR Observation field notes 05/2/15- School B.**

R2: Present or immediate past events

Reflections on the immediate past or present events were the most prolific of the reflective types within the observations and dialogues. These reflections were spontaneous and evidenced children's thinking. Frequently the children talked about the event, their understanding of the experience, event of knowledge, demonstrated new knowledge based on the recent experience and in some cases referred to how they felt about it. For example,

> *Morning nursery class; after break. Child MNA002 brought a book about dinosaurs into nursery and he took it where ever he went. He had a very good memory for the names of each dinosaur and enjoyed talking about the images in it.*'
>
> **HR Observation field notes 26/2/15 School B**

> 'Observer '*Hi C, how are you?*'
>
> *MNA002 'Fine, I have got a book about dinosaurs and this one is called T Rex. I am very good at dinosaurs and I know them all.'*
>
> *MNA002 points to the dinosaur and then proceeds to point out others, naming them. He points out how one looks like bird as the image has feathers on it. He tells me that T-Rex is a meat eater and roars. I smile and ask him how he knows that T-Rex is a meat eater and then thinks for a while and then says because he has sharp teeth. I agree and ask if there is any other clue that could show that he eats meat. He shakes his head and I point to his feet.*
>
> *MNA002 'Sharp claws ' he smiles.*
>
> *Observer 'well done' 'can you think of any other meat eater animals?'. MNA002 smiles and roars again*
>
> *MNA002 'tiger, they eat meat and they have sharp teeth and …sharp claws?*
>
> *Observer 'shall we see?*
>
> *He thinks for a moment and then points to the small world play. We go to the small world play area and Child MNA002 starts to look through the animal box for a tiger to check. MNA002 finds a tiger and points to the claws. He smiles at himself and then continues to sort through the animals inspecting their feet'*
>
> **Observation 11- session 11**

R3: Future events

Future events did sometimes figure in children reflections. Typically, these events referred to things which children were going to do or people they were going to do something with. For example,

> *MNM005 'Are you my teacher today?*
>
> *Observer 'No I am here doing my research, do you remember?*
>
> *MNM005 'Ah'*
>
> *MNM005 'I have been to two schools already and this is three. At my first school I can't remember but my last one I had my lunch there and my mummy picked me up and there were babies too. When I am 5 I am going to big school. Into class 3 and my teacher will be Mrs S. I will be a big boy and stay all day. I am going to have a school dinner and my mummy will come to get me. There won't be babies though. I am going to do lots of work at school like E (his sister). She doesn't like school dinners but I will. My favourite is fish fingers.'*
>
> **Observation 20- session 20.**

Figure 4.12 below shows the occurrences of each of the different reflection timeframes. It appears that present/ immediate past tense reflections R2, were the most prolific for both genders and future reflections least.

Figure 4.12: Reflective timeframes by gender
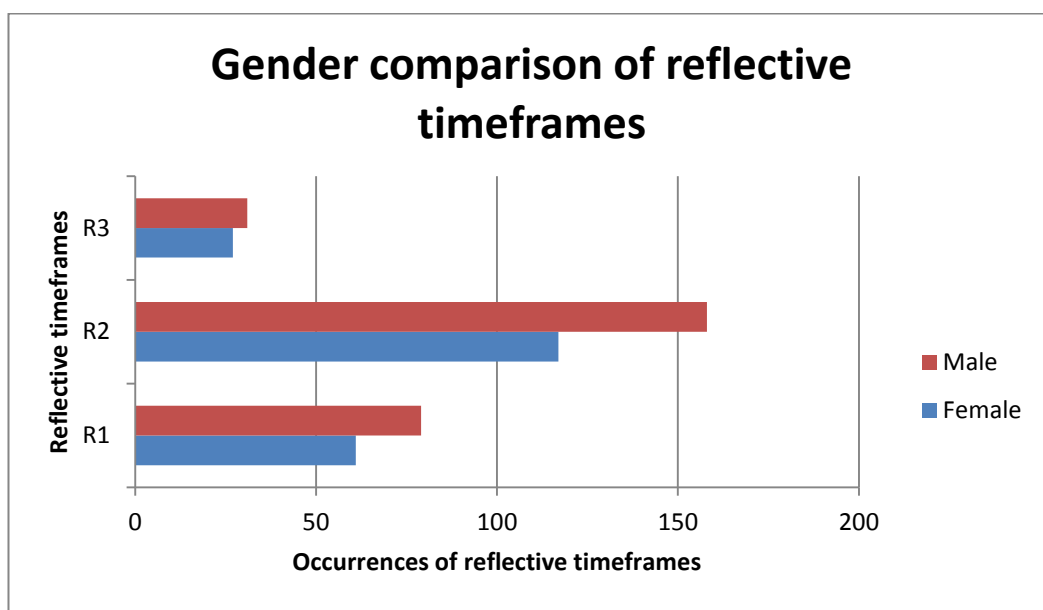
Key: R1= past tense reflection; R2= present or immediate
past; R3= future tense reflection.

This aspect when examined across the first four utterances per child (Figure 4.13) similarly showed that R2 was the most prolific type of reflection. However, this sample revealed that females were more likely to reflect on past tense and future tense than males.

Figure 4.13: Reflective timeframes in first four utterances by gender

Reflective timeframes by gender for first four utterances
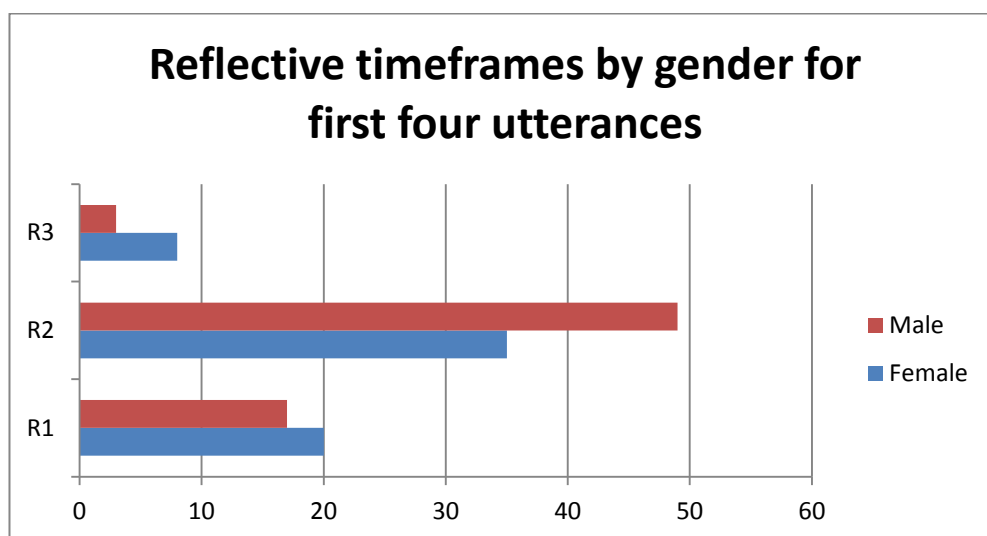
Key: R1= past tense reflection; R2= present or immediate past; R3= future tense reflection.

Theme 2: Topics of reflection

Within the dialogue and observations a variety of topics were reflected on and these could be categorised into sub themes with distinct foci. Initially coding of these themes was as described on page 87 and repeated below.

Table 3.5 Topics of reflection and codes (below and page 87)

Topic of reflection	Code
Objects	RO
Events	RE
Person	RP
Feelings or emotions	RFE
Character/ cartoon	RC
Actions	RA
Strategies of learning	RS

Additional topic themes were identified as below in Table 4.7.

Table 4.7: Further topics of reflection and codes

Topic of reflection	Code
Food	RF
Actions of others	RAO
Social relationships/ friendships	RSF
Weather	RW

- RO: Objects

As in the pilot study, inanimate objects were frequently the focus of reflective discussion or actions. Whilst many of these objects were those found in the classroom, some were objects which the children had at home, or that they had seen outside. The children would talk about the object, describing its properties or their relationship to it. An example below illustrates this.

> *Two children are playing with the toy trains. MNM006 and MNM001 (boys)*
>
> *MNM006 'I went on two trains and do you know what made it run?*
>
> *MNM001 and the observer look at him*
>
> *MNM006 'coal'*
>
> *Observer 'I knew that you knew that word'*
>
> *MNM006 'Do you know how I know it?'*
>
> *MNM006 'Because it is not easy to find, but it is easy to break.'*
>
> *MNM006 'It's not easy to find it, because you have to break rocks, black rocks, then the coal is under it'.*
>
> *Observer 'So where does the coal come from?'*
>
> *MNM006 'Mine, like diamonds'. 'Or like emeralds'*
>
> *Observer 'What happens to the coal on the train?'*
>
> *MNM006 'it goes to steam'. 'You have to cook it''.*
>
> ***Observation 23- session 23***

- RE: Events

Significant events such as birthdays, holidays and trips were the foci of children's reflections. Sometimes these reflections were prompted by a resource as in the example below, other prompts included questions, or the presence of an adult or comment made about the weather or a person. For example,

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MNM001 is playing at the sand tray with an adult

MNM001 '*I've been on holiday.*'

Observer 'Have you where did you go?'

MNM001 'I went down the south'

MNM001 'I and dad went down the beach and it was nice, the water was cold. It went back and front'.

Observer 'Backwards and forwards, that is called the tide'

MNM001 'I built castle and water knocked it down'

Observer 'Oh no'

MNM001 'Yes it didn't break the flag though'.

Dialogue Transcript 19- session 48.

- RP: Person

Typically children reflected on their immediate family or friends, talking about something that they had done or said or were going to do. These reflections were often rich in detail and offered insight into the child's ability to consider the feeling of others. The example below is different as it involves child reflecting on the skills of a visitor; a juggler. For example,

'*The theme in school this week was the circus and a theatre company had visited school to teach the children circus tricks. The reception class are in free flow play and several boys were re-enacting some of the tricks they have been taught*.'

Excerpt from field notes date 5/3/15- School B.

> '*MNA002 and MNA001 are playing in the home corner. They are talking about juggling and who can juggle the most balls. MNA002 notices the adult and comes up to show her the balls. They are invisible balls.*
>
> *MNA002 'Look, watch me juggle.'*
>
> *MNA002 mimes juggling*
>
> *Observer smiles and says 'well done'.*
>
> *MNA002 'We had a man who came to show us how to do circus tricks. I can juggle now, look. How many balls do you think I am juggling?.*
>
> *Observer ' three'*
>
> *MNA002 'no'*
>
> *Observer 'five'*
>
> *MNA002 'No 8, watch'*
>
> *MNA002 continues to demonstrate invisible juggling.*
>
> *MNA002 'I am good at it and the man was too, he showed us how to juggle feathers too and how to walk across a tight rope.'*
>
> *He was very good and had on red and yellow trousers. He is a circus man.' ' you just have to move your hands faster when you have more balls.'*
>
> **Observation 14- session 14**

- RFE: Feeling and emotions

A few children appeared to reflect on their own feelings and sometimes the feelings and emotions of others. These reflections usually referred to past experiences and often referred to instances when they had felt unwell. Below is an example.

> FRA005 '*I have got a photo of me in hospital. I was in hospital when I was a baby.'*
>
> *She shows a photo of her getting a sticker from a nurse.*
>
> *Teacher 'Can you tell the other children why you were in hospital FRA005'*
>
> *FRA005'I had a poorly heart and it got mended. I got a sticker.'*
>
> *Teacher 'You did, that is a photo of you being very brave isn't it.*
>
> *FRA005 'Yes I was brave and when I go again I am brave and not scared. I am having a photo taken of my heart again. I have to lie still but it doesn't hurt. My mum comes with me and we are having fish and chips when we get home. E can't come he is with granny. He would be scared, but I'm not'.*
>
> **Observations number: *9- session 9*.**

- RC: Characters/ cartoons

A surprising number of reflective utterances contained references to characters from the television or computer games. Power heroes figured significantly and children had quite in depth conversations about these and their characteristics, strengths and weaknesses. For example,

> *'Two boys are drawing at the marking Table in reception and chat about their favourite super heroes.*
>
> *MRA001 has drawn a Figure and shows it to MRA002.*
>
> *MRA001 'Look mine is batman and he has super powers. These are his blasters and he can power you.'*
>
> *MRA001's drawing is of a man and there are rockets coming from each of his arms.*
>
> *MRA002 'Mine is Spiderman and he has webs to blast as well. He will catch you and spin away. He is fast so you won't catch him with your rockets.'*
>
> *MRA002 is now drawing using a red crayon. He has a head and a body drawn.*
>
> *MRA001 'Did you see batman he shoots, pow and then the baddies are dead, he blasts them. I watched it last night and I am going to watch it again tonight'.*
>
> *MRA001 'I can draw the blasters, look.' shows MRA002 his drawing.* **Observation session 1**.

- RA : Actions

Reflecting on their own actions occurred frequently within the observations and dialogues. Sometimes these reflections were in response to a question or a resource. For example,

> '*Child FRM006 is drawing and an A comments on her picture. She smiles*
>
> *FRM006 ' I still need to write my name on it'. ' I can put the lid back on with my head, watch.*
>
> *FRM006 presses the pen top back on using her head and smiling. The A smiles at her*
>
> *A 'I am glad that you have remembered to put the lid back on, what happens when you don't?'*
>
> *FRM006 'Runs out'*
>
> *A 'Do you draw at home?'*
>
> *FRM006 'yeh I like drawing vehicles at home.*
>
> *FRM006 'I did draw a helicopter. I am going to draw one here'.*
>
> FRM006 begins to draw the blades.
>
> **Dialogue 19- session 48**

- RS: Strategies of learning

There are more examples of these reflections within the dialogues because the researcher directed these discussions and sometimes used photographs of children's work to prompt their recall. There were some however, which were child initiated. An example of an adult initiated reflection is below.

Observer 'I also saw, MRA001 I saw you doing today some really good writing, you wrote your name! Do you remember on the whiteboard?"

MRA001 "Yeah."

Observer "And Miss M was so impressed wasn't she?"

MRA001 "Yeah."

Observer "Why did she think your name was really good?"

MRA001 "Because I writed two names."

Observer "Two names?! You did your first one which was..?"

MRA001 "X"

Observer "-XXXX. And your other name.."

MRA001 "Mmmm"

Observer "Mmmm good boy. And he remembered something really important in the middle. And when you were writing MRM002, you did it too, what did you have to remember to do?"

MRM002 "Finger space"

Observer "That was your target to do? And you did some finger spaces today? MRA001 did you do a finger space today?"

MRA001"Yeah"'

Dialogue 3- session 35.

Figure 4.14 below, shows the occurrences of the reflective topics across the whole data set, with reflecting on objects, RO and, reflecting on actions, RA being the most prolific for both genders. Interestingly, when considering the first four utterances only (Figure 4.15) the most prolific topics of reflection for male children were reflecting on strategy, RS, and reflecting on objects, RO. Female children within the first four utterances were more likely to reflect on objects, RO.

Figure 4.14: Occurrence of reflective topics

Key: RO= Objects; RE= Events; RP=Person; RF= Food; RFE= feelings or emotions; RC= Character or cartoon; RA= Actions; RAO= Actions of others; RS= Strategy; RSF=social or friendships; RW=Weather.
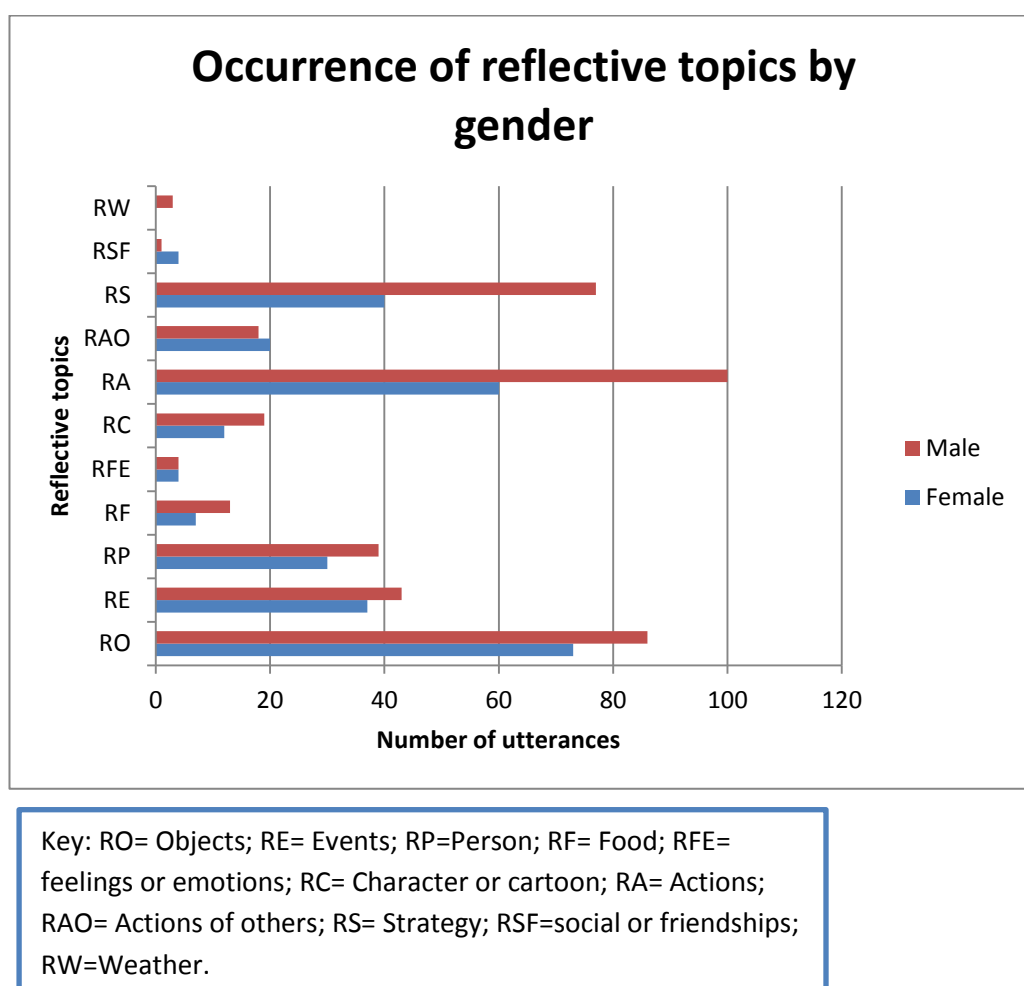
Figure 4.15: Occurrence of reflective topics in first four utterances

Reflective topics by gender in first 4 utterances

Bar chart showing number of occurrences of reflective topics by gender (male in red, Female in blue). Y-axis: Reflective topic (RW, RSF, RS, RAO, RA, RC, RFE, RF, RP, RE, RO). X-axis: Number of occurrences (0 to 30).
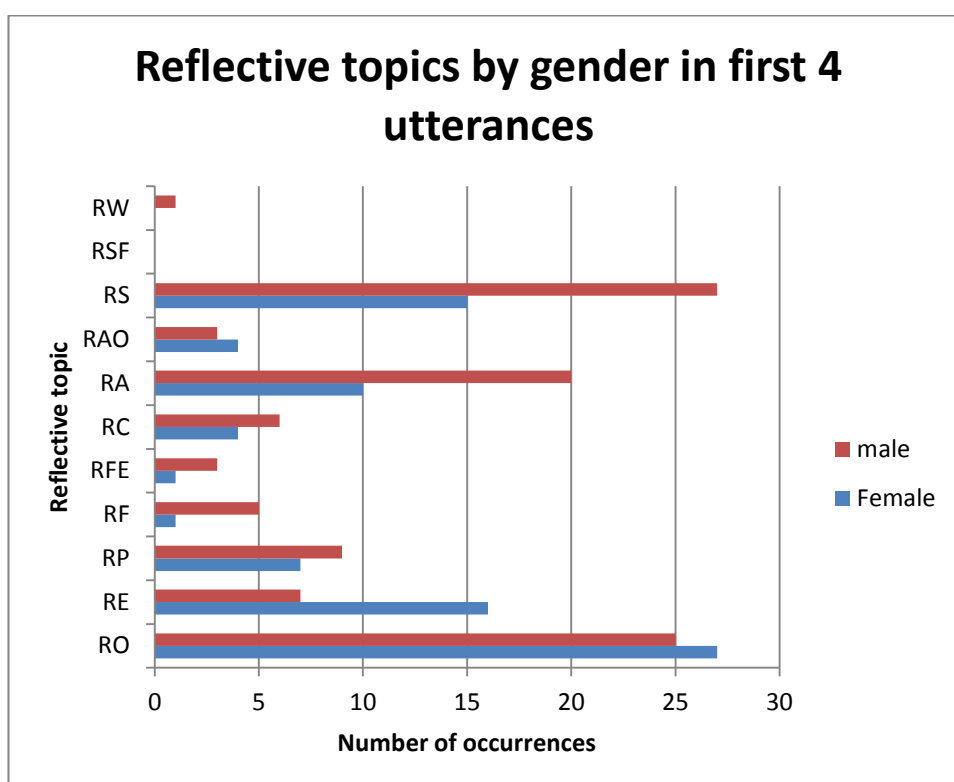
See above key on page 138

Theme 3: Reflective style which children used.

An additional theme was discovered and this related to the overall style of the reflective utterances or behaviour, or their disposition to reflect. This theme presented itself on analysis of the field notes, as shown below. Excerpts from field notes exemplify this.

> 'There is a *small group of children, who I have recorded* ==reflecting more frequently== *than others. Some of these children obviously seek me out to talk to, others I have managed to observe reflecting as they play*.'
> **Field notes 20/1/15- School B**

'*The observations and dialogues enable me to record some obvious reflective utterances but today I am left wondering if the reflections are different in some way, if the* ==children reflect in a certain way or about certain things==*?.*

Field notes 27/1/15- School B

'*What is a reflection? Getting confused and* ==don't want just 'recall'== *to be what I am recording and calling reflection; I need to make sure that what I have operationalised as reflecting is that. This week plan to re-read literature and establish exact criteria for reflective utterances.*'

Field notes 5/2/15- School B.

'*Reflective utterances- established it as 'utterances, comments or actions which show a child recalling a* ==previous event== *or experience which provides* ==detailed information== *about an event/ experience and also* ==how they felt,== *or* ==what they have learned== *and or* ==why they did something*==*, based on Jordi (2011), Mercer and Littleton (2007)and Zelasas (2015).*

Field notes 8/2/15- School B.

'*Different topics appear in reflections more than others; people, things c's do and where they have been. Some c's appear to* ==reflect more about themselves than others*==*.*

Field notes 5/3/15- School B.

> '*Today MNM001 has reflected lots, it is not all about him though, more Vygotskian feel, as if talking out loud; it is about strategies, things he knows and a bit about the property of objects etc. But MNM004's reflections are almost always about him or his family, objects and events which relate to him. Poss. look again at all reflective utterances to see if other categories are evident.*'
> **Field notes 24/4/15- School C**.

Studying their utterances it became apparent that their reflections predominantly reflected one of two distinct styles; '**objects and I'** style, or '**know and do'** style'.

- '**Objects and I'** reflections differed in that the focus was on objects and the children's relationships to them more than procedural knowledge. For example,

> *FRM004 'I am painting at the weekend. I am going to paint a zebra. I need more black paint though as you can't mix black paint so I will have to ask my mum to get me some'*
> **Observation 18- session 18**

> *FNA001 'E my baby sister was 0 years old yesterday but she had her birthday and now she is 1' ' my mum made a birthday cake and it had a candle on it and number 1 and it was in a box'.*
>
> *Observation 3- session 3*

> *FNM003 'They [the chickens] did peck me' (as she showed me her arm).* '**Observation 23- session 23**

MRA001 *'I have a plaster, look. Do you know, when MRM002 and I run MRM002 stayed next to me. I am not fast, coz I losed my breathe. I am not good at running, my heal is not too bad now, but my blister might come back, if I don't wear trainer socks again*.'

Observation 2- session 2

FNA004 '*I can climb all of the stuff in PE and throw balls really high. PE is my favourite, I do lots of stuff there.*'

FNA004 Dialogue 6- session 38

FNA004 '*I think that the nursery rhyme this week is about bees. Because I saw yellow play dough. My bike is yellow and yellow if my favourite colour*'.

Dialogue 13- session 42

- **'Know and do'** reflections focussed on the individual's knowledge of the processes of events and or experiences. They talked about what they did or what they knew in relation to actions. For example,

MRA007 '*I know all of the diagraphs*'.
A '*How do you know these?*'
MRA007 '*Because I keep on learning them. I keep on remembering them and I can do them.*'
Dialogue 4- session 36

FRM004 '*Do you actually know what you can do with bubble gum? You can blow it into a big bubble like this and then pop it.*'
Observation 18- session 18

'*In this observation MNM001 is paying with the small world play which is set out to mirror the story about the naughty bus. He role plays with the bus retelling the story through his actions and with use of very few words. He manipulates the bus, manoeuvring it around a course, making the bus have accidents which mirrored the story and then repairing the course. Eventually he does use words to retell the story and re-enacts the story again with words for nouns and actions.*'

Observation 24- session 24

'*FRA003 has watched two other children making paper bags. She then indicates using gestures that she wants to make one too. She picks up the appropriate materials, folds the paper in half, sticks down the sides and cuts a strip of paper to make the a handle. When she struggled to manipulate the handle she made noises which suggested that she was frustrated with it. When an adult offered to help, she accepted and followed their* instructions.' **Observation 4- session 4**

MNM001 '*Look a track*'

MNM001 '*Look it looks like a triangle, It looks like a pizza cause it is triangle shaped.*'

Dialogue 20- session 49

'*MNM001 is playing with the dry sand, filling bottles using a funnel. Another child comes to help him.*

MNM001 'Put a lot in.. We are making a leaky bottle.'

When the sand almost reaches the top the sand stops running through into the bottle. Initially he tries to push the sand down into the funnel. Then MNM001 lifts the funnel up and it continues to run in and over the top. 'Come on' MNM001 says to the sand.

The other child approaches to tip more sand into another bottle which is almost full. The other child says 'we need to put some more in' MNM001 notices.

MNM001 'no, need to put some more in' and then he lifts the funnel to let the sand move through it.

MNM001 'It's almost full now".

Observation 31- session 31

- Relationship between independent learning and MCK and reflective style

The next analysis involved looking at any potential relationship between these styles of reflection and independent learning and MCK ability. Whilst each child's independent learning behaviour and MCK was measured at the start of the observation, it was not intended through this study to measure any rate of improvement or progress. Rather, it was hoped that there might be an indication that some children had a disposition to reflect more than others and to investigate whether there was any correlation between that disposition and their base line metacognitive behaviour.

Analysing the utterances of the children, as well as the field notes, there were fourteen children who stood out from the 30 who featured throughout all of the observations and dialogues These data for the fourteen children, who were recorded reflecting frequently throughout the study were analysed. It is not unreasonable to assume that the higher ability children might demonstrate independent learning and MCK 'usually' and or 'always', compared to the middle ability children who might demonstrate this 'always' or 'sometimes', and the lower ability children 'sometimes' or 'never'. The results shown in Table 4.8 below corroborated this. The teachers' independent learning and MCK assessments did correlate to the three ability bands (Table 4.8).

What was more interesting, however, was the relationship between the ability of the child/ their metacognitive behaviour and their reflective style. The below table shows that, with the exception of the two lower ability children who both demonstrated a 'Know and do' style of reflecting there is no obvious relationship between ability and reflective style.

Table 4.8: Teacher assessments of independent learning, ability and reflective style

Child	Ability	Metacognitive knowledge assessment CINDLF	Reflective style
FNA004	Medium	Usually/sometimes	Objects and I
MNA002	High	Always/ usually	Know & do
FNA002	Low	Sometimes/never	Know & do
MRA002	Low	Sometimes/never	Know & do
FRA004	High	Always/ usually	Know & do
FRA005	High	Always/ usually	Objects and I
MRA004	Medium	Usually/sometimes	Objects and I
MNM005	High	Always/ usually	Objects and I
MNM003	Medium	Usually/sometimes	Know & do
MNM001	Medium/ Low	Usually/sometimes	Know & do
FNM003	Medium	Usually/sometimes	Objects and I
MNM006	Medium	Usually/sometimes	Know & do
FRM006	Medium/High	Always/ usually	Objects and I
FRM004	High	Always/ usually	Know & do

Theme 4: Context of reflection

Qualitative analysis of the field notes, observations and dialogues indicated that contextual factors may influence reflective comments and metacognitive knowledge activity.

These factors include;

1. Resources (materials, activities, provision areas)

Throughout the observations and reflective dialogues there are instances where the resources in the classrooms clearly motivated children to reflect. Examples include images around the room, small world play to reflect stories and themes which children are interested in, having provision areas which reflect children's interests and also allow for children to rehearse and revisit key learning. All of these resources allow for the children to reflect on previous knowledge and learning. Similarly, familiar resources allow the children to explicitly refer to their own likes, preferences and to demonstrate knowledge of skills and their understanding of key concepts. Activities such as role play and creative tables enable children to rehearse strategies and to be creative. The examples below illustrate this.

> '*Room layout was the same. Large circular tray had resources in it which facilitated the reconstruction of the story which the children had been reading; 'The naughty bus'. Other larger resources outside also mirrored aspects of the story. Really sparked some c's storytelling, role playing interest. Really effective way to support sequencing, cause and effect and recall of story.*'
> **Field notes 22.5.15- School C**

> '*Outdoor provision area is not accessible all of the time. Children given access to it at set times. Area is large, resources sporadic; there is no obvious link to any themes or mirroring of indoor provision. Majority of the children appeared to use the space to play games which involve running around, a few used the blocks and a role play activities. Did not appear to be many children engaged in reflective conversation, though difficult to be certain as most on the move.*'
>
> **Field notes 5/2/15- School B**

2. Teacher/adult activity (Qs and As, feedback, sharing work, tell a friend strategy)

Throughout the observations and in some of the reflective dialogues, the teacher or adult instigated reflection by asking the children specific questions. These open ended questions prompted them to think about an incident or a strategy that they had used and to explain how it worked, or what they did. Getting the children to verbalise these thought processes allowed them to think about the event, to talk about how they felt and to reiterate what they had learnt. The 'tell a friend' strategy appeared to create space for this reflective thinking and explicit metacognitive activity, but it was difficult to know how effective this strategy was, because of the noise. Sharing examples of children's work allowed those children to reflect and demonstrate metacognition, but the limitations of this are that not all children had this opportunity and there was a tendency for the more able to children to be given this chance. For example,

> *'Teacher regularly asks C's to 'tell a friend'. Loud noise erupts as the c's turn to a partner. Obvious signs that c's are showing each other how they worked out the sum, gauged by use of fingers to demonstrate. Absolutely no idea what being said though'.*
> **Field notes 1.5.15- School C**

> *'Music session; this revisited previous session in naming instruments. Teachers asked C's to have a go at naming them, to try to remember, think about what sound instrument made last week as it might help them to remember. Good strategy in telling C's that it does not matter if they get the name wrong, it is good to try.'*
> **Field notes 24.4.15- School C**

3. Environment (outdoor or inside).

The environments, according to the ECERS-3 assessments, were on average 'good'. However, some of the factors which are assessed in ECERS-3 change daily and are dependent on variables. Both schools B and C had indoor and outdoor EYFS provision areas in both the nursery and reception classes, though the actual layout of the nursery unit in school C was more conducive to independent learning because it was larger, open plan and had free flow access to the outdoors. School B's nursery was a T shaped room and access to the outdoor for the nursery and reception class was only available at certain times and the whole class had to go at once. This provided opportunity for the children to access the outdoor area but they were not free to choose when and play outside was dominated by the children running around and playing physical games. Resources to support

other play and learning were available but were under used. Schools C's nursery was completely free flow as was the reception class for proportions of the morning. The indoor and outdoor provision areas in school C were good and in school B the indoor provision was good, but the outdoor provision was just adequate.

Space was influential in that it offered opportunity for children to talk in small groups and for children to transport and transfer their learning to different areas of the FS classroom. A child creating a pirate map for example on the mark making table could export the idea and role play a pirate outside, building a treasure chest and designing a safe place to hide it with the large planks of wood. This provided the chance for the child to reflect on learning, to make decisions and choices, to demonstrate metacognition by repeating activities and transferring knowledge.

An area of provision which was weak in all of the classrooms was the chance for solitary play; there were quiet areas, but no genuine space for privacy or solitude. Excerpts from the field notes below demonstrate this.

> '*Outdoor play not available all session. This restricts children's choice but teacher says they do go out every day. Same for both nursery and reception class. Indoor spaces well used and reasonable EYFS provision areas evident, quality and choice better in nursery. Outdoor resources not attractive, though lots of space, same space used for nursery and reception.*'
>
> **Field notes 20/1/15- School B**.

'*Nursery - Outdoor play available after first half hour and for most of the morning until C's called in to circle time. Reception and nursery have own spaces, resources excellent in nursery and very good in reception. Reception have free flow but for about 50% of the time.*'
Field notes 17/4/15 –School C.

'*No real space for private play in nursery. Quiet areas in nursery but not well used. Screens do offer c's opportunity for private play but good height to allow adults appropriate supervision. Reception has a separate room but only accessed with small groups and with teacher/ TA.*'
Field notes 20/1/15 School B.

'*Outdoors c's could play in solitude because of the space; the play house for example frequently saw c's in there alone. Not designated area for privacy or solitary play though. One child with SEN always appears to play alone with TA support*.'
Field notes 24/4/15 School C.

'*Outside play; it was cold out but all C's had to go out. They ran around and only a few engaged in play with resources; bricks, rocks, sand and cars, mark making. Not easy to observe, one instance of MC and reflective action recorded*.'
Field notes 5/3/15- School B

> '*It was a beautiful spring morning, very sunny. In and outdoor provision areas were all set up, some linked to theme of transport. MNM005 and FNM003 were replaying role play from last week, painting a road. Lots of chat about how they did it last time and why the road dried up (water evaporated). Opportunity arose because same activities available.*'
>
> **Field notes 24/4/15- School C.**

4. Noise

The noise level fluctuated significantly throughout a morning. When this was high, there were fewer opportunities for reflective talk to take place. It was also more challenging for an observer to hear what was being said and to ask children to repeat things was problematic. Personally, I did not find the 'tell a friend' strategy useful because of the noise that this generated and I am not convinced that it is possible to assess the validity of this approach as one which encourages metacognition. Field note excerpts below illustrate this point.

> '*Teacher had to ask the children to use 'indoor voices' as the classroom got very loud. Not possible to hear what was always said this morning. If I got very near to the children they sometimes stopped talking. Used recorded at times to catch conversation'.* **Field notes 1/5/15- School C**.

> '*During the carpets sessions teacher asked Cs to tell each other how they had worked out the number sentence. Lots of noise. I could see them using fingers to indicate taking away but could not hear.*'
>
> **Field notes 8/5/15- School C.**

> '*Today there were obvious divides between activity of the children and think this might be typical. When the children were sat and the activities were obviously adult led then children were quiet. Some answered questions and took part in singing etc. but not really easy to spot MCK or reflecting. There were times though when teacher was actively promoting MC, for example when sharing examples of children's work on visualiser and asking them to tell class what they had done. Other times when child initiated play there was more noise but more chances to see/ hear MCK behaviour as well as reflection*'.
>
> **Field notes 5/2/15 School B.**

4.4 Mixed quantitative and qualitative analysis

Some of the themes from the qualitative data were examined to establish any possible relationships between variables, including gender, timeframe of reflection (R1, R2 & R3) and topic of reflection (objects-RO and actions-RA) and the MCK categories. The decision to focus on objects and actions relates to the discovery of the theme of dispositions of reflections and the two categories of 'objects and I' and 'know and do' which were identified.

The Chi Square test was chosen for statistical analysis because it allows exploration of the possibility of variables being dependent or independent of each other. The SPSS package was used to compute the values. The level of risk was set at 0.05 for all calculations. The different variables were considered in pairs, so the degree of freedom is 1, therefore using the Chi Square table, the critical value is 3.84 at p=0.05.

Hypothesis

- Hypothesis 4a

The null Hypothesis was that there would be no difference in the proportion of males or females reflecting on past events R1.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1= Male , P_2 = Female , P_3 = R1 (Reflects on past) P_4 =No R1

The research Hypothesis was that there may be a difference in the proportion of males and females reflecting on past events R1.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 4b

The null hypothesis was that there would be no difference in the proportion of males or females reflecting on present or immediate past events, R2.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1= Male , P_2 = Female , P_3 = R2 (Reflects on present) P_4 =No R2

The research Hypothesis was that there may be a difference in the proportion of males and females reflecting on present or immediate past events R2.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 4c

The null Hypothesis was that there would be no difference in the proportion of males or females reflecting on future events R3.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1 = Male , P_2 = Female , P_3 = R3 (Reflects on future) P_4 = No R3

The research Hypothesis was that there may be a difference in the proportion of males and females reflecting on future events R3.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 5a

The null Hypothesis was that there would be no difference in the proportion of males or females reflecting on Objects RO.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1 = Male , P_2 = Female , P_3 = RO (Reflects on objects) P_4 = No RO

The research hypothesis was that there may be a difference in the proportion of males and females reflecting on objects RO.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 5b

The null Hypothesis was that there would be no difference in the proportion of males or females reflecting on actions RA.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1= Male , P_2 = Female , P_3 = RA (Reflects on actions) P_4 =No RA

The research Hypothesis was that there may be a difference in the proportion of males and females reflecting on actions RA.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 6a

The null Hypothesis was that there would be no difference in the proportion of reflective utterance where reflection was on objects, RO and demonstrating MCK-U Metacognitive Knowledge-aspect Understanding.

H_o: P_1 =P_2 =P_3 =P_4

P_1= RO, P_2 = No RO , P_3 = MCK-U, P_4 =No MCK-U

The research hypothesis was that there may be a difference in the proportion of reflective utterances reflecting on objects (RO) and demonstrating MCK-U Metacognitive Knowledge-aspect Understanding.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 6b

The null Hypothesis was that there would be no difference in the proportion of reflective utterance where reflection was on actions, RA and demonstrating MCK-U Metacognitive Knowledge-aspect Understanding.

H_o: P_1 =P_2 =P_3 =P_4

P_1= RA, P_2 = No RA , P_3 = MCK-U, P_4 =No MCK-U

The research Hypothesis was that there may be a difference in the proportion of reflective utterances reflecting on actions (RA) and demonstrating MCK-U Metacognitive Knowledge-aspect Understanding.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 7a

The null Hypothesis was that there would be no difference in the proportion of reflective utterance where reflection was on objects RO and demonstrating MCK-K Metacognitive Knowledge-aspect Knowledge.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1= RO, $P_{2=}$ No RO , P_3 = MCK-K, P_4 =No MCK-K

The research Hypothesis was that there may be a difference in the proportion of reflective utterances reflecting on objects (RO) and demonstrating MCK-K Metacognitive Knowledge-aspect Knowledge.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 7b

The null Hypothesis was that there would be no difference in the proportion of reflective utterance where reflection was on actions RA and demonstrating MCK-K Metacognitive Knowledge-aspect Knowledge.

H_o: $P_1 = P_2 = P_3 = P_4$

P_1= RA, $P_{2=}$ No RA, P_3 = MCK-K, P_4 =No MCK-K

The research Hypothesis was that there may be a difference in the proportion of reflective utterances reflecting on actions (RA) and demonstrating MCK-K Metacognitive Knowledge-aspect Knowledge.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 8a

The null Hypothesis was that there would be no difference in the proportion of reflective utterance where reflection was on objects (RO) and demonstrating MCK-S Metacognitive Knowledge-aspect Self .

H_o: $P_1 = P_2 = P_3 = P_4$

P_1 = RO, P_2 = No RO , P_3 = MCK-S, P_4 = No MCK-S

The research Hypothesis was that there may be a difference in the proportion of reflective utterance on objects (RO) demonstrating MCK-S Metacognitive Knowledge-aspect Self.

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

- Hypothesis 8b

The null Hypothesis was that there would be no difference in the proportion of reflective utterance where reflection was on actions (RA) and demonstrating MCK-S Metacognitive Knowledge-aspect Self .

H_o: $P_1 = P_2 = P_3 = P_4$

P_1 = RA, P_2 = No RA , P_3 = MCK-S, P_4 = No MCK-S

The research hypothesis was that there may be a difference in the proportion of reflective utterance on actions (RA) demonstrating MCK-S Metacognitive Knowledge-aspect Self .

H_1: $P_1 \neq P_2 \neq P_3 \neq P_4$

The Chi square values and significance value are recorded in Table 4.9 below.

Table 4.9: Chi square values

Hypothesis	Variables	N	Chi Square value	df	P value
4a	Gender and R1	438	0.227[a]	1	0.633
4b	Gender and R2	438	0.188[a]	1	0.665
4c	Gender and R3	438	0.481[a]	1	0.488
5a	Gender and RO	438	0.977[a]	1	0.032
5b	Gender and RA	438	2.249[a]	1	0.134
6a	RO and MCK-U	438	23.551[a]	1	0.000
6b	RA and MCK-U	438	6.351[a]	1	0.012
7a	RO and MCK-K	438	15.282[a]	1	0.000
7b	RA and MCK-K	438	0.180[a]	1	0.671
8a	RO and MCK-S	438	11.313[a]	1	0.001
8b	RA and MCK-S	438	1.910[a]	1	0.167

Research Hypothesis, 6a, 7a, 8a which state that there may be a difference in the proportion of reflective utterance on objects (RO) demonstrating MCK-U (Metacognitive Knowledge-aspect Understanding), MCK- K (Metacognitive Knowledge-aspect Knowledge), MCK-S (Metacognitive Knowledge-aspect Self), respectively, may be the most attractive explanations for the difference in occurrences. This is illustrated by higher obtained values of 23.551[a],

15.282^a and 11.313^a and the low probability values of 0.000, 0.000 and 0.001

respectively (see Tables 4.10, 4.11 & 4.12).

Table 4.10: Chi square for RO and MCK-U

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	23.551^a	1	.000		
Continuity Correction^b	22.583	1	.000		
Likelihood Ratio	24.263	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	23.497	1	.000		
N of Valid Cases	438				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 66.07.

b. Computed only for a 2x2 Table

Table 4.11: Chi square for RO and MCK-K

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	15.282^a	1	.000		
Continuity Correction^b	14.458	1	.000		
Likelihood Ratio	15.034	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	15.247	1	.000		
N of Valid Cases	436				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 50.69.

b. Computed only for a 2x2 Table

Table 4.12: Chi square for RO and MCK-S

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.313[a]	1	.001		
Continuity Correction[b]	10.609	1	.001		
Likelihood Ratio	11.143	1	.001		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	11.287	1	.001		
N of Valid Cases	438				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 51.18.

b. Computed only for a 2x2 Table

The research Hypothesis 6b which states that there may be a difference in the proportion of reflective utterances reflecting on actions (RA) and demonstrating MCK-U (Metacognitive Knowledge-aspect Understanding), may be the most attractive explanation of the difference in occurrences, reflected by the obtained value of 6.351[a] and probability value of 0.012.

4.5 Conclusion

This convergent, parallel, mixed method approach to data analysis provided a transparent and logical strategy, which has enabled results to be clearly identified and articulated. Keeping the quantitative and qualitative data separate until the final stage was constructive and ensured that data sets were handled ethically. Identification of themes from the qualitative data and then re-examining these quantitatively for potential relationships between MCK behaviour offered scope for creative perspective taking and

interpretation which would not necessarily be possible considering data from one paradigmatic stance. Implications of these findings are discussed in the next chapter.

Chapter 5 Discussion

5.1 Introduction

As demonstrated in the previous chapter, with a mixed method approach, inferences are drawn from the data as part of the interpretation of results. Any conclusions are drawn from the separate quantitative and qualitative strands as well as meta-inferences which are drawn from across both strands (Creswell and Plano Clark, 2011: 212). It is probable that this interpretive and evaluative process and the subsequent report writing will rely to some extent on some of the skills of Delamont's poet (1992), including elements of perspective, creative expression and interpretation. This chapter initially includes a critical evaluation the quantitative data and the instruments used. I draw upon the literature review as the results are interpreted and analysed. Secondly, the qualitative themes are critically examined and once again existing literature offers a lens through which these results can be considered. The final section of this chapter provides an interpretation of the mixed quantitative and qualitative data, followed by a short conclusion.

5.2 Interpretation of quantitative data

A range of quantitative data informed this study, specifically, that obtained using the Child Independent Learning framework (C.Ind.Le). This was used by teachers to assess all the participating children's metacognitive ability and by the researcher to identify metacognitive behaviour within dialogues and

observations. Both descriptive and non-parametric statistics were used to analyse findings.

- Child Independent Learning (C.Ind.Le) framework

The Child Independent Learning checklist (C.Ind.Le) was an effective tool in assessing children's' MCK. The results of this teacher rating tool show that there was a strong and obvious correlation between the metacognitive ability and the general ability grouping of the children. These were completed by the class teachers, as they knew the children well and had assessed the children for at least one academic term before this point.

Teachers reported that the checklist was easy to complete, which was important as they had limited time. However, the checklists relied to an extent on the teachers instinctive responses and assessments of this type are fixed and mostly retrospective (Feuerstein, 1979). Teachers in the classes appeared to know each child well but checklist assessments such as these are not without limitations. Use of checklists within qualitative research can be useful as they are quick to administer but can be prescriptive (Barbour, 2001) and fail to account for contextual and situational issues. These checklists have been validated by Whitebread et al (2009) and also used by other researchers, including Robson (2016). The same limitations of this checklist, discussed previously in Chapter 2, may also apply to my research in that it can be argued that like Whitebread et al I have not explicitly identified the exclusiveness of the categories (Dinsmore, 2017). That said, this measurement tool was included within the systematic review by Gascoine et al (2017) who screened by appraising the reliability, validity

and replicability of the tools used in a range of different studies of metacognition.

Teacher assessment indicated that 'more able' and 'average' ability children 'usually' or 'always' demonstrated metacognitive behaviour in each category, though there was a greater variation in the category of motivation. This category includes activities which include: 'finds own resources without adult help', 'develops own ways of carrying out tasks', 'initiates activities', 'plans own tasks, targets and goals', 'enjoys solving problems'. The wider variation of this category could be explained by the argument that fewer children within society are offered opportunity to take risks and make their own decisions. It can be said that most children live within a cosseted world, where adults control their experiences and exposure to risk. Alternatively, it is possible that this behaviour is more likely to manifest itself when children engage in self-initiated activity, observation of which can be missed by adults who are less involved in reception class, self-initiated activities (Moyles and Worthington, 2011) or who fail to take opportunities to engage with children in sustained shared thinking (Sylva et al (2010).

Yet the findings of Robson (2016) showed that children were more likely to express emotional and motivational regulation when an adult was not present, making assessment of it more challenging for teachers, which could also account for the greater diversity of ability ratings in this category. Another consideration for this response could be the impact of the environment, as Claxton and Carr (2004) stated that prohibitive and affording classroom environments are less likely to support a child's disposition to think.

The teacher assessments indicated that average ability children also showed variation in pro social behaviour. This category includes; 'negotiates when and how to carry out tasks', 'can resolve social problems with peers, 'shares and takes turns independently', 'engages in independent cooperative activities with peers', and 'is aware of the feelings of others and helps and comforts'. One explanation for this could be that within this small sample, these children may have had fewer opportunities to develop social skills, though it could also be a consequence of the point made earlier which cites Robson's (2016) findings concerning emotional and motivational regulation. The samples are too small to establish any definite explanations of variance and there are many unknown factors which may explain these variations, such as teacher error, social economic status of the children, status in family, older child or only child, which is beyond the scope of this research. These issues are potentially worth further investigation.

- Occurrence of metacognitive behaviour in utterances within dialogues and observations.

A total of 438 utterances were identified from observations and reflective dialogues. The descriptive analysis of the observations and dialogues suggested that all children observed demonstrated metacognitive behaviours and specifically MCK behaviour. This concurs with a growing body of research which suggests that young children have metacognitive skills (Annevirta and Vauras, 2001, Chernokova, 2014a, Doran and Cameron, 1995, Larkin, 2010, Marulis et al, 2016, Robson, 2016, Whitebread et al, 2007, 2009, Wall, 2008) and that these behaviours are observable.

One of the most prolific aspects of MCK behaviour was the category of metacognitive knowledge: 'self', which includes 'expressing emotions', 'likes and dislikes', 'awareness of own capabilities', 'reference to own strengths and weaknesses', 'indicates tentativeness', 'sets own targets' and 'refers to others'. This category was more evident within the dialogues, where the researcher potentially asked questions to prompt children to talk about their strengths and to explain what or how they had done something. This high occurrence could reflect the egotistical nature of this age group who are developing a strong sense of self and identity. Mead's theoretical perspective of the development of self supports this by identifying that 'I' the agentic self, is constantly present within memory experiences (Valsiner and van der Leer, 2005).

These findings appear to contradict those of Robson (2016), yet concur with Whitebread et al (2009). A possible explanation for this could be that this research, like the Whitebread et al study (2009) sought to observe metacognitive behaviour, but not specifically the impact of adult presence. This aspect of the findings therefore, emerging inductively. Robson (2016) however, set out to investigate the impact of adults on children's behaviour, learning and metacognition and found that the children in her study appeared to absolve themselves of certain metacognitive behaviours including self-monitoring. Her interpretation therefore, appearing to be deductive.

The aspect of metacognition 'cognition' (excluding the category C1 which is awareness of own capabilities) also figured prominently across both the dialogues and observations. The elements of this category include: 'speaking about how they have done something or what they have learnt', can speak

about planned activities', 'can make reasoned choices and decisions', 'asks questions and suggests answers', 'uses previously taught strategies' and 'adopts previously heard language for own purposes'. All except two of the above sub elements require children to be able to vocalise and all of the children within this study except for one had average or better than expected language for their ages.

The higher incidence of this type of metacognitive behaviour within the dialogues may again reflect the use of questioning or the fact that dialogue recordings took place when there was more opportunity for a discussion and reflective talk to take place. It is also possible that this group of children were engaged in private speech, which Vygotsky (1978) suggested can occur simultaneously with actions and which children find useful when working through challenges. These findings again do not support the work of Robson (2016) who, finding low levels of MCK , suggested that MCK is difficult to record and that during the moment of play there is more need for children to regulate rather than display MCK (Robson, 2016). Alternatively, it is possible that to demonstrate MCK children need verbal skills and this can be a limiting factor (Larkin, 2010, Chenokova, 2014a). Indeed it is possible that some of the children within this study would be described as 'quiet' and therefore, according to Desautel (2009), more likely to share metacognitive behaviour and knowledge with a peer than with an adult, which may make it more challenging to observe.

There were low incidences of motivational metacognitive behaviour within the utterances. This type of behaviour includes: 'finds own resources', initiates activities' and 'enjoys problem solving'. The low incidence supports

the findings of Robson (2016) who states that children are more likely to express emotional and motivational behaviour when an adult is absent, though it contradicts evidence found by Whitebread et al (2007). In dialogues an adult was always present whereas in the observations there was a lower likelihood that the adult influenced the children's behaviours. Similarly, the low incidence of pro social behaviour seen cross the whole data set, which includes: 'negotiates when and how to carry out tasks', 'can resolve social problems with peers' and 'is aware of feelings of others' behaviour', may correspond to the findings of Robson (2016) which suggested that children are more likely to look to a present adult to resolve issues and take responsibility for some tasks such as negotiating and guiding other children. It is possible also, that Brown's (1987) suggestion that regulation of cognition is more unstable and is therefore more challenging to measure, may offer an alternative explanation for this result.

When considering the descriptive statistics for metacognitive behaviour and gender, two categories appeared to indicate a gender difference. These were the aspects of metacognitive knowledge: self (MCK-S) and metacognitive knowledge: knowledge (MCK-K). The aspect MCK-Self refers to the individual's ability to express knowledge of cognition in relation to self and others. Self-concept, which was subdivided by James (1892 cited Boyd and Bee, 2014) into 'objective self' (the inner self) and 'subjective self' (individuals properties or qualities), develops throughout the Early Years, though children of this age usually gain an understanding of themselves in relation to their physical ability (Boyd and Bee, 2014).

These findings appear to show that MCK-S was more prevalent in male than in female utterance. This, possibly, suggests that male children were more able or willing than females to refer to their likes/ dislikes, own strengths or weaknesses or set own targets. This potentially challenges the findings of Adey et al (1989), who suggested that girls were more likely at age 11 to have developed formal operational thought than boys of the same age. Another interpretation may reflect the development of self-concept within this particular group, indicating that male children aged three-five in this study had a stronger sense of self than the females. A possible explanation for this, suggested by Kilvington and Wood (2016), is that there is a greater emphasis on masculinity in society, which may lead to male children having a well-developed sense of identity, or to adults unconsciously looking for masculine traits when observing children. Considering this from a social constructivist perspective, it is possible that there could be a misalignment between the culture or communication practices of the some groups of children and the setting, which has resulted in female children having fewer opportunities to demonstrate sense of self (Palinscar, 1998). My results, which analysed the first four utterances, also indicated that male children were more likely to demonstrate MCK-S than females.

Female children in this smaller sample however, appeared to be more likely to show prosocial behaviour than males, suggesting that their social skills and ability to negotiate were more developed. Prosocial behaviour, referring to a child's behaviour which intends to benefit others, begins to emerge in the third year of a child's life (Boyd and Bee, 2014). Whilst there appears to be little literature which articulates specific gender differences in prosocial

behaviour in the Early Years, Boyd and Bee (2014) remind us that there is a relationship between prosocial behaviour and the ability to regulate emotions. It is possible therefore, that the females within this sample have well developed positive emotions which facilitate their social skills and self-regulation.

Alternatively, the aspect of metacognitive knowledge: knowledge (MCK-K), which includes expression of own knowledge in relation to strategies used, appeared to occur in a higher percentage of female utterances than male utterances both in the whole data set and in the first four utterances. This does accord with Adey et al (1989) findings and it may imply that the female children within this sample demonstrated procedural knowledge more frequently than the males. Bartsch et al (2003) reported that from the age of 4 children were able to report on procedural knowledge.

A final interpretation of these results could suggest that the female children were more eager to display these skills or that they were more aware of being observed and the need to demonstrate them. This view is similar to that expressed by Berk and Winsler (1995), when discussing the impact of 'instructional questioning'. They reported that children typically from middle class backgrounds are more likely to be prepared for classroom dialogue because they know the game, having been questioned by their parents.

To some extent the analysis of the descriptive statistics supports the inferential statistical findings. The Chi Square nonparametric test found that there was a possibility that the research Hypothesis 5 is acceptable and that the null hypothesis that occurrences of male and female and metacognitive knowledge- self will be equal can be rejected. Based on the Chi Square test

of independence with two different dimensions; male and female and metacognitive knowledge-self and no evidence of metacognitive knowledge-self; n=438, df 1, critical value= 3.84, obtained value or Chi Square is 4.134 (p= 0.042) (level of significance 0.05), it would appear that the difference in variables cannot be attributed to chance alone. Gender, may therefore appear to influence the occurrence of metacognitive knowledge- self in this sample.

Explanations for this slight difference could relate to the difference in the occurrence of male or female utterances. 245 utterances were made by males (56%) compared to 193 being made by females (44%). However analysis of the first four utterances per child mitigated for this difference. Another explanation may relate to the individual children themselves. The males who featured within the sample may have been more attuned to their concept of self than their female counterparts, more vocal in expressing their likes and dislikes and more aware of their strengths and weaknesses than female participants within the sample. The size of this sample and other influencing factors makes it impossible to say with any certainty that there is a definite relationship between gender and MCK behaviour, though inferential statistical tests suggest that there could be.

Within the literature search few journals made reference to gender differences and these findings suggest that it may be an area of potential interest for those supporting Early Years pedagogy.

5.3 Interpretation of qualitative data

Qualitative data included observations, reflective dialogues and field notes and these were analysed using thematic analysis which facilitates analysis and reporting of patterns and themes in the data (Braun and Clarke, 2006). In this research, inductive themes relating to the data and emerging from the bottom up were considered alongside deductive themes which related to the researcher's theoretical interests and so could be described as being generated by a top down approach (Braun and Clarke, 2006). It was important to stay close to the data, to recognise the potential for theory or perspective bias in identifying themes. It is not a 'given' (Hammersley, 2010) that the themes or theory are simply there within the data, but that they are created, and the creativity is a result of the interaction between the data and the researcher as well as those participating in the research, including the participants and the research audience (Bryman, 2016). The themes which emerged from the data included the reflection timeframe or mode, topic of reflection, style of reflection and the context of reflection.

Theme 1: Reflection timeframe or mode.

The very nature of reflection suggests that an event or experience has happened previously in the past and that this event is stored, retrieved and reconsidered. For this study, I have conceptualised this as '*utterances, comments or actions which show a child recalling a previous event or experience which provides detailed information about an event/ experience*

and also how they felt, or what they have learned and or why they did something'.

What became apparent was that these past events featured within distinctly different reflective timeframes. The past tense timeframe where children reflected on a past event or experience (R1) - off line (Gascoine et al, 2016), the immediate past or present timeframe where children reflected there and then (R2) – on line (Gascoine et al, 2016) and finally where children reflected about future events based upon a past experience (R3). This theme was deductive in nature.

- Past tense reflections- R1

These reflections were evident within children's speech as well as their actions as demonstrated within the vignettes in the results chapter. The children appeared able to remember previous experiences and to recall this in detail, commenting on what they have learnt, how they felt or why they did something. Some children reflected on events which happened the day before but others would refer to events which happened several weeks ago, a phenomenon which was noted by Morgan (2007), specifically when children reflected on emotional aspects. Some even referred to events which occurred months before but it would be difficult to know whether they were recalling that memory or recalling what they have been told about it. Whilst there was evidence of past tense reflections by both male and female children, when looking at the first four utterances per child, this sample revealed that females were more likely to reflect on past tense events than males. This could suggest that the female children in this sample had a more developed understanding of the concept of time.

To reflect verbally on the past, requires the skills of recall, concept of time and, to some degree, the ability to use appropriate tenses. Recorded private speech of children is typically associated with self regulation and reflection on actions (Berk and Winsler, 1995). It was also obvious that for children to be able to reflect on past, present or future events they required the opportunity to do so. This opportunity was often associated with time, space and relevant prompts. This finding agrees with the comments made by participants in Cremin et al (2006) research, as they identified the importance of time and space when promoting reflection. Similarly, for reflections to be noted, an observer has to be aware of what reflection can look like, be able to find the time to observe it and place themselves in a position to be able to recognise it.

Within the observations and reflective dialogues, certain contexts promoted past reflection and those children able to participate were afforded genuine opportunity. Activities such as circle time or plenary discussions were often used to provide space for a child to share their experiences or to explain what they had done and how they did it. These strategies were similar to those described by Carr (2011). These instances offered opportunity for a few children to reflect and it could be argued that this reflective behaviour was being modelled to the whole group. However, teachers did not often allude to the process of reflection when encouraging children to take part. This mirrors the findings of Whitebread and Coltman (2010) who suggest that teachers appear to be challenged when providing opportunity for reflective practices. There can be many explanations to account for this which relate to

the ability of the teacher, the pressures of a target driven educational agenda and a heavy focus on curriculum based topics (Gascoine, et al. 2016).

- Immediate past or present reflections R2

These reflections occurred within reflective dialogues but more spontaneously within the observations. Children would talk about what they were doing, how they were doing something and how they felt about it. Sometimes these conversations occurred with themselves, at other times with a peer or an adult. At times, the nature of these reflections felt similar to Vygotsky's notion of 'talking aloud', especially when the child reflected to themselves (1962). These reflections were many and occurred with a greater frequency than those of the past or future timeframes. This is to be expected, as children of this age group are more likely to be concerned with present experiences, relying less on the ability to think retrospectively or prospectively. As Jordi (2011) stated, extracting knowledge from previous experiences is a process which will require less effort if the child is able to reprocess the information at a neural level there and then, prompted by the experience and or resources which relate to a specific aspect or issue (Zelaza, 2015).

The observations and dialogues detailed many instances when children reflected on an immediate or recent past event with another person, either a peer or an adult. A social constructivist perspective reminds us that thinking is a social event and that the interaction between learners and others is important (Daniel, 2005, Pritchard, 2014). Reflecting alongside others could also be an example of 'inter psychological' categories of mental functioning, as described by Vygotsky (1960). These opportunities offered children the

opportunity to share their experiences, which is in itself, a valuable activity and as Hubbs and Brand (2005) suggested, it provides the chance to test their own beliefs and to recognise the significance of learning from others. It also provided a chance for a child to be respected, listened to and learn collaboratively. The witnessed reflections reinforced the notion that reflection is a social process, a chance to 'interthink' (Mercer and Littleton, 2007) which in turn may promote cognitive regulation at three levels: self, other and shared (Iiskala et al, 2011).

- Future timeframe reflections R3

This type of reflection occurred least frequently, but these reflections were enlightening in terms of being able to assess a child's ability to predict behaviour and acknowledge how they intend to use their knowledge and learning. Private speech can also be used to talk about what a child intends to do (Berk and Winsler, 1995). These reflections, to a degree, relied again on a child's verbal skill in being able to articulate his or her intentions using appropriate future tense verbs. The future timeframe reflections recorded related to a range of different topics, mostly prompted by either a resource or an activity and they all involved the child telling someone what they planned to do, how and or why. Analysing only the first four utterances per child showed that female children reflected on future events more frequently than males, again perhaps suggesting that their concept of time was more developed.

The paucity of research which explores reflection on future events could be explained by the interchangeability of terms relating to metacognition and reflection. For example, it is quite likely that research into children's ability to

plan and set goals would encompass aspects of reflecting on future events. Alternatively, it could be explained by the lack of opportunity that children have to talk about what they plan to do in Early Year's classrooms. The current climate within education is driven by the need to assess what a child has already achieved and this can influence the use of 'instructional questioning' where teachers ask children questions which the teacher already knows the answer to (Berk and Winsler, 1995). This practice could be driven by the pressure on schools to meet targets. Whilst there was acknowledgement of the children having targets and tasks to work towards in the observations, little space was given to allow children to talk about what they planned to do. Reflection is often misconstrued and considered as being an activity to look back at an experience or to operate the 'thinking back' control, and so the 'thinking forward' control is often overlooked.

Theme 2: Topic of reflection

The thematic analysis of the qualitative data revealed a second deduced theme, the topic of reflection. These topics of reflection were coded as sub themes. Reflective dialogues often steered by the adult would lead naturally to reflection on certain topics such as activities and actions (RA) that children have been involved with or strategies (RS) they have used. These strategies would be supported by the findings of Rojas-Drummond et al (2014) and Rojas-Drummond and Mercer (2003). Within observations of classroom activity teachers offered children opportunities to talk about what they done over the weekend (RE), why they had brought in a certain object (RO) or how they had worked out a specific problem (RS). This approach is similar to

one identified by Carr (2011), who described co-authorship of reflective conversations. Similarly, it was anticipated that children would talk about events and experiences from their micro system which would include their family (RP) and everyday occurrences. Some of these sub themes were inductive and unexpected, including reflecting on feelings and emotions (RFE) and on cartoon characters (RC).

- Reflecting on actions and activities: RA

The act of doing is of paramount importance when learning, according to classical theorists such as Piaget, Bruner and Vygotsky. Children of this age range actively engage with their surroundings and have a developing vocabulary associated with their actions, echoing the findings of Bartsch et al. (2003). This is mirrored to some extent as 'reflections on actions' occurred with the greatest frequency within male reflective utterances when looking at the whole data set and it was the second most prolific topic of female utterances. At the same time children's physical skills are developing and many are mastering physical and gross motor skills such as running, jumping, cutting and drawing.

Children are beginning to be aware of their own agency and are developing a sense of self and independence. They appear to enjoy recalling what they and others have done and frequently talk about how they have done something and assess their own skill and ability and compare themselves to others (Desautel, 2009, Alterio, 2004). This relates to the findings of Bartsch et al (2003) who found that children tended to reflect on behavioural issues of knowledge. The focus on ability could be indicative of the climate of testing within the education system and also of the practice of normative

measurement embedded within Early Years provision in the UK and wider western world. Similarly, the rights agenda has championed children's rights and those associated with the care and education of children, including parents, are more likely to promote these and instil a notion of agency within children themselves. The research of Carr (2011) and Morgan (2007) discussed the necessity of acknowledging children as active participants in the classroom, teaching and learning and the research process.

- Reflecting on strategies: RS

As previously explained, children were encouraged to talk about how they had done something within the reflective dialogues and also within activities such as plenary sessions. The rationale for this is undoubtedly recognition of the importance of promoting and supporting children's metacognition as well as an indication of the instruction teachers receive in initial teacher education. In addition, recent changes to the National Curriculum stipulate the necessity for children to be taught procedural knowledge and appropriate terminology (Department for Education, 2014).

Whilst reflective dialogues did provide opportunity for an adult to ask a child to elucidate which strategy they used, this often resulted in formulaic responses about finger spaces when writing or asking for help when needed. These results accord with the findings of Carr (2011), who gave an honest account of the apparent influence of using audio recordings. What emerged from observations was a much richer array of strategy knowledge. Indeed, the analysis results for the first four utterances per child indicated that reflecting on strategies was the most frequent topic of reflection for male children. These strategies included: working together, rehearsal, invention, or

looking for clues, copying and repetition. These findings align with those of Robson (2016) who states that a greater diversity of strategies was evident when an adult was absent. They also reflect, to some degree, collaborative learning (Pritchard 2014, Daniel 2005) and inter-thinking as identified by Mercer and Littleton (2007). This finding also adds to the debate around whether strategies ought to be infused or discrete aspects of teaching (McGuiness, 1999). The occurrence of a broader array of strategies seen in observations could suggest that my findings are similar to those of Taggert et al (2005) where an infused approach appears be more successful.

- Reflection on event or experience: RE

This was an expected topic of reflection but it was surprisingly less prevalent than RO and RA reflections. Children, when offered the chance to talk about events or experiences, recalled a wide range of interesting topics. These included hospital visits, holidays, fires, birthday, winning prizes and having visitors in schools, echoing perhaps the thoughts of Engstrom (2005) who suggested that children are immersed within a constant flow of information. The balance of the reflections recorded in this study is in favour of home related events rather than school related ones. Whilst there is no specific reference in her work to preferences which children may have when reflecting on events from home or school, Carr (2011) acknowledges the need for teachers to allow children to direct the topic of reflections.

Children often embellished these reflections by talking about how they felt and how others felt and the degree of detail was rich. This concurs with the findings of Morgan (2007) who found that young children were more able to recall emotional responses several weeks after an event. They were often

able to recall information about other people, the weather and why the event happened. The quality of these reflections suggests a need to recognise the importance of the home environment on children's learning and development and its significance for them.

The collaborative nature of reflection was evident within these examples as children would often initiate conversations with one another which would expand to include more children or diversify into other topics of reflective conversation. This finding supports those of Whitebread et al (2009), Hubbs and Brand (2005) and Mercer and Littleton (2007). There was a temptation to ask children questions, especially within the dialogues, but this did not necessarily extend the reflective content of the conversation (Carr, 2011). Indeed on many occasions the depth of reflection was just as profound when there was no intervention from an adult.

It was evident that most of the children enjoyed being able to talk about their experiences with each other and also with adults. However, it was challenging at times for teachers to allow sufficient time for children to reflect on events which are important to them and there is a danger that some experiences are identified as more valuable than others which can be an exclusive practice. The notion of allowing time to 'stretch' to facilitate genuine reflection was noted by Cremin et al (2006).

- Reflecting on objects: RO.

This topic of reflection was prevalent throughout all of the observations and dialogues, typically the second most prolific topic of reflection for both genders across the whole data set. Predominantly these reflections related to objects which were physically there, providing a visible prompt or a verbal

reminder, but not always. Some children were able to recall details of an object from memory and reflect on its properties or talk about what they had done with it or were going to do with it, similar to the social scripts described by Meadows (1993). The objects were diverse, ranging from toys to household items. Sometimes children reflected on virtual objects such as treasure or an object from a video game. Interestingly when examining the first four utterances, reflecting on objects was the second most prolific topic for female children.

Teachers used objects to encourage reflective discussion but there was usually a link to a curriculum topic such as letter sounds or colour knowledge. This approach potentially limits the richness of reflections on objects as children have often brought in the objects to pacify the teacher or parent or to get a sticker rather than to offer the object up as an item of interest and worthy of detailed reflective consideration. On some occasions the researcher used photographs of objects or examples of children's work/ artefacts to prompt reflection. This was not very successful, as some children appeared not to recognise the object or their work, or appeared disinterested in the photograph. These findings appear to contradict those of Wang et al (2009), Pratt (2006), Bhosekar (2009) and Morgan (2007). One explanation for this could be that the quality of the photographs was poor or that the videos used by the other researchers were more engaging than still images.

- Reflection on person: RP

Children within this study often talked about other people, reflecting on what they had done, how they did something or how they were feeling. The people reflected on were usually significant others, that is family members or friends,

potentially signalling the importance of those who scaffold children's learning and development (Wood and Middleton, 1975). Though studies referred to by Berk and Winsler (1995) suggested that it is not 'who' but 'how' an individual scaffolds a child which is important. As with events, these people were usually those closest to them, though there were some examples where children reflected on key people in schools. These reflections revealed children's understandings of relationships and an indication of their awareness of others. This may reflect the findings of Iisala et al (2011) who stated that children's metacognitive reflection is a product of the interaction between others. These young children may be developing an interest in the cognition of others. Typically these reflections would be prompted by another conversation with a peer or by the sight of an object such as a book or an item from the role play area.

Snack time was also a time when children often reflected on a significant other and other routines such as arrival and departure appeared to promote this topic of reflection. Routines were highlighted by Carr (2011) as a useful context in offering a revisiting opportunity which prompts reflection on learning. There were some examples where a teacher encouraged this topic of reflection and these related to discussion about the feelings of others but the majority of the recorded utterances which related to people occurred within observations when conversations were more private.

- Reflection on feelings and emotions: RFE

Whilst from the outset it was acknowledged that feelings are an aspect of reflective thought (Mezirow, 1998), this sub theme emerged inductively. It was not anticipated that emotions and feelings would be topics of children's

reflections based on the assumption that many find reflecting on their feelings challenging. Some children in this study did, however, reflect on their feelings as well as the feelings of significant others, a phenomenon which was noticed by Morgan (2007). They reflected on positive as well as negative emotions, though there were relatively few occurrences compared to other topic areas. In the analysis of the first four utterances per child, more male children than female children reflected on feelings or emotions. The findings of this study concur with Robson (2016), as children tended to refer to the feelings of others more than their own feelings and more incidences of this type of reflection occurred within the observations when adults were not always fully participative. Some teachers did acknowledge children's feeling's as well as their own and there were some instances when both positive and negative feelings were acknowledged but these tended to be spontaneous rather than planned opportunities. The work of Rojas-Drummond et al (2014), and Rojas-Drummond and Mercer (2004) also identified that teachers may share their own thought processes when reflecting with children.

- Reflection on characters and cartoons: RC

This theme was not an expected topic of reflection and yet it featured within observations and reflective dialogues. Children referred to characters from cartoons, books and games confidently and knowledgably. They reflected on the characters' attributes, strengths, weaknesses, characteristics and appearances, often in more detail than real people. These reflections are similar to Meadows' social scripts (1993) which Dowling (2013) suggests may well be influenced by popular culture and the media. The prevalence of

these reflections could therefore be testament to the amount of time which children engage with televisions, books and games or it could be representative of the way that certain attributes are exaggerated in cartoons and images. It may also suggest that digital formats have greater significance for and impact on these children, and may explain the successes noted by Wang et al (2009), Pratt (2006), Bhosekar (2009) and Morgan (2007). These reflections often took place in conversations between peers but also in the children's art work, role play and writing. Children were also adept at talking to adults about the characters they portrayed. For some children these characters were clearly fictitious but for others they attributed reality to them.

The significance of these characters was not overlooked and all of the settings within this study provided resources which either reflected some of the characters or which were open ended to facilitate children's exploration of them. Staff were also knowledgeable and appeared to be accepting of the children's interest. Carr (2011) noted similar context's which supported children's reflections, referring to learning stories, displays which reflected the children's interests and stories and movies which provided visual stimulation as well as recall.

Theme 3: Style of reflection

This theme emerged on analysis of the field notes as well as the observations and dialogues; however it is an example of a theme which was initially deductive. Previous research undertaken by myself into adult

reflections identified that some adults found reflecting more challenging than others. This interest led to a hypothesis that it may be possible for individuals to have a disposition towards reflecting, similar to having a preferred learning approach. Predisposition means that an individual must have the ability to do something as well as the motivation and interest (Grant, 2001).

The two sub themes which emerged were:

'**Objects and I'** reflectors: these individuals' reflections differed in that the focus was on objects and their relationships to them more than the process.

'**Know and do'** reflectors: these children's reflections focussed on the individual's knowledge of the processes of events and or experiences. They talked about what they did or what they knew in relation to actions.

Rather than, as Desautel (2009) suggested, focussing on those who appeared able to reflect or not, this research explored the predisposition towards a certain reflective style. One of the two styles 'Know and do' reflectors, offered some similarity to the findings of Bartsch et al (2003) who found that young children were able to talk about aspects of what they have learnt but they are more likely to relate this to how to do something (procedural knowledge) and with whom, rather than to the new knowledge itself. This group of children appeared to reflect more often on procedural aspects of learning which relates to one of Schraw's (1998) three areas of metacognitive knowledge, procedural knowledge. It is also possible that this group of children may well have had an expressive style of vocabulary development (Nelson, 1973, Nelson et al, 1978), however without further information this is purely conjecture.

The 'objects and I' reflectors reflected predominantly on objects and their relationship to them, akin to Schraws' declarative metacognitive knowledge (1998). Analysing these reflections revealed that this group of children referred to the properties of objects and their own relationship to them. Personal pronouns figured within their reflections suggesting that they have a well-developed theory of mind and understanding of the social world they live in. Prescott (2001) suggested that children who can reflect on their social world are more likely to reflect on academic tasks. This style may also indicate an expressive early language style (Nelson, 1973, Nelson et al,1978). This finding may also align with the view of Dowling (2013), who reminded us that children have a disposition to think and that the relationship between a child's disposition to think and the environment was also acknowledged by Vygotsky (1994).

Theme 4: Context of reflection

This final theme, like the style of reflection, emerged on initial examination and review of the field notes and latterly the observation data. The resulting analysis identified that there were contextual factors relating to the occurrence of reflection and metacognitive behaviour. These factors appeared to potentially enhance or inhibit both activities. Understanding therefore the influence of the social and cultural contexts of children can lead to greater understanding of them (Berk and Winsler, 1995).

- Resources

This factor included the activities and provision areas available to the children and these were assessed using Early Childhood Environment Rating Scale (ECERS-3) (Harm et al., 2015). There was a good degree of similarity between the two schools. The classes within school B had average subscale scores between 4.36 and 5.40 where 3 is 'minimal', 5 'good' and 7 'excellent. School B scored well on the subscales language and literacy (5.4) and the subscale on which school B scored the lowest was 'learning activities (4.36). School C's average subscale scores were between 4.54 and 5.70. School C scored well on the subscales language and literacy (5.60) and space and furnishings (5.70). The subscale which the school scored the lowest on was also 'learning activities (4.54).

This ECERS-3 evaluation included a broad array of categories including fine motor skills, art, music, blocks, dramatic play, mature/ science, math materials and activities, maths in daily events, understanding written numbers, promoting acceptance of diversity and appropriate use of technology. Whilst this rating scale has been mapped to the UK Early Years Foundations Stage (EYFS) provision areas, it is based on typical provision in the United States and there appears to be a particular focus on mathematical aspects of provision. The nursery units within each school scored higher in this subscale than the reception classes however because the assessment was based on one three hour observation it was possible that some aspects of provision were not observed, resulting in a slightly lower score.

Where resources reflected the interests of children or allowed them to repeat and rehearse activities and skills, there was evidence of reflection as well as

metacognition. This concurs with the findings of Carr (2011) who noted that having the same resources available in the setting encouraged children to reflect. Children were able to recall events and experiences, think about them, refine them and think about what they had learnt. For some children, having resources which related to featured topics and themes in a range of different provision areas offered them the chance to creatively explore alternative scenarios as well reinforce existing knowledge and skills. They were able to refine skills using more than one resource, for example creating a map on paper, building the obstacles on the map in the outdoor area, and planning a game with peers to find the treasure based on a series of rules.

Reflection was also more prevalent when activities were available for long periods of time and where there was resource which was flexible and had open ended outcomes. This issue of stretching time was discussed by the participants in Cremin et al (2004) research. The relatively free flow nature of the two nursery units enabled this, whereas both of the reception classes appeared to limit the time children were able to spend on self-initiated play, being placed into sets and often following set tasks.

With the exception of school C's nursery unit metacognitive behaviour and reflection were observed with less frequency when children played outdoors. These areas of provision lacked resources to stimulate children and focus their attention and did not appear to reflect indoor provision or topics or themes. This possibly influenced children's engagement and redirected their play towards physical activity which did not always appear to be purposeful. It is also possible however that there were more challenges to observing both types of behaviour because the children had more space and were

constantly on the move, accounting for lower occurrences being observed. It is interesting that all of the research journals considered for the literature search to support this research appeared to focus on indoor provision. There were few, if any, references made to metacognitive development and reflecting associated with outdoor areas, and given the importance and status currently afforded to outdoor play, this must be an area worthy of further investigation.

An area of provision which was lacking in both schools was an area designated for solitary play. This aspect of the environment was highlighted within the ECERS-3. There were observed instances of children playing alone but no specific place for purposeful solitude was evident. Some might argue that solitary play may not be an essential aspect of promoting metacognition or indeed reflection, but space to think and play individually is valuable and potentially essential for some learners. Again there is little evidence within the explored literature which can offer any comment on the importance of solitude when children reflect or undertake metacognitive activity. It is, however, an area of interest and further research to explore silence and silent spaces in schools, would be helpful.

The environment however is significant as it can influence all aspects of a child's learning and development as well as their disposition to think (Dowling, 2013).Further evaluation of it using other measures such as that identified by Claxton and Carr (2004) may illuminate the quality of child engagement opportunities and the possibility of it being responsive enough to meet the needs of children (Vygotsky, 1994). Vygotsky, according to van der Veer and Valsiner (1991) reinforced the significance of resources within

the environment when he stated that practitioners needed to be aware of the relationship which a child has with the environment as this changes with age.

- Teacher activity

The activity of teachers in scaffolding children's learning and development has become a preoccupation within education and a key component of the inspection regime. This section of this theme included strategies which teachers adopted in observed sessions such as sharing examples of children's' work, questioning, and 'tell a friend', some of which echo the practices associated with scaffolding (Wood and Wood, 2009).

Questioning children about what they had done and how they had done something occurred typically in many of the observations and dialogue sessions. Teachers used direct open ended questioning and directed questions to specific children as well as the whole group. Questioning to elicit MCK and provide opportunity for children to reflect has been acknowledged by many as important (Mercer and Littleton, 2007, Rojas-Drummond et al (2014), and Rojas-Drummond and Mercer, (2004). This approach did allow children to talk, reflect and to demonstrate some aspects of MCK but it had limitations. Some children were not able or willing to answer, reducing their opportunity to reflect and demonstrate metacognition, or they may not have been aware of the rules of the game as discussed by Berk and Winsler (1995).

In addition, relying on questioning to get a clear picture of a child's knowledge and understanding tends to focus the questions on a specific aspect and can become interrogative in style if it is prolonged. These findings supported those of Carr (2011), Dillon (1988) and Wood (1992) cited in

Mercer and Littleton (2007). There is a cautionary note here too as the power balance within dialogue ought to be considered. Dowling (2013) noted that children talking with peers were more likely to express honest opinions and an accurate picture of their metacognition, than when talking with an adult. It was also noted that teachers were adept at seeking clarification about the 'what' and 'how' of learning but appeared less concerned about the 'why' and 'who' and affective aspects of the process, which corresponds to some extent to the findings of Whitebread et al (2009)

What was pleasing to note was the use of cognitive language within the questions and children were encouraged to think and have a go at answering and not to be worried about getting an answer wrong. Several instances of sharing examples of children's work occurred and the discussions which this strategy prompted, often resulted in effective reflection and demonstration of MCK behaviour including 'awareness of own capability' and 'strengths and weaknesses'. These strategies offered scope for children to reflect and represented an opportunity to revisit learning as described by Carr (2011).The use of the visualiser was especially supportive of this approach allowing the whole class to see examples of work. This use of technology mirrored the successes of Morgan (2007), Pratt (2006) and Robson (2010). Issues with this were that it was more often the most able children who had their work shared and it did not allow for the range of knowledge and skills to be shared which were not recorded on paper. There is also the possibility that these plenary sessions were similar to using discrete methods of supporting children's thinking which are not as successful as infused methods according to Coles and Robinson (1991).

- Noise

When time, space and noise levels allowed, many examples of conversations which were reflective as well as containing metacognitive behaviour were recorded or observed. These conversations took place between children and also between children and adults. It was noted however that noise levels fluctuated significantly throughout almost all observed sessions. This made observation challenging and highlights a limitation of this approach to data collection. Noise potentially could also influence the degree and quality of conversation and play and possibly reflection, but it is not possible to be certain of this. It is likely that quality conversations and reflections were taking place at noisy times but it was impossible to record them. Many children appear to be oblivious to levels of noise and to be occupied in activity as well as conversations, indicative perhaps of their emerging capability to cope with multi-sensory information. However because it is difficult to gauge the quality of the conversations, there remains a degree of uncertainty about the impact of noise on children's engagement and learning. It is also possible that conversations become more like sound bites as children shorten discussions to get key messages across and respond to each other less, as listening is more challenging. This affect was noted in the work of Dillon (1988) and Wood (1992) cited in Mercer and Littleton (2007).

The observed practice of using quiet times to provide opportunity for children to share their ideas and reflect on what they had done, placed individual children at the centre of attention of the whole class. It was obvious that for some children this opportunity to talk in front of others when everyone could

hear was a daunting prospect, as they offered minimal information or even refused to say anything at all. It is clear that there has to be balance between providing emotionally safe levels of noise to provide all children with the chance to talk to others.

5.4 Interpretation of mixed quantitative and qualitative analysis

- Topic of reflection and metacognitive knowledge

An interesting finding concerned the topic of reflection, reflection about objects. Inferential statistics suggest that the research Hypotheses 6a (that there may be a difference in the proportion of reflective utterances reflecting on objects (RO) and demonstrating MCK-U Metacognitive Knowledge-aspect Understanding), 7a (that there may be a difference in the proportion of reflective utterances reflecting on objects (RO) and demonstrating MCK-K Metacognitive Knowledge-aspect Knowledge) and 8a (that there may be a difference in the proportion of reflective utterance on objects (RO) demonstrating MCK-S Metacognitive Knowledge-aspect Self) are the most attractive explanations, and that chance cannot account for the difference between reflecting about an object (RO) and metacognitive knowledge aspects of self (MCK-S), understanding (MCK-U) and knowledge (MCK-K) respectively.

The most significant difference was between reflecting about objects and metacognitive knowledge-understanding (MCK-U) with the obtained Chi Square value of 23.551[a] with p=0.000. It is possible that as children reflected on objects they were more likely to demonstrate knowledge of that object, an

ability to compare similarities and differences relating to the object and make reference to judgements about the task associated with the object, than when reflecting on other topics. Vygotsky stressed the importance of language as children learn, that it is appropriate to use names of objects for example to facilitate co-construction of their knowledge (Palinscar, 2005). The work of Carr (2011) demonstrated that resources provided an important context for revisiting which prompted reflection and conversation about learning. To some degree this may also coincide with one of the two styles of reflection identified, 'Objects and I', where children had a tendency to reflect on objects rather than processes.

Objects are important to children as they are tangible and concrete. Knowledge of objects and thinking about them and their properties enables children to explore concepts such as size, shape, number, speed, object permanence, measurement, trajectory, colour and space. Some of the younger children may well still attribute personal attributes to inanimate objects (animism) (Piaget, 1976). Objects are often associated with home and/or school and can allow children to make effective transitions. The significance of transitional objects for this age group could also reinforce children's MCK development.

An alternative explanation for this finding may relate to the impact of 'instructional questioning' as discussed by Berk and Winsler (1995). Children within this sample may be similar to those from typical middle class backgrounds who have exposure to being asked questions relating to objects, to which an adult already knows the answer. These children are

described as 'knowing the game' and are therefore better prepared for school as they understand the rules when being questioned.

Finally, analysis suggests that research Hypothesis 6b which states that chance may not explain the difference between reflective utterances reflecting on actions (RA) and demonstration of MCK-U Metacognitive Knowledge-aspect Understanding, may be the most attractive explanation of the difference in occurrences. This is reflected in the obtained value of 6.351[a] and p=0.012. In other words children appear to be more likely to demonstrate MCK-U when reflecting on actions. Thinking about their actions can facilitate expression of and knowledge of that action, an ability to compare similarities and differences relating to the action and chance for children to refer to judgements about the action. These findings support those of Bartsch et al (2003) who found that children were more likely to reflect on 'how to' knowledge, though Robson (2016) found that MCK was less likely to occur when an adult was present which would make observing this type of behaviour more challenging.

As discussed earlier, the notion that children learn by doing and by being active agents within their environments is a fundamental principle of Early Years education. Ideas about active and play based learning are strongly held beliefs for many educationalists, based on theoretical perspectives and reinforced by contemporary statutory guidance governing care and education of young children. Proponents of social constructivism explicitly acknowledge the importance of children actively constructing their knowledge and understanding, creatively exploring and examining their world through interacting with resources and the environment. Learning by expanding

emerges as children have opportunity to reflect on their own activity and to develop new ways off working (Engstrom, 2005).

Early pioneers within the Early Years movement and organisations such as the Pre-School Learning Alliance extolled the virtues of a play based curriculum, now embedded as good practice with the revised Early Years Foundation Stage (EYFS). The two schools within this study had Early Years provision areas based on activities which are hands on and play based. It is perhaps then, not unexpected that reflecting on actions therefore promoted MCK-U

5.5 Conclusion

Throughout this chapter the findings from my research have been scrutinised and examined from different perspectives; firstly the results have been analysed and interpreted from the researcher's perspective and then secondly considered in relation to the existing literature. Similarities and differences have been identified and discussed. I conclude that I have been able to identify metacognitive and reflective behaviour in this small sample of young children. Findings from the analysis show that the children in the sample reflect on a range of different topics, in different dimensions of time and potentially using different styles of reflection. Their reflections contained categories of metacognitive knowledge behaviour, especially knowledge of self. Findings also appear to suggest that differences between children's reflections on objects and their metacognitive knowledge behaviour may not be explained by chance. Unexpectedly, I have found that the environment

and context appeared to influence the young children's reflections and metacognitive behaviour, though this had not been an intended focus for the study. It is hoped that this study will add to the debate about young children's metacognitive skilfulness and increase the awareness of the importance of promoting and supporting reflection for this age group. The next chapter provides a brief synthesis of my findings and includes my final conclusions and my recommendations for future practice and further research.

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Chapter 6: Conclusions and recommendations

6.1 Introduction

There is evidence to show that the research aims have been met: using a mixed method approach I have explored young children's reflections and their MCK behaviour. The study also investigated if the type/mode of reflection appeared to influence MCK behaviour. My findings reinforce my belief that young children are capable and have an untapped capacity to be critical thinkers (Roche, 2011), which will hopefully lead to productive thought and metacognitive behaviour. Significantly, I suggest that my findings illustrate that reflection is an appropriate vehicle to promote and demonstrate metacognition and this remains an area of interest to me and prompts me to make recommendations for Early Years practitioners to consider this when planning the learning environment and assessing children. This chapter summarises my key findings and offers recommendations. I conclude that the content of child's reflection are varied and offer a valuable insight into their social worlds. Secondly, I tentatively suggest that my findings inferr that there is a relationship between gender and some aspects of metacognitive behaviour. The context of children's reflections was explored and the significance of the environment was identified. I have designed an environmental assessment tool for teachers and practitioners, so that they can evaluate their setting's provision for reflection (Appendix 20). I conclude that some children may adopt one of two styles of reflection, though this theoretical notion requires further research. Finally, in this chapter I have identified the limitations of my research.

6.2 Content of reflection

This mixed methods research has enabled the exploration of young children's reflections and their metacognitive behaviour. It would appear that within this small sample of participants, children between the ages of three and five years can and do reflect. They reflect on different topics and in different timeframes. The findings suggest that aspects of MCK are more likely to emerge when children reflect on objects rather than other topics. The implications of this are many. Firstly, children need to be able to reflect on objects important to them. Being able to demonstrate their procedural and declarative knowledge (Schraw, 1998, Brown, 1987) and their understanding relating to these objects promotes metacognition (Whitebread et al, 2005b, 2009).

Secondly, those working with and caring for young children can learn about a child's metacognitive ability if they attend to a child's reflections. Thirdly, teachers and carers also need to consider how to facilitate both opportunities for young children to reflect, and how objects of individual significance to children can be included within the setting. There is also evidence to indicate that reflecting on actions offers opportunity for children to demonstrate understanding as an aspect of MCK. Ensuring that children are able to be active and have capacity to reflect on their actions will support their development of task knowledge, comparison of strategies and degree of difficulty. Reflection will also allow children to mentally and verbally examine what they may be confused about or what is new, re-organising their

thoughts, applying knowledge and understanding, processes identified by Wertheimer as important for productive thought (Newton, 2013).

Recommendations

1. Children need to be given opportunities to reflect on topics of their choice, specifically objects from all aspects of their social world.
2. Teachers and carers ought to consider methods for observing and listening to children's reflections.
3. Specific resources which promote exploration and reflection on actions and objects need to be available.

6.3 Gender and metacognition

The findings relating to gender, reflection and MCK suggest that there may be a relationship between gender and aspects of metacognitive knowledge-self. Both boys and girls reflected and both demonstrated metacognitive knowledge. The findings from this study however, indicated that boys in this sample were more likely to reflect on their own strengths and weaknesses, capabilities, preferences, likes and dislikes and awareness of others, than girls. This is interesting and warrants further investigation.

Those working with young children will be aware of the requirements of the EYFS curriculum and the prime areas of learning and development. Aspects of metacognitive knowledge-self (MCK-S) correspond with the prime area 'personal, social and emotional development' which contains early learning goals related to self-confidence and self-awareness (Department for Education, 2017). It is important that all children are supported in this area of

development but considering that boys may be more likely to demonstrate MCK-S it is important to ensure that they have opportunity to develop and transfer these skills.

Recommendations

1. Group practices and strategies which promote metacognitive knowledge development and reflective practice need to be reviewed to ensure that they are inclusive and relevant.

2. All children need opportunities to develop awareness of themselves as learners, to be supported in recognising their own strengths and weaknesses and to have opportunities to express their preferences.

3. Research to identify ways of developing this awareness would be helpful.

6.4 Context of reflections

Whilst I had not intended to specifically examine the context of reflection, I had expected to see that reflective dialogue between children and an adult would provide opportunities for MCK behaviour in young children, as seen in similar research by Whitebread et al (2007a) where a higher level of MCK behaviours was observed when adults were involvement in events. I did not set out to compare levels of metacognitive behaviour when adults were or were not present, but I found that MCK behaviour was evident within both reflective dialogues and observations, when adults were present and not present. The depth, breadth and quality of the reflections were greater when the children were able to choose what they wanted to talk about, whereas

adult initiated dialogue had a tendency to result in one word or formulaic responses from the children.

However, after evaluating the pilot study, it was obvious that the environment potentially impacted on children's opportunities to reflect and on an adult's capacity to observe and listen to their reflections. What emerged was a need to revise the method for collecting data to ensure that reflections were authentic. There is a need therefore for those working with children to be mindful of where and how children are observed and assessed. Creating adult led discussions and prompting specific reflection felt contrived and resulted in fewer and less rich reflective discussions. Enabling children to decide on the 'where', 'what' and 'when' of reflecting will be more rewarding, though admittedly challenging. I would suggest that space both physically and mentally is vital if children are to be able to hone reflective skills. There is also scope to explore in more depth the impact of noise and potential for solitary and silent spaces to provide balance within the Early Years classroom.

Recommendation

1. Those working with young children should ensure that there is quality (meaning planned and purposeful) time (such as activities and discussion sessions) and space (both physical and emotional) to allow for reflective thought and discussion. I have created a 'Space For Reflection' questionnaire to support this process (Appendix 20).

2. Those working with young children should model reflective processes and provide children with appropriate vocabulary which could support reflection and, in turn, metacognition.

3. Those working with young children need to consider the roles of reflection and how they can be operationalised and, therefore, promoted and assessed.

4. Further research may be required to identify appropriate ways to assess children's reflections.

5. Teachers need to give time to observing children demonstrating metacognitive behaviour in child-initiated activities and reflecting on topics of their own choice.

6.5 Reflective styles

I observed and classified a range of different types of reflection used by young children and these fell into categories, relating to time, topic and style of reflections. This small sample of children demonstrated reflective skills and I tentatively suggest that there is an indication that children may have a preferred style of reflection. There were some who noticeably reflected on objects and their relationship to them (Objects and I), and others who reflected on their knowledge and actions (Know and do). Further investigation into these possible styles would be beneficial, as it may illuminate practice which could utilise this knowledge of a child's preferred style. For example, children who appear to favour reflection on 'Objects and I' could be afforded access to resources which reflect familiar objects and be

supported in the use of personal pronouns and similar vocabulary, then being able to transfer this metacognitive skill to other academic tasks (Prescott, 2001).

Final recommendations

1. Metacognitive knowledge should be promoted across a range of different activities in Early Years settings, providing opportunities for children to practise metacognition but that this should be embedded and not offered as discrete learning activities.

2. Metacognition needs to be considered as a life span activity and that those teaching and caring for young children need to have an appreciation of its aspects and how it can be identified in children's speech and actions. To that end, training resources could be valuable aids to the acquisition of such knowledge.

6.6 Conclusion and limitations

It is important to remember that no research or discussion is context free and the researcher's assumptions relating to knowledge and the meanings of research need to be explicit at each stage and therefore questioned (Wisker, 2001). Acknowledging this potential for reflexivity is essential, as according to Delamont (1992) there is no way that the researcher can place themselves outside the world that they are researching. I had an interest in reflection and believed that it is possible that some individuals may have a predisposition to reflect. For this reason the findings relating to the proposed style of reflection may be the starting point for further research. For example a study which

undertakes content analysis of children's reflections may well provide additional evidence to support this.

The size of the sample in this research would not suggest that these findings can be generalizable. The findings may be relevant to other Early Years teachers and practitioners who may be able to relate to the context and findings in line with Bassey's (2000) concept of relatability. To illustrate what this could mean, I offer a potential instance. Here, the findings apply to medium sized primary schools, typical of the North East of England. In another Early Years context, perhaps where the participating schools have a different demographic, findings may illuminate alternative outcomes. This could also make an interesting and worthwhile research project.

The limitations attributed to the Whitebread et al (2005b) framework and CIndLe have been discussed in Chapters 2 and 3 and can therefore also apply to this study. However the inclusion of these measures within the Gascione et al review (2016) and their use by other researchers reassured me of their validity and appropriateness. I accept that I could have offered an analysis of the exclusive and inclusive nature of the different metacognitive knowledge category behaviours observed but this was outside of the scope of the research. It could be a future area of research.

This research intended to add to the body of knowledge and debate relating to young children's' MCK. It also hoped to suggest a new area of interest for other researchers and that is to explore young children's reflections and disposition to reflect.

6.7 Reflection on my own metacognitive journey

I have found balancing active research, full time employment and family commitments a struggle. There were times when I had to prioritise and this research was often left to occupy what was considered to be my spare time. I have on occasion questioned the logic of doing the doctorate part-time over four years, as this lengthy timespan has resulted in periods of inactivity, which have made returning to the research process laborious. It has been a journey, one which I had to recalibrate on several occasions. The journey itself has had highlights which include gathering the data, sharing the process with young children and with an undergraduate researcher and engaging with a wide range of literature.

This study has challenged me professionally, as well as academically. Academically, I have I have gained knowledge and skills in research design and in analysis of quantitative data, as well as using the software package SPSS. Professionally, this knowledge enhances my confidence in managing research and also teaching research skills to my students. I have gained knowledge which offers insight into children's development of metacognitive knowledge, which reinforces my own belief that young children are capable and active learners who can think about their own thinking. This adds to the knowledge of child development and psychology which I have already gained from other research, academic study and practical experience.

As a Lecturer in HE, it is part of my role to disseminate research findings and to demonstrate evidence of research informed teaching and learning. This research experience and its findings will be integrated in to modules I teach on the MA Education, a BA (Hons) Early Childhood Studies programme and

a suite of Foundation Degrees. It is also important to acknowledge that the research process is not finished until it has been disseminated. I have presented these findings at a breakfast seminar within an HEI and intend to work on producing a journal for publication.

I have learnt that I lack confidence in myself as an academic and as a researcher. I admit to feeling inadequate when colleagues talk knowledgably about their research approaches as they litter their conversation with key terminology and offer a very definite perspective and rationale. This inadequacy has not disappeared as a result of undertaking my doctoral study, but it has forced me to reflect on why I feel this way and how I can overcome it. I am persuaded that declarative and procedural knowledge is powerful in the world of academia but I have taken time to consider and reflect on how knowledge can be gained and how it can influence my practice. I intended to gain knowledge through the research but not simply knowledge of the subject area. I also hoped to learn about myself and about how research can be used.

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Appendices

Appendix 1 Aspects of metacognition and examples of behaviour. Adapted from Whitebread et al, (2005a).

Appendix 2: Child Independent learning checklist (C.Ind.Le

Appendix 3: Table of schools Class teacher consent form

Appendix 4 Head teacher letter and consent form

Appendix 5 Teacher letter and consent form

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Appendix 8 Example of CIndLe

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Appendix 13 Durham University ethics email confirmation

Appendix 14 DU ethics form

Appendix 15 Chi Square description and information

Appendix 16 Inter-rater calculation and description and information

Appendix 17 Codes for MCK and CInd Le

Appendix 18 Pilot study data spreadsheets

Appendix 19: Main study data spreadsheets.

Appendix 20: Tool for teachers when reviewing provision for reflection.

Appendix 1: Aspects of metacognitive knowledge and examples of behaviour. Adapted from Whitebread et al, (2007).

Person variable A verbalisation which demonstrates explicit expression of individuals own knowledge in relation to cognition or peoples cognitive processes. It may include knowledge of cognition relating to ; self, others and universals (Whitebread et al (a), 2005)	Self: Emotions/ Likes/dislikes	I like making patterns
	Is aware of own capabilities	I know how to do that and what comes next
	Self: Reference to own strengths and weaknesses	I am good at measuring
	Indicates tentativeness	Ten, Nine… erm eight?
	Self: Sets own targets	I am going to do this until it is full up
	Reference to others:	You have been going the wrong way.
Goals and tasks A verbalisation demonstrating explicit expression of own long term memory knowledge in relation to elements of the task	Understanding	Where should I put this block?
	Compares across tasks, identifying similarities and differences	This is the same as one I did last time
	Makes a judgement about level of difficulty or rates task on basis of pre-established criteria or previous knowledge	It is easier than the last one. I remember doing this one before
Knowledge of strategies: A verbalisation demonstrating the explicit expression of own knowledge in relation to strategies used or performed during the task, where strategy is cognitive or behavioural activity that is employed to enhance performance or achieve	Describing task contents	Next we have to put that on there
	Rating/ describing difficulties and problems	This is hard
	Comparing	I am making these, I am not finished yet but Jake has
	Evaluates effectiveness of one or more strategies	

Appendix 2: Child Independent Learning Checklist (C.Ind.Le)

C.IND.LE

Name of Child:		Teacher:	
Date:		School / Setting:	

	Always	Usually	Sometimes	Never	Comment
Emotional					
Can speak about own and others behaviour and consequences					
Tackles new tasks confidently					
Can control attention and resist distraction					
Monitors progress and seeks help appropriately					
Persists in the face of difficulties					
ProSocial					
Negotiates when and how to carry out tasks					
Can resolve social problems with peers					
Shares and takes turns independently					
Engages in independent cooperative activities with peers					
Is aware of the					

	Always	Usually	Sometimes	Never	Comment
feelings of others and helps and comforts					
Cognitive					
Is aware of own capabilities					
Can speak about how they have done something or what they have learnt					
Can speak about planned activities					
Can make reasoned choices and decisions					
Asks questions and suggests answers					
Uses previously taught strategies					
Adopts previously heard language for own purpose					
Motivation					
Finds own resources without adult help					
Develops own ways of carrying out tasks					
Initiates activities					
Plans own tasks, targets and goals					
Enjoys solving problems					

Appendix 3

Table of schools

	Schools								
	1	2	3	4	5	6	7	8	9
Phase FS					√				
KS1					√				
KS2									
All	√	√	√	√		√	√	√	√
No. Pupils on roll	182	236	331	269	153	266	308	198	287
Catchment: area of deprivation	No	Yes	No	Yes	No	No	No	No	No
Last Ofsted	Good	Good	Good	Good	Good	Outstanding	Good	Outstanding	Good
Pupil premium	Slightly below	Slightly above	Average	Average	Slightly below	Average	Slightly below	Average	Slightly below
Agreed	Yes	Yes	Yes	No	Yes	No	Yes	No	No
Project school			√ B		√ C		√ A		

Appendix 4: Head teacher letter and consent form

Dear

I am undertaking research as part of a Doctorate in Education and seek to obtain permission from you to include your school reception and nursery classes in my research.

The research will commence within the reception and nursery classes at XXXXXX Primary School during this spring term 2015 and it seeks to explore young children's metacognitive knowledge development; which is their knowledge of their own learning and awareness of learning strategies.

Separate hour long observations of whole class activity will be recorded in each class and some photographs will be taken of work produced by the children, followed by two fifteen minute discussions between me, the researcher and a sample of children from the two classes. The discussions will be recorded and all recordings will be later transcribed and used for the research. Observations and recorded discussions will be completely anonymous and confidentially and securely stored; they will also be deleted once the research process is complete.

I will seek to gain permission from the reception teachers, nursery teachers, support staff and parents and will also ask each child to give consent to taking part in my research project. Enclosed is a consent form which I would ask you to sign, date and return to me in the envelop provided by Thursday 8th January 2015

Please contact me if you have any further questions.

Yours faithfully,

Helen Rowe

Principle Lecturer and Acting Head of Programmes (Work Based).

Education and Theology

York St John University

Research Consent Form; Head Teacher

Name of Researcher(s) *(to be completed by the researcher)*
Helen Rowe   EdD Durham University
Title of
A mixed methods investigation into young children's development of metacognitive knowledge using photos in reflective dialogues and stem questions

Please read and complete this form carefully. If you are willing for your school to participate in this study, ring the appropriate responses and sign and date the declaration at the end. If you do not understand anything and would like more information, please ask.

I have had the research satisfactorily explained to me in verbal and / or written form by the researcher.   **YES / NO**

I understand that the research will involve: *Obtaining consent from you, the class teachers and support staff, all parents and children in the reception and nursery classes and specifically the children participating in the reflective dialogues. Weekly 60 minute observations of class work within the reception and nursery classes (field notes, tape recorded and specific incidences or pieces of work photographed); weekly 15 minute reflective dialogue recorded by tape recorder with a sample of children. Access to school assessment data relating to the children before and after the research phase.*   **YES / NO**

I understand that I may withdraw the school from this study at any time without having to give an explanation. This will not affect my future care or treatment.   **YES / NO**

I understand that all information about my school will be treated in strict confidence and that I and my school will not be named in any written work arising from this study.   **YES / NO**

I understand that any audiotape material of my school will be used solely for research purposes and will be destroyed on completion of your research.   **YES / NO**

I understand that you will be discussing the progress of your research with others at Durham University

                                            YES / NO

As Head teacher I freely give my consent for my school to participate in this research study and have been given a copy of this form for my own information.

Signature: ……………………………………Date

Appendix 5: Class teacher research consent form

Name of Researcher(s)
Helen Rowe   EdD Durham University
Title of
A mixed methods investigation into young children's development of metacognitive knowledge using photos in reflective dialogues and stem questions

Please read and complete this form carefully. If you are willing for your class to participate in this study, ring the appropriate responses and sign and date the declaration at the end. If you do not understand anything and would like more information, please ask.

I have had the research satisfactorily explained to me in verbal and / or written form by the researcher.   **YES / NO**

I understand that the research will involve: *Obtaining consent from the Head Teacher, the class teacher and support staff, all parents and children in the class and specifically the six participating children. Half termly 60 minute observations of class work within the reception class (field notes, tape recorded and specific incidences or pieces of work photographed); a 15 minute reflective dialogue recorded by tape recorder with six children at half termly intervals. In addition it would be beneficial to be able to access school assessment data relating to the six children before and after the research phase.*   **YES / NO**

I understand that I may withdraw the class from this study at any time without having to give an explanation. <u>This will not affect my future care or treatment.</u>   **YES / NO**

I understand that all information about my class will be treated in strict confidence and that I or my class will not be named in any written work arising from this study.   **YES / NO**

<u>I understand that any audiotape material of my class will be used solely for research purposes and will be destroyed on completion of your research.</u>   **YES / NO**

I understand that you will be discussing the progress of your research with others at Durham University

                                                                                        YES / NO

As class teacher I freely give my consent for my class to participate in this research study and have been given a copy of this form for my own information.

Signature: …………………………………….Date:

Appendix 6 Parent research consent form

Name of Researcher(s)
Helen Rowe   EdD Durham University
Title of
A mixed methods investigation into young children's development of metacognitive knowledge using photos in reflective dialogues and stem questions

Please read and complete this form carefully. If you are willing for your child to participate in this study, ring the appropriate responses and sign and date the declaration at the end. If you do not understand anything and would like more information, please ask.

I have had the research satisfactorily explained to me in verbal and / or written form by the researcher.   **YES / NO**

I understand that the research will involve: *Obtaining consent from the Head Teacher, the class teacher and support staff, all parents and children in the class and specifically the six participating children. Half termly 60 minute observations of class work within the reception class (field notes, tape recorded and specific incidences or pieces of work photographed); a 15 minute reflective dialogue recorded by tape recorder with six children at half termly intervals. In addition it would be beneficial to be able to access school assessment data relating to the six children before and after the research phase.*   **YES / NO**

I understand that I may withdraw my child from this study at any time without having to give an explanation. <u>This will not affect their future care or treatment.</u>   **YES / NO**

I understand that all information about my child will be treated in strict confidence and that my child will not be named in any written work arising from this study.   **YES / NO**

<u>I understand that any audiotape material of my child will be used solely for research purposes and will be destroyed on completion of your research.</u>

                                      YES / NO

I understand that you will be discussing the progress of your research with others at Durham University

                                      YES / NO

As the parent or carer of my child I freely give my consent for my child to participate in this research study and have been given a copy of this form for my own information.

Signature:…………………………Name of Child: ……………   Date:

<u>Appendix 7: Child Consent Form</u>

Name………………………………………………………………

I give consent to be observed by Helen as part of the whole class.

I also give consent to take part in a discussion within a small group of other children.

Tick one box
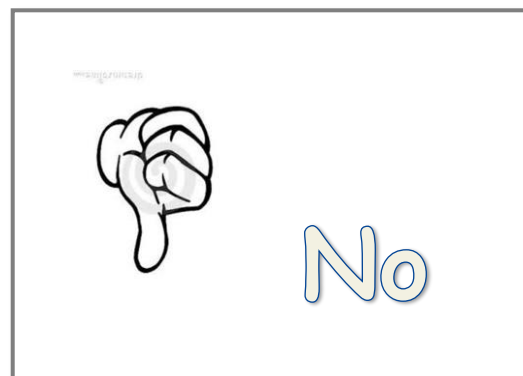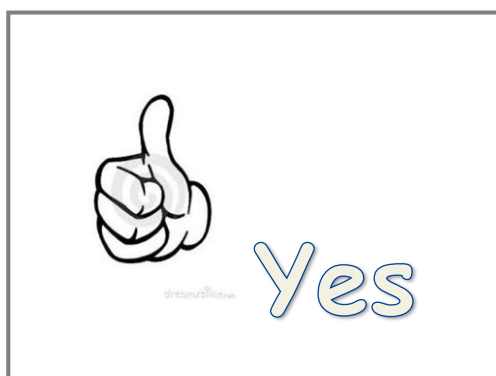
Appendix 8: Completed Child Independent Learning Checklist (C.Ind.Le)

C.IND.LE

Name of Child:	▉▉▉▉▉▉▉▉	Teacher:	▉▉▉▉▉▉▉
Date:	01/05/15	School / Setting:	▉▉▉▉▉

	Always	Usually	Sometimes	Never	Comment
Emotional					
Can speak about own and others behaviour and consequences		✓			
Tackles new tasks confidently		✓			Gets worried when she finds tasks difficult/gets it wrong.
Can control attention and resist distraction	✓				
Monitors progress and seeks help appropriately		✓			sometimes less confident to ask for help when needed.
Persists in the face of difficulties		✓			See above.
ProSocial					
Negotiates when and how to carry out tasks	✓				
Can resolve social problems with peers	✓				
Shares and takes turns independently	✓				
Engages in independent cooperative activities with peers	✓				
Is aware of the feelings of others and helps and comforts	✓				

	Always	Usually	Sometimes	Never	Comment
Cognitive					
Is aware of own capabilities	✓				
Can speak about ~~how they have~~ done something or what they have learnt	✓			~~~~	
Can speak about planned activities		✓			
Can make reasoned choices and decisions	✓				
Asks questions and suggests answers		✓			Building confidence now to approach adults to ask qu's.
Uses previously taught strategies	✓				
Adopts previously heard language for own purpose	✓				
Motivation					
Finds own resources without adult help	✓				
Develops own ways of carrying out tasks	✓				
Initiates activities	✓				
Plans own tasks, targets and goals		✓			
Enjoys solving problems	✓				

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Appendix: 9

Sample observation: Observation number 7-session 7(Adapted from Creswell, J.W. (2007) Qualitative inquiry and research design. Choosing approaches among five approaches. (2nd ed) London: Sage. Page: 137)

Aspects of metacognitive knowledge	Observation	Reflections and comments
Self: Emotions/ Likes/dislikes Is aware of own capabilities	It is first thing in the morning. All children arrive and place their coats etc on their pegs. Parents are welcome to come in too. ▮▮▮▮▮ goes straight to the sand to play alongside another little boy. He is tipping dry sand out of a bucket.	Weather good, though cold outside. The class room as normal. Teacher and two TAs.
Self: Reference to own strengths and weaknesses Indicates tentativeness	He says out loud ' two treasures' as he is holding two glass beads in his hand which he has found in the sand. I am going to look for more treasure'.	▮▮▮▮ comes over to me and smiles, keen to chat.
Self: Sets own targets Reference to others: Understanding	'How are you going to find more shining treasure?' ▮▮▮ asks him. ' you have to see something shiney ' he replies. 'You have to look for it'. He demonstrates searching in the sand. 'shell is shiney ' he states. ' I know that'. 'can you see any shiney things' ▮▮▮ ask again ' should I help you look?'. Another child says ' found shiney, look.'	
Compares across tasks, identifying similarities and differences		Three other children catch my eye and remember me form the week before.
Makes a judgement about level of difficulty or rates task on basis of pre-established criteria or previous knowledge	Charlie says ' it has to be shiney'. ▮▮▮▮▮▮▮) came over to the sand tray where ▮▮▮▮ was sitting.	▮▮▮▮ (quiet little girl) had played with me last week. Her speech telegraphic but ▮▮▮▮ very articulate
Describing task contents Rating/ describing difficulties and problems Comparing	She indicated to the adult that she wanted to pay the treasure game which they had played the previous week. 'Looking for treasure' she said and smiled at the adult. She picked up the beads and began to bury them.	▮▮▮▮ nervous but wants to play, recalling rules from week before

| Evaluates effectiveness of one or more strategies | A boy ███████ came up to the tray. She smiled at him and said 'he close eyes', recalling that these were the rules which the same boy had insisted on last week.

'I will close my eyes ███████ and you have to bury the treasure. Then I open my eyes and I will find them all. Coz x marks the spot.' ' it is tricky but I am good at it. You tip it up, look. He demonstrates

███████ closed his eyes and ███████ looked up at me smiling before finishing off burying all of the beads. She said 'keep eyes closed' to ███████. then 'finished'.

███████ opened his eyes and began to scoop the sand away using a sieve. He found three beads and announced 'x marks the spot'.

███████ was smiling and clapped. Once ███████ had found five of the beads he counted them and then ██████ said 'my turn, I shut eyes'.

She was excited, jumping up and down and shut her eyes using her hands to cover them.

Another little girl arrives and ███████ says to her ' can you see anything shiney?'

She has brought something with her and she has dropped it into the sand. ██████ says ' that's not shiney'.

The little girl takes the bead from ██ hand and ██████ says ' look shes found some treasure'. | Resources clearly prompt this

Good recal and obvious ref to rules

██████ almost reluctant to let other girl join in |

	'Look it has to be shiney' he says to her. ██████ finds a large rock in the sand ' wow. The little girl ███████ finds more beads in the sand . ███████ takes the beads which he has found and states that he is ' going to bury the treasure'. ██████ joins us at the and tray ██████ says to her ' do you know how to find treasure ████?'. ' You have to find x marks the spot'. █████ finds another bead in the sand. ' let's bury this treasure' he says. ████ looks at him a little uncertain at first He uses the spade to bury the bead. █████ finds a bead and ██████ says ' █████ found treasure, she found x marks the spot'. He gets another bead. 'I hope that you never find this one' as he buries another. █████ joins in burying the beads. They continue to play hiding the treasure, closing their eyes and taking turns finding it. I remind █████, 'what do we need to ask ██████ to do? █████ says .. ' Close him eyes'. █████ obliges and shuts his eyes. At the dough Table a ███████ is playing with the dough Table cutting out stars.	██████ share his knowledge with ne little girl Noise level rising in the room Moved over to dough Table three children 1 girl

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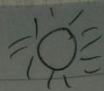
	She counts the start imprints, 1, 2. Then counts three more to make 5. She counts well up to 7.	
	She continues to make star imprints and to count. It appears that she is aware that a big piece of dough allows for more star imprints and a small piece fewer imprints. Then she picks up a different mould and states that she will do flowers now.	Moved to duplo. ▮▮▮▮ there, chatty but only when no other children present
	I go over to the duplo where a little boy is playing. He glances up at me and points 'look that coupling does not work ' he says. I try to help him to fix the coupling.	Teacher calls tidy up time. Noise as resources put away. Adults help
	It is time to tidy up they help and then go to sit down on the mat	Children sit on mat in front of teacher. TAs continue to tidy away and set up for next session
	Once they are sat down, they sing the hello song and then because it is the nursery rhyme, ' the queen of hearts, they sing that.	
	The children appear to know the rhyme well and join in . Those less sure join in the end of the sentences.	
	▮▮▮▮ suggests that ▮▮ should be the queen as she has hearts on her leggings.	Nice recall of current nursery rhyme. Uses Qs and A session. Not all able to contribute though
	'who should be the knave? ▮▮▮▮ do you know what a knave is?' ▮▮▮▮ answers ' someone who helps people'. 'Yes you are tight ▮▮▮▮, but he was naughty one day, can you remember what the knave does?.' ' he pinched the tarts' said ▮▮▮▮.	
	▮▮▮▮ said that she has found some knitted tarts for out rhyme and that they	

	needed two tarts. ' please can you show me two everyone?'.	Next session is PE in main hall.
	Many children were able to hold up two fingers.	
	The whole group then went through the rhyme again and they were reminded to do some good listening.	Orderly, routine clearly familiar and children observed rules to remove socks and shoes and put them around the side of the room.
	It was then time to go into the hall to do PE.	
	The children were praised for coming into the hall nicely. All the children were asked to remove their shoes and socks and to place these into their shoes. , placing their shoes under the benches. ██ asked them why they had to remove their socks?	TAs had set up equipment. Hall huge but plenty of resources for children to use. Climbing, jumping apparatus and then hoops, balls and other obstacles.
	██ girl said so that they do not slip and ██ said well done.	
	She then said that she was going to ask someone to help to show everyone what to do.	
	██ was putting out the equipment.	
	██ was chosen to show them what to do. He walked around each piece of equipment and jumped off each bench. He was praised ' good jumping ██'.	Routine appears to be that children demonstrate and then all children have chance to do it independently.
	██ is then asked to choose someone else to go around and demonstrate the circuit. He chooses ██ , ██ then does the circuit, he does well and is very agile.	
	Then ██ choses ██ to go through the tunnel but she does not want to go	As children play on the equipment the teacher and TA wander around and support as necessary.

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	through so she demonstrates the big climbing frame instead. She is very cautious but does it.	Most children are engaged purposefully, though some more hesitant than others
	███ goes next and does it very quickly in 5 seconds. ███ asked can anyone do it quicker. Another girl does it in 9 seconds. Then it is everyones turn.	
	███ goes to the big apparatus and waits her turn. She comes to tell me that some one has pushed her but that it did not hurt.	
	She then crawls along the beam to the end and then jumps down. She then waits in line to go up the ladder. ███ does a forward roll on the mat. ███ is crawling up the ladder and the climbing frame. ███ goes up to the little boy and takes the disc off him, she wants to join in the rolling of the discs around the floor. She pauses on the beam and waits her turn. ███ goes to jump and tells me to watch her. ███ then goes to copy ███ and watches ███ at the next apparatus. 4 children are sat on the parachute and one little girl tries to pull them along on it. She can't do it, so swaps with a boy and manages to pull them along.	
	███ is playing with a ball. It is time to stop and they all return to the benches to sit down.	
	They were all praised for some good PE. ███ is praised for doing some good rolling, an adult tries to persuade ███ to show everyone by doing it again, but he is having none of it.	Session comes to an end and there is a discussion about what they have done. Clearly trying to engage one child who is very agile and to encourage him to demonstrate what he does but he will not do it.
	███ is asked to demonstrate what ███ did and he does	
		End of observation.

		Recap: PE sessions a little stilted but suspect rigidity due to need to ensure safety of the children.

Appendix 10: Field note

22/5/15

~~[crossed out]~~ Sunny day. Arrived and all C's as normal.
T. + TA = clam + ready to begin day. Room layout was the same. Large circular tray had resources in it which facilitated the reconstruction of the story which the C's had been reading.

Remembered "The Naughty Bus" (do need to get a copy of it).

Other large resources outside - these also mirrored aspects of the story.

Really sparked some C's storytelling + also their role play (especially [boxed scribble])

Effective way to support sequencing. Cause relfed too + recall.

Appendix 11 Sample reflective dialogue transcript: Dialogue 4 session 36

Recorded reflective dialogue No:	
Transcription	**Codes**
"You've been doing and learning about what this morning? Can you tell me?"	
███ 1: mee	
"You've been learning about me?.."	
██████: My!	
"Is it 'me' or is it 'my'?"	
██████: It's my	
"My.."	
██████: I've worked my socks off today!	
"You have worked your socks off! Haven't you? What does that mean?"	
██████: Look at my socks!	
██████: I drawed everything on my board.	
"You did! You did a really good set of drawings and you did some letters didn't you? You worked very very hard. ██████ what letters and words did you do today?"	
████████████ I, know, go, under, the, and my, and two, into	
"And in!"	
██████: Into- I know 'into'.	
"Into?!"	
██████: Yeah	
"You did lots and lots of words, how did you remember and how did you know how to do that?"	
████████████ does know how	
██████: She knows 'into' lots of times!	
"Who does?"	
████████: ████. But she's gone to ██████ school, and she's moved	

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house as well so she can going to ████ school.

"She knew into did she? ███ how did you know these words?"

███: 'Cause I did.

"Cause you did? You knew them?"

███: Yeah- I know them, good.'

"And did you do some really good writing?"

Ollie: Yeah

"Which one do you know best?"

███: ummm... tch tch tch. That's a phoneme.

"That's a phoneme"

███: I know all the diagraphs

"And you know all the diagraphs? How do you know those diagraphs?"

███: Because I keep on learning them, and I keep remembering them.

Ollie smiles at me

"Well done, so we keep on learning and we keep on remembering! ████ can you tell me about your words? Which ones do you know best?"

████: I, know, go and run.

"And how do you know those?"

████: They're the phonemes

"They're the phonemes"

████: They're just to help you know which ones you have to do before the other one.

████: You can't write it.

"Why can't you write it?"

████: Because it's a tricky one

"Are the tricky ones harder to do than the easier ones?"

████: Yeah.

████████████████████████████████

████████: Because they're hard to write.

"Are they? What makes them hard to write? Is it the letters is it the sounds?"

████████: I don't know how to write them

"You don't know how. How do you learn how?"

████████: ..you learn how to write. Like this. Child demonstrates hand movements as if writing

"You do, is it like practising?"

████████: I had a helper 3 times. They showed me how to do it, like this.

"You had a helper three times? Well that's good to keep trying isn't it?"

████████: You've got a helper list.

"You've got a helper list?...I'm going to ask each of you which one you think's hardest. ████, which one of these words is the hardest? You can write darling, you tell me which one's the hardest."

████: Ummm, this one. Child points to his words on the white board where he has written several words.

"That's very good writing though. Do you think that one's hard ████? You know, it's a very special letter, why is it so special?"

████████: Because it's his name! ████████

"Oll.. and what's at the end?"

Children: i i i

"████. How beautiful was that? Do you find that one easy. Which one of those is the hard one? Can you put a little tick next to the one you find hard. You're so good at drawing those 'Os' and 'Ls'. First of all, I want ██████ to tell me which one do you think is the hardest from that list on there? Can you tell me which one you think's hard?"

The child points to one of the words on the white boards and uses the pen to tick the word, thinking about it for a while

"Why is that one hard? Good girl for ticking. Can you tell me what it is? ████████████████

████: Because it's too hard and you might get the 'o' there and the 'nnn' there. She points to word 'on'.

"Ahhhh. I see. Can you see what ████████ done? What's she done? What might happen if you put the 'n' and then the 'o'..████████ drawn it the other way round; put the 'o' first and then the 'nnn'. It makes it hard doesn't it to know which way to do it. What happens...Can you write the 'o' and then the 'n' for me ████ over here so we can all see. What word...do you know what sound and word that is now? ██████ do you know? Doesn't say no does it? It says.."

████████: ON!

The child points to the words on the whiteboard.

"On! You are on fire today ████ aren't you? It does say on.......
Thank you ██████, I'm going to pass my list to Jake to tick which one he ██

████: Can I have a go?

"You've already had a go ████

████: Can I have another go?

"You'd like another go? Ok."

██████: I wrote on the Table. Child picks up the pen and copies word from whiteboard onto another whiteboard but some of the marks go onto the table.

"Aw we can rub it off. ████ you've done a very very big letter, what letter's that?"

██████ J!

████ has written his name.

"J for ████! And please can you tell me which word's hard ████ on there?"

██████: Outside is absolutely icy! Child is pointing out of the window.

"Well you've got to be really careful today then haven't you?"

██████: I didn't bring my wellies. Child looks down at her feet.

"Aw, I hope your shoes have got lots of grip so you don't fall over."

██████: I neeeeearly fell over when went out last time. I didn't have

my wellies on.

"You nearly fell over? ▆▆▆ could you pass my list now to ▆▆▆▆▆? I want ▆▆▆▆▆ to tell us which words he thinks is hardest. Oh, he's put a mark next to that word. What's that one ▆▆▆▆▆?" ▆▆▆▆ takes the pen and the list and looks down the list. He marks on the list

▆▆▆▆: Into

"Into. Why is that the hardest word?

▆▆▆▆: Cause you get the 'nnn' there, and then you get the 'i' there and then the 'o' there.

He points to the letters as he says each one.

"It is tricky isn't it? When you've got a tricky word, how do you suddenly make it easy?"

Anthony: You just look at the walls if you don't have it. You could look at the wall, or you could tell the teacher.

He points to the walls where there are key words on posters and looks at the teacher.

"Clever boy. So you could look at the walls if you don't have it or you could tell the teacher. ▆▆▆▆ what would you do? If you don't know a tricky word, what would you do?"

▆▆▆▆: Write my name

"You'd write your name? If you didn't know the tricky word? Would you? And what happens if ▆▆▆▆ says ▆▆▆▆ I want you to write the word 'mum'."

▆▆▆▆: I would write mummy

"Do you know how to write mummy?"

▆▆▆▆: Noo

"How do you think you might solve that tricky word? That new word."

▆▆▆▆ You could ask somebody else, then they can show you and we can do it.

"You could ask somebody else. Can you think of something ▆▆▆▆? What would you do if you didn't know how to do it ▆▆▆▆? What would you do?"

▆▆▆▆: You could practise how to write more words I like

practising'.

"You could practice."

███████ We could write our names when we practice.

"You could write your name again, but I want you to write the word 'mum'. Can you think of how to do it? no?"

███████: I love my mammy! I am going to write mummy, like this.' She picks up a pen and writes m..u..mm

"Aw. Right I'm gonna rub this out and I'm gonna ask ████."

███████: ??What's on the recorder?? Child points to the tape recorder.

"Well I'm hoping it's still taping us. I hope it's still taping us. I haven't told it to stop. ██████ gonna rub it off for me, thank you. So can I come again next Tuesday? And will you come and talk to me again next Tuesday and tell me what you've learned?"

██████ I want to come and visit ya

"One day you might come and see me but I live a long way away."

Child: I have a new dance.

Child then begins to get up to demonstrate their dance.

"That's good dancing. Well thank you for telling me all about learning your sounds and learning your letters, what were they again?"

███████: Digraphs

" We know what they are and phonemes.

"Digraphs, and phonemes. One second, you've gotta wait for me and we'll all go together. Come on ████ we're going to go back in."

██████ I just wanna wait..

"Well we can't go back, just wait here one second! Come on █████ we've got to go..quick quick quick! Good boy."

██████ is it ? time? Are we going to play? I am going to play with the pets in the vets.

"It's going, time to go back now."

██████: You're going to have another..

"Well I'm not and I'm gonna go back now. Take this back....Come

on ▮▮▮▮▮ In we go...That's it, we need to go in."	

Appendix 13 Email confirming ethical clearance

I have managed to find the below email confirming that my application for ethical approval was granted on 12/3/14.
I wasn't sent a signed copy of this however.
Best wishes
Helen

From: SMITH J.C.
Sent: 12 March 2014 11:54
To: 'h.rowe@yorksj.ac.uk'; ROWE H.
Cc: NEWTON L.D.; ED-PGRSTUDENTS E.
Subject: Ethical approval: H Rowe

Dear Helen
I am pleased to inform you that your application for ethical approval in respect of 'Research questions and sub questions' has been approved by the School of Education Ethics Committee.
May we take this opportunity to wish you good luck with your research.

Sheena Smith
Research Office
School of Education
Durham University

Tel: (0191) 334 8403
www.dur.ac.uk/education

I work part time Monday - Thursday

From: NEWTON L.D.

Appendix 14: ethics consent form

Durham University

School of Education

Research Ethics and Data Protection Monitoring Form

Research involving humans by all academic and related Staff and Students in the Department is subject to the standards set out in the Department Code of Practice on Research Ethics. The Sub-Committee will assess the research against the British Educational Research Association's *Revised Ethical Guidelines for Educational Research* (2004).

It is a requirement that prior to the commencement of all research that this form be completed and submitted to the Department's Research Ethics and Data Protection Sub-Committee. The Committee will be responsible for issuing certification that the research meets accepTable ethical standards and will, if necessary, require changes to the research methodology or reporting strategy.

A copy of the research proposal which details methods and reporting strategies must be attached and should be no longer than two typed A4 pages. In addition you should also attach any information and consent form (written in layperson's language) you plan to use. An example of a consent form is included at the end of the code of practice.

Please send the signed application form and proposal to the Secretary of the Ethics Advisory Committee (Sheena Smith, School of Education, tel. (0191) 334 8403, e-mail: <u>Sheena.Smith@Durham.ac.uk</u>).   Returned applications must be either typed or word-processed and it would assist members if you could forward your form, once signed, to the Secretary as an e-mail attachment

Name: Helen Rowe   Course: EdD (PT)

Contact e-mail address:h.rowe@yorksj.ac.uk   Supervisor: Prof. L Newton

Title of research project:

<u>Research questions and sub questions</u>

Using mixed methods to investigate if the use of photos in reflective dialogues with young children influences their metacognitive knowledge over time.

Using mixed methods to investigate whether there is a relationship between the use of stem questions and young children's development of metacognitive knowledge.

Sub questions

Using mixed methods to investigate whether there is any correlation between development of metacognitive knowledge and age or gender.

Questionnaire

		YES	NO	
1.	Does your research involve living human subjects?	√		IF NOT, GO TO DECLARATION AT END
2.	Does your research involve only the analysis of large, secondary and anonymised datasets?		√	IF YES, GO TO DECLARATION AT END
3a	Will you give your informants a written summary of your research and its uses?	√		If NO, please provide further details and go to 3b
3b	Will you give your informants a verbal summary of your research and its uses?	√		If NO, please provide further details
3c	Will you ask your informants to sign a consent form?	√		If NO, please provide further details
4.	Does your research involve covert surveillance (for example, participant observation)?		√	If YES, please provide further details.
5a	Will your information *automatically* be anonymised in your research?	√		If NO, please provide further details and go to 5b
5b	IF NO Will you explicitly give *all* your informants the right to remain anonymous?			If NO, why not?
6.	Will monitoring devices be used openly and only with the permission of informants?	√		If NO, why not?
7.	Will your informants be provided with a summary of your research findings?	√		If NO, why not?
8.	Will your research be available to informants and the general public without restrictions placed by sponsoring authorities?	√		If NO, please provide further details
9.	Have you considered the implications of your research intervention on your informants?	√		I have considered the implications of my research on several different groups. The schools will be recruited and I will gain informed consent. It is not anticipated that my research will interfere in any way with their day to day practice. It is hoped that after the research is completed that I will share my findings with them as well as the tool which I

				hope to create to enhance reflecting with young children. I have considered the teaching and support staff who will be observed whilst working with the children in the class. These observational details will be anonymised and kept confidential. I do not intend to add to their work load and hope too that after it is completed that they will be able to use the tools created. I have considered the parents and will assure them that any observations on their child will be anonymous and that the intervention strategy will not cause harm in any way. The children are the key to this whole research and I have considered carefully how to both involve them and to ensure their safety. They will be observed within their normal classroom activities and then a sample of them will be asked to take part in a reflective dialogue about aspects of the session observed.
10.	Are there any other ethical issues arising from your research?		√	If YES, please provide further details.

Further details
Overview of research

The focus of my doctorate study is children's development of metacognitive knowledge and whether using reflective skills can enhance metacognitive knowledge development. The aim is to explore whether the processes of reflective dialogue using visual images as well as reflective questioning techniques can enhance children's metacognition and how their metacognitive knowledge evolves over a period of time.

Having strategically explored the relevant literature there is a sound rationale for this study as it should contribute to the discussion surrounding metacognitive knowledge development and possibly illuminate the role that reflection may play in this process. The findings may provide teachers of young children within the participating schools with a usable dialogic tool to aid metacognition and the work may contribute further to the current debate of recognising the importance of metacognition awareness for young

children.

Draft research questions and sub questions

As above

This research will adopt a mixed method approach and I intend to look at living responses to specific situations, interactive variables as well as the whole context. It is probable that a convergent parallel mixed method design will be used with equal emphasis on both types of data collection which are then mixed at the point at which results are interpreted. Both quantitative and qualitative data will be collected using five instruments; observational field notes (tape recorded and hand written notes) , photographs taken by children and observer, records of reflective dialogues (tape recorded and hand written observations), stem questions and a tick list of observed metacognitive behaviour.

A pilot will commence in April/ May 2014 and the full study in September 2014. An opportunity sampling method will be utilised to identify twelve primary schools from North Yorkshire and York Local Education Authority, which have a statutory provision nursery attached to them and deemed to be typically representative of other primary schools in England. Once matched these groups of schools will be randomly assigned to one of three groups; Group A where participants will take part in reflective dialogue discussions with a researcher following an observed taught session with photographic prompts; Group B where participants will take part in reflective dialogue discussions with a researcher following an observed taught session without photographic prompts; and Group C where the participants will be observed during a taught session Within each of these schools groups of eight children will be recruited four from nursery or pre reception and four from year 1. In selecting the children from each class random allocation will be used if permission is obtained from all parents or a matched pairs approach if not.

Declaration

I have read the Department's Code of Practice on Research Ethics and believe that my research complies fully with its precepts. I will not deviate from the methodology or reporting strategy without further permission from the Department's Research Ethics Committee.

Signed Helen Rowe   Dat14/3/14

Proposal discussed and agreed by supervisor (for students) or colleague (for staff):

Name ……………………………………………. on ………………….(Date)

SUBMISSIONS WITHOUT A SYNOPSIS OF THE RESEARCH PROPOSAL WILL NOT BE CONSIDERED.

Appendix 15: Chi Square Test of significance

For details on the Chi Square analysis please see:

Salkind, N.J. (2014) *Statistics for people who (think they) hate statistics*. (5th ed) London: Sage.

Pages 303-309

Appendix 16: Inter-rater reliability

For details on the inter-rater reliability calculation please see:

Salkind, N.J. (2014) *Statistics for people who (think they) hate statistics*. (5th ed) London: Sage.

Pages 118-119

Appendix 17: Table of codes

Whitebread et al (2005a) categories adapted from Bronson (2000) Aspects of metacognitive knowledge	Code	CIndLe Checklist categories Emotional	Code
Self: Emotions/ Likes/dislikes	S1	Can speak about own and others behaviour and consequences	E1
Is aware of own capabilities	S2	Tackles new tasks confidently	E2
Self: Reference to own strengths and weaknesses	S3	Can control attention and resist distraction	E3
Indicates tentativeness	S4	Monitors progress and seeks help appropriately	E4
Self: Sets own targets	S5	Persists in the face of difficulties	E5
Reference to others:	S6	**ProSocial**	
Understanding	U1	Negotiates when and how to carry out tasks	PS1
Compares across tasks, identifying similarities and differences	U2	Can resolve social problems with peers	PS2
Makes a judgement about level of difficulty or rates task on basis of pre-established criteria or previous knowledge	U3	Shares and takes turns independently	PS3
Knowledge: Describing task contents	K1	Engages in independent cooperative activities with peers	PS4
Rating/ describing difficulties and problems	K2	Is aware of the feelings of others and helps and comforts	PS5
Comparing	K3	**Cognitive**	

Evaluates effectiveness of one or more strategies	K4	Is aware of own capabilities	C1
		Can speak about how they have done something or what they have learnt	C2
		Can speak about planned activities	C3
		Can make reasoned choices and decisions	C4
		Asks questions and suggests answers	C5
		Uses previously taught strategies	C6
		Adopts previously heard language for own purpose	C7
		Motivation	
		Finds own resources without adult help	M1
		Develops own ways of carrying out tasks	M2
		Initiates activities	M3
		Plans own tasks, targets and goals	M4
		Enjoys solving problems	M5

Appendix 18

Excerpts from pilot study spreadsheet. Pilot study utterances and tense of reflection

Utterance	Child	MALE	FEMALE	R1	R2	R3
1	MAA	1			1	
2	MAA	1		1	1	
3	FAE		1		1	
4	FAC		1		1	
5	FAD		1		1	
6	MAA	1		1		
7	MAB	1			1	1
8	FAE		1		1	
9	MAB	1		1	1	
10	MAA	1			1	1
11	MAA	1			1	
12	FAC		1	1	1	
13	FAD		1	1	1	
14	FAE		1		1	
15	FAC		1	1	1	1
16	FAC		1		1	
17	MAA	1		1		
18	FAD		1	1		1
19	FAC		1		1	
20	FAE		1		1	
21	FAE		1		1	
22	MAA	1		1		
23	MAB	1		1	1	
24	MAB	1			1	
25	FAE		1		1	
26	MAA	1			1	
27	MAB	1			1	
28	MAA	1		1	1	
29	FAD		1		1	
30	FAC		1		1	
31	FAE		1		1	
32	MAB	1			1	1
33	FAD		1		1	
34	MAA	1			1	
35	FAD		1		1	

R1= past tense reflective utterance

R2= recent past or present tense reflective utterance

R3=future tense reflective utterance

Pilot study utterances and topic of reflection

Utterance	Child	MALE	FEMALE	RO	RE	RP	RFE	RC	RA	RS
1	MAA	1							1	
2	MAA	1								1
3	FAE		1	1					1	
4	FAC		1		1	1				
5	FAD		1	1						
6	MAA	1							1	
7	MAB	1					1			
8	FAE		1	1		1				
9	MAB	1				1				
10	MAA	1								
11	MAA	1								
12	FAC		1			1				
13	FAD		1	1						
14	FAE		1	1					1	
15	FAC		1							
16	FAC		1					1	1	
17	MAA	1		1						
18	FAD		1							1
19	FAC		1	1						
20	FAE		1						1	
21	FAE		1						1	
22	MAA	1		1						
23	MAB	1				1				
24	MAB	1				1				
25	FAE		1	1					1	
26	MAA	1								1
27	MAB	1		1						
28	MAA	1				1	1			
29	FAD		1	1						
30	FAC		1						1	
31	FAE		1		1					
32	MAB	1							1	
33	FAD		1	1				1		
34	MAA	1						1		
35	FAD		1	1						
Total				13	2	7	2	3	10	3

RO=Reflection on object; RE= Reflection on event; RP= Reflection on person; RFE= Reflection on feeling or emotion; RC= Reflection on character or cartoon; RA= Reflection on action; RS= Reflection on strategy

Pilot study utterances and metacognitive categories

Utterance	Child	MALE	FEMALE	S1	S2	S3	S4	S5	S6	U1	U2	U3	K1	K2	K3	K4
1	MAA	1		1					1							
2	MAA	1												1		
3	FAE		1	1						1						
4	FAC		1		1			1								
5	FAD		1													1
6	MAA	1				1					1					
7	MAB	1			1											
8	FAE		1	1											1	
9	MAB	1						1								
10	MAA	1									1					
11	MAA	1			1											
12	FAC		1	1									1			
13	FAD		1	1												
14	FAE		1	1												
15	FAC		1			1										
16	FAC		1				1				1					
17	MAA	1		1	1											
18	FAD		1													
19	FAC		1	1												
20	FAE		1	1									1			
21	FAE		1		1											
22	MAA	1										1				
23	MAB	1					1									
24	MAB	1		1							1			1		
25	FAE		1								1					
26	MAA	1												1		
27	MAB	1														
28	MAA	1					1									
29	FAD		1		1											
30	FAC		1													
31	FAE		1			1										
32	MAB	1		1												
33	FAD		1										1			
34	MAA	1														
35	FAD		1	1												

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Key

Aspects of metacognitive knowledge	Code	Aspects of metacognitive knowledge	Code
Self: Emotions/ Likes/dislikes	S1	Knowledge: Describing task contents	K1
Is aware of own capabilities	S2	Rating/ describing difficulties and problems	K2
Self: Reference to own strengths and weaknesses	S3	Comparing	K3
Indicates tentativeness	S4	Evaluates effectiveness of one or more strategies	K4
Self: Sets own targets	S5		
Reference to others:	S6		
Understanding	U1		
Compares across tasks, identifying similarities and differences	U2		
Makes a judgement about level of difficulty or rates task on basis of pre-established criteria or previous knowledge	U3		

Pilot study utterances and independent learning categories- emotional and prosocial

Utterance	Child	MALE	FEMALE	E1	E2	E3	E4	E5	PS1	PS2	PS3	PS4	PS5	
1	MAA	1			1					1				
2	MAA	1							1					
3	FAE		1	1					1	1	1			
4	FAC		1											
5	FAD		1							1				
6	MAA	1		1										
7	MAB	1							1		1	1		
8	FAE		1	1										
9	MAB	1						1	1	1	1			
10	MAA	1			1	1								
11	MAA	1								1				
12	FAC		1											
13	FAD		1							1		1	1	
14	FAE		1	1					1	1				
15	FAC		1											
16	FAC		1						1					
17	MAA	1		1					1		1	1		
18	FAD		1											
19	FAC		1											
20	FAE		1	1				1						
21	FAE		1				1		1	1				
22	MAA	1												
23	MAB	1		1						1	1			
24	MAB	1												
25	FAE		1						1	1				
26	MAA	1			1	1			1					
27	MAB	1										1	1	
28	MAA	1							1					
29	FAD		1						1					
30	FAC		1	1										
31	FAE		1	1	1					1				
32	MAB	1												
33	FAD		1		1				1		1			
34	MAA	1		1										
35	FAD		1	10	5	2	1	2		1				

Key

Emotional	Code	ProSocial	Code
Can speak about own and others behaviour and consequences	E1	Negotiates when and how to carry out tasks	PS1
Tackles new tasks confidently	E2	Can resolve social problems with peers	PS2
Can control attention and resist distraction	E3	Shares and takes turns independently	PS3
Monitors progress and seeks help appropriately	E4	Engages in independent cooperative activities with peers	PS4
Persists in the face of difficulties	E5	Is aware of the feelings of others and helps and comforts	PS5

Pilot study utterances and independent learning categories- cognitive and motivational

Utterance	Child	MALE	FEMALE	C1	C2	C3	C4	C5	C6	C7	M1	M2	M3	M4	M5
1	MAA	1		1	1						1				
2	MAA	1		1		1			1						
3	FAE		1			1									
4	FAC		1		1		1	1		1					
5	FAD		1												
6	MAA	1				1		1							
7	MAB	1							1		1				
8	FAE		1	1									1	1	
9	MAB	1		1	1			1							
10	MAA	1													
11	MAA	1						1							
12	FAC		1				1								
13	FAD		1		1										
14	FAE		1							1					
15	FAC		1												
16	FAC		1			1									
17	MAA	1													
18	FAD		1	1							1			1	
19	FAC		1	1			1								
20	FAE		1	1				1	1						
21	FAE		1												
22	MAA	1				1									
23	MAB	1													1
24	MAB	1													
25	FAE		1	1			1	1		1					
26	MAA	1													
27	MAB	1					1								
28	MAA	1									1				
29	FAD		1		1										
30	FAC		1												
31	FAE		1		1										
32	MAB	1						1							
33	FAD		1												
34	MAA	1				1									
35	FAD		1				1				4		1	2	1

Key

Cognitive	Code	Motivation	Code
Is aware of own capabilities	C1	Finds own resources without adult help	M1
Can speak about how they have done something or what they have learnt	C2	Develops own ways of carrying out tasks	M2
Can speak about planned activities	C3	Initiates activities	M3
Can make reasoned choices and decisions	C4	Plans own tasks, targets and goals	M4
Asks questions and suggests answers	C5	Enjoys solving problems	M5
Uses previously taught strategies	C6		
Adopts previously heard language for own purpose	C7		

Appendix 19: Spreadsheet of utterances from main study.

Utt	Child	M	F	Ses	R1	R2	R3	RO	RE	RP	RF	RFE	RC	RA	RAO	RS	RSF	RW	S1	S2	S3	S4	S5	S6	U1	U2	U3	K1	K2	K3	K4	E1	E2	E3	E4	E5	PS1	PS2	PS3	PS4	PS5	C1	C2	C3	C4	C5	C6	C7	M1	M2	M3	M4	M5
1	MRM001	1	0	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	MRM004	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	MRM002	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
4	MRA001	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
5	FRM001	0	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
6	FRM002	0	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
7	FRM002	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8	FRM002	0	1	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0
9	FRM001	0	1	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0
10	MRM002	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
11	MRM002	1	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
12	MRM002	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
13	FRM003	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0
14	MRM002	1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
15	MRM003	1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
16	FRM003	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
17	FRA001	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	FRM001	0	1	1	0	0	1	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
19	MRA001	1	0	2	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
20	FRM002	0	1	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
21	MRA002	1	0	2	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	FRM003	0	1	2	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0
23	FRM003	0	1	2	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
24	FRM003	0	1	2	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0
25	MRM002	1	0	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
26	FRM003	0	1	2	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
27	FRM003	0	1	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0
28	FRM003	0	1	2	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
29	MRM002	1	0	2	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
30	MRA001	1	0	2	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
31	MRA001	1	0	2	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
32	FRM003	0	1	2	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
33	MRM002	1	0	2	0	0	1	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
34	MNA001	1	0	3	0	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
35	FNA001	0	1	3	0	1	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	FNA002	0	1	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
37	MNA002	1	0	3	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
38	MNA001	1	0	3	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0

#	ID											
39	MNA002	1 0 3	0 1 0	1 0 0 0 0 0 1 0 0 0 0 0	0 0 0 0 0 0	1 1 0	0 0 0 1 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0
40	FNA003	0 1 3	0 1 0	1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 0 0	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 0 0 0	0 0 0 0 0
41	MNA001	1 0 3	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0	0 0 0 0 0 0	1 0 1	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 1 0 0	0 0 1 0 0
42	FRA002	0 1 3	0 1 0	1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 1	1 1 0	0 0 1 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0
43	MNA001	1 0 3	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0	0 0 0 0 0 0	1 0 1	1 0 0 0 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 1 0 0	0 0 0 0 0
44	FNA003	0 1 3	0 1 0	1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 1 0	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 1 0 0 0	0 0 0 0 0
45	MRA003	1 0 3	0 1 1	1 1 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 1 0	1 0 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1	0 0 0 0 0
46	MNA002	1 0 3	0 1 0	1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 1 0	0 0 0 1 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 0 0 0	0 0 0 0 0
47	MNA002	1 0 3	0 1 0	1 0 0 0 0 0 1 0 0 0 0 0	0 1 0 0 0 0	1 0 0	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0	1 1 0 0 0
48	FNA004	0 1 3	0 0 1	0 1 0 0 0 0 1 0 0 0 0 0	0 0 0 0 0 1	1 0 0	0 0 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 1 0	0 1 0 0 0
49	FNA003	0 1 3	1 1 0	1 1 1 0 0 0 0 0 0 0 0 0	0 0 0 0 0 1	1 0 0	0 0 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0	0 0 0 0 0
50	MNA001	1 0 3	0 1 0	1 0 0 0 0 0 0 0 0 1 0 0	0 0 0 0 0 0	1 1 0	0 0 1 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 0 0 0	0 0 0 0 0
51	FRA003	0 1 4	0 1 0	1 0 0 0 0 0 0 0 1 0 0 0	0 1 0 0 0 0	1 0 0	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 1 0 1	0 0 0 0 0
52	MRA004	1 0 4	0 1 0	1 0 0 0 0 0 0 0 1 0 0 0	0 0 0 1 0 0	1 0 0	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1	1 0 0 0 0
53	FRA004	0 1 4	0 1 1	1 0 0 0 0 0 1 0 1 0 0 0	0 1 1 0 0 0	1 1 0	0 0 1 0 0	1 0 0 0 0 0	1 1 0 1 0 0	0 0 1 0 0 0 0	1 0 0 0 0
54	MRA005	1 0 4	0 1 1	1 0 0 0 0 0 1 0 1 0 0 0	0 1 1 0 0 0	1 1 0	0 0 1 0 0	1 0 0 0 0 0	1 1 0 1 0 0	0 0 1 0 0 0 0	1 0 0 0 0
55	FRA005	0 1 4	0 1 0	1 0 0 0 0 0 1 0 0 0 0 0	0 1 0 0 1 0	1 0 0	0 0 0 0 0	0 1 0 0 1 0	0 1 0 1 0 1	0 0 1 0 0 0 0	1 0 1 0 0
56	FRA006	0 1 4	1 0 0	0 1 0 0 0 0 1 0 0 0 0 0	0 0 0 0 0 0	0 1 0	0 0 0 0 0	0 0 1 0 0 0	0 0 1 1 0 0	0 0 0 0 0 1 1	0 1 0 0 0
57	MRA007	1 0 4	0 0 1	0 0 0 1 0 0 0 0 0 0 0 0	1 0 0 0 0 1	1 0 0	0 0 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 1 0 0 0	0 0 0 0 0
58	FRA006	0 1 4	0 1 1	1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 1 0	1 1 0 0 0	0 0 0 0 0 0	0 0 1 0 0 0	1 0 1 0 1 0 0	0 0 0 0 0
59	MRA005	1 0 4	0 1 0	0 0 0 0 0 0 0 0 1 0 0 0	0 1 0 0 0 0	1 0 0	0 0 0 0 0	1 1 0 0 0 0	0 0 0 0 0 0	1 1 0 0 0 0 1	0 0 0 0 0
60	MRA006	1 0 4	0 1 0	0 0 0 0 0 0 0 0 1 0 0 0	0 1 0 0 0 0	1 0 1	1 0 1 0 0	0 1 0 0 0 0	0 0 0 0 0 0	0 1 0 1 0 1 0	0 0 0 0 0
61	MRA004	1 0 4	0 1 0	0 0 1 0 0 0 0 0 1 0 0 0	0 1 0 1 0 0	0 0 0	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 1 0 0	1 0 0 0 0
62	MNM001	1 0 5	0 1 0	0 0 0 0 0 0 0 0 1 0 0 0	0 1 0 0 0 0	1 0 0	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 1 0 1 0	0 0 0 0 0
63	MNM001	1 0 5	1 0 0	0 0 0 0 0 0 1 0 1 0 0 0	0 1 1 0 0 0	0 0 0	0 0 0 0 0	1 0 0 1 0 0	0 0 0 0 0 0	1 0 0 0 0 1 0	0 0 0 0 0
64	FNA004	0 1 6	0 1 0	1 0 0 0 0 0 0 0 1 0 0 0	0 0 0 0 1 1	1 0 0	0 0 0 1 0	1 0 0 0 0 0	0 0 0 0 0 0	0 1 0 1 0 0 1	0 0 0 0 0
65	FNA004	0 1 6	0 1 0	1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 1 0	0 0 1 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1	0 0 0 0 0
66	FNA004	0 1 6	0 1 0	0 0 1 1 0 0 0 0 0 0 0 0	1 1 0 0 0 1	1 1 0	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1	0 0 0 0 0
67	MNA001	1 0 6	0 1 1	1 0 0 0 0 0 0 1 0 1 0 0	0 0 0 0 1 1	1 0 0	0 0 0 0 0	0 0 0 0 0 0	1 0 0 1 0 0	1 1 0 1 0 0 0	1 0 1 1 0
68	FNA005	0 1 6	0 1 0	1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 0 0	0 0 0 1 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0
69	FNA004	0 1 6	0 1 0	1 1 1 0 0 0 0 0 0 0 0 0	0 0 0 0 1 0	0 1 0	0 0 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 0 0 1	0 0 0 0 0
70	MNA001	1 0 6	0 1 0	0 0 0 0 0 1 0 0 0 0 0 0	0 1 0 0 1 0	1 1 0	1 0 0 0 0	0 0 1 0 0 0	0 0 0 0 0 0	0 1 0 1 0 0 0	0 0 1 0 0
71	MNA002	1 0 6	0 1 0	1 0 0 0 0 0 0 0 1 0 0 0	1 0 0 0 0 0	1 0 1	0 0 0 0 0	1 0 1 0 0 0	0 0 0 0 0 0	0 1 0 1 0 0 0	1 1 0 0 0
72	MNA002	1 0 7	0 1 1	1 0 0 0 0 0 1 0 1 0 0 0	0 1 0 1 0 0	1 1 0	1 0 1 0 0	0 1 1 0 0 0	0 0 1 1 0 0	0 1 1 1 0 1 0	1 1 0 0 0
73	MNA002	1 0 7	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0 0	0 0 0 0 0 0	1 0 1 1 0 0	1 1 0 0 0 0 0	1 1 1 1 1
74	FNA002	0 1 7	1 0 0	0 1 0 0 0 0 0 1 1 0 0 0	0 0 0 1 0 0	1 1 0	0 0 0 0 0	1 0 0 0 0 0	0 0 1 0 0 0	0 0 0 0 0 1 1	0 0 0 0 0
75	MNA002	1 0 7	1 0 0	0 0 0 0 0 1 0 1 0 0 0 0	0 0 0 0 0 1	1 0 0	0 0 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0
76	FRA005	0 1 8	1 1 0	1 1 1 0 0 0 0 0 0 0 0 0	0 0 0 0 0 1	1 0 0	0 0 0 0 0	1 0 1 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0	0 1 0 0 0
77	FRA005	0 1 8	1 0 0	0 0 1 0 0 0 0 0 0 0 0 0	0 0 0 0 0 1	1 0 0	0 0 1 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 1 0
78	FRA005	0 1 8	1 0 0	1 0 0 0 0 0 1 0 0 0 0 0	0 1 0 0 0 0	1 0 0	1 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	1 1 0 0 0 0 0	0 1 0 0 0

#	ID																																																										
79	FNA006	0	1	9	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
80	FRA005	0	1	9	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81	MRA004	1	0	9	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	FNA004	0	1	10	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
83	FNA002	0	1	10	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
84	FNA004	0	1	10	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
85	FNA004	0	1	10	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
86	FNA004	0	1	10	0	1	0	0	1	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
87	MNA002	1	0	10	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0
88	MNA002	1	0	10	1	0	0	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
89	MNA002	1	0	10	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
90	FNA002	0	1	11	1	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1	0
91	FNA006	0	1	11	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	1	0
92	FNA002	0	1	11	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
93	MNA002	1	0	11	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	1	0	1	0	1	0	1	1	0	0	0	1	0	0	1
94	FNAA002	0	1	11	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
95	FNA004	0	1	11	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	MNA002	1	0	11	0	1	0	1	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1
97	MNA003	1	0	11	0	1	0	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
98	FNA004	0	1	11	0	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0
99	FNA002	0	1	11	0	1	0	1	1	1	0	1	0	0	1	1	0	1	0	0	0	0	1	0	1	1	0	0	1	0	1	1	1	0
100	FNA004	0	1	11	0	0	1	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	1	0
101	FNA004	0	1	11	1	1	0	0	0	1	1	0	0	1	0	1	0	1	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	1	0
102	MNA002	1	0	11	0	0	1	0	1	0	1	0	1	0	1	1	1	1	1	1	0	1	0	0	0	0	1	1	1	0	1	0	0	1
103	MRA007	1	0	12	0	1	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0
104	MRA004	1	0	12	0	1	0	1	0	1	0	1	1	0	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	1	1	1	1
105	FRA005	0	1	12	1	0	0	1	1	0	1	0	0	1	0	0	0	1	0	0	0	1	1	0	1	0	0	1	0
106	MRA004	1	0	12	0	1	0	0	1	1	0	1	0	1	1	0	0	1	0	1	1	0	0	1	1	1
107	FRA004	0	1	12	1	0	0	1	1	1	0	1	0	0	1	0	1	0	1	1	0	1	0	1
108	FRA004	0	1	13	0	1	0	1	0	1	1	0	1	1	0	1	0	1	0	1	1	1	0	1	0	1	0	1	1
109	MRA005	1	0	13	0	1	0	1	0	1	1	0	1	0	1	0	1	1
110	FRA004	0	1	13	1	1	1	1	0	1	0	1	1	0	0	1	0	1	1	0
111	MRA007	1	0	13	0	1	1	1	0	1	0	1	1	0	1	1	0	1	1
112	MRA007	1	0	13	1	1	1	1	1	1	0	1	1	0	1	0	1	1	0	1	1	1	0
113	MRA005	1	0	13	1	0	1	0	1	0	1	1	0	1	1	1
114	MRA007	1	0	13	1	0	1	0	1	1	1	0	1	1	1	0	1	1
115	FRA005	0	1	13	1	0	1	0	1	1	1	1	1
116	FRA005	0	1	13	0	1	1	1	0	1
117	FNA004	0	1	14	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1
118	MNA002	1	0	14	0	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	0	1	1	1

#	ID																																																					
119	MNA002	1	0	14	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
120	MNA002	1	0	14	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0
121	MNA002	1	0	14	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	1	1	0	1	0	0
122	FNA004	0	1	15	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
123	MNA002	1	0	15	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
124	FNA002	0	1	15	1	1	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
125	MNA002	1	0	15	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
126	FNA002	0	1	15	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
127	MNA002	1	0	15	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	1
128	FNM001	0	1	16	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0
129	MNM002	1	0	16	0	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
130	MNM003	1	0	16	1	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
131	MNM004	1	0	16	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0
132	MNM001	1	0	16	1	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0
133	FNM004	0	1	16	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	0	1	0	0
134	MNM004	1	0	16	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	0
135	MNM003	1	0	16	0	1	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0
136	MNM003	1	0	16	0	1	0	1	0	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	1	1	1	0	0	0	0
137	FNM001	0	1	16	1	1	0	1	0	1	0	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0
138	FRM004	0	1	17	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	1	0	0
139	FRM005	0	1	17	1	1	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0
140	MRM005	1	0	17	0	1	0	1	0	1	0	0	0	0	1	1	0	0
141	FRM004	0	1	17	0	0	1	1	1	0	0	0	1	0	1	0	0	1	0
142	FRM005	0	1	17	0	0	1	1	1	0	0	0	1	0	1	0	1	0
143	FRM004	0	1	18	0	1	0	1	0	1	1	0	0	1	0	1	0	1	1	1	0	0	1	0
144	FRM006	0	1	18	0	1	0	1	1	1	0	0	1	0	1	0	1	1	1	0	0	1	0
145	FRM004	0	1	18	0	1	1	1	0	1	1	0	1	1	0	1	0	1	1	0	1	1	0	0
146	FRM004	0	1	18	0	0	1	1	1	0	1	1	1	1	1	1	0	1	0	1	0	1	0	1
147	FRM006	0	1	18	1	0	0	1	1	0	1	0	1	1	0
148	MNM005	1	0	19	0	1	0	0	1	1	1	1	0	1	1	1	1	1	0	0	1	0	1	0
149	FNM002	0	1	19	0	1	0	1	1	0	1	1	1	0	1	1	0	1	0
150	FNM004	0	1	19	0	1	0	1	1	1	1	1	0	0
151	MNM005	1	0	19	0	1	0	1	1	1	1	1	0
152	FNM004	0	1	19	0	1	0	1	1	1	1	1	1	0	1	1	0
153	MNM007	1	0	19	0	1	0	1	1	0	1	1	1	1	0	1	0	1	0
154	FNM004	0	1	19	1	1	0	1	1	0	1	1	0	1	1	0	1	0	0	1	1	0	1
155	MNM003	1	0	19	0	1	0	1	1	1	0	1	1
156	MNM005	1	0	19	0	1	0	1	1	1	0	1	1	1	0	1	1	0	1	0	1	0	1	0	1	1	1	1
157	MNM005	1	0	19	1	0	0	1	1	1	1	1	1	0	1	0
158	FNM003	0	1	19	0	1	0	1	1	1	1	0	1	0	1	0	1	1	1	1	0

159	MNM005	1	0	19	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	MNM005	1	0	19	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
161	MNM006	1	0	20	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	0	1	0	0	1	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0
162	MNM005	1	0	20	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
163	FNM001	0	1	20	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	1	0	0
164	MNM001	1	0	20	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
165	FNM001	0	1	20	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
166	MNM001	1	0	20	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	1	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	1	0	0	1
167	FNM001	0	1	20	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	1	1	0	0
168	FNM001	0	1	20	0	1	1	1	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	0	1	0
169	MNM001	1	0	20	0	1	1	1	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	0	1	0
170	MRM006	1	0	21	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
171	MRM006	1	0	21	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0
172	MRM006	1	0	22	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
173	FRM006	0	1	22	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	1	0	0	0	1	0	1	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	1
174	MRM007	1	0	22	0	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	MNM006	1	0	23	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0
176	MNM001	1	0	23	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	0	1	1	0	1	0	1	1	0
177	MNM005	1	0	23	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0
178	FNM003	0	1	23	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
179	FNM003	0	1	23	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
180	FNM003	0	1	23	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
181	FNM002	0	1	23	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
182	MNM005	1	0	23	0	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	1	1	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	0
183	MNM005	1	0	24	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
184	MNM005	1	0	24	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0
185	MNM005	1	0	24	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0
186	MNM005	1	0	24	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0
187	MNM007	1	0	24	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0
188	MNM001	1	0	24	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0
189	MNM007	1	0	24	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
190	FRM004	0	1	25	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
191	FRM004	0	1	25	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0
192	FRM006	0	1	25	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
193	FRM004	0	1	25	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	1	0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0	1	1	0	0	0	1	1	0	0	0	0	0
194	MNM008	1	0	25	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	1	0	1	1	0	0	0
195	MNM006	1	0	25	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
196	MRM007	1	0	25	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
197	FNM004	0	1	25	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0
198	FNM003	0	1	25	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0

#	ID			Age																																																								
199	MRM007	1	0	25	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
200	MRM006	1	0	25	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
201	MRM006	1	0	25	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0
202	FRM007	0	1	26	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0
203	FRM006	0	1	26	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
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205	MNM005	1	0	27	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0
206	MNM005	1	0	27	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
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208	FNM003	0	1	27	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
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211	MNM007	1	0	28	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
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218	MRM006	1	0	29	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1	1	1	0	1	1	0	1	1	0	0	1	1	0	0	0	0	1	1
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221	MRM009	1	0	30	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
222	FNM004	0	1	30	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
223	MRM006	1	0	30	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
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225	MRM007	1	0	30	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	1	1	0
226	MNM001	1	0	31	0	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	1	1	1	1	0	1	1	1	1	0	0	1	0	0	0	0	1	1	1	1	0	1	0	1	1	1	0
227	MNM001	1	0	31	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0
228	MNM005	1	0	31	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
229	MNM005	1	0	31	0	1	0	1	0	0	0	0	0	0	0	1	0	1	1	0	1	0	1	1	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	1	0
230	MNM001	1	0	31	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	0	1	1	0	0	1	1	0	0	0	1	1	1	1	1
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232	MNM005	1	0	32	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
233	MNM001	1	0	32	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
234	FNM004	0	1	32	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
235	MNM001	1	0	32	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0
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237	MNM003	1	0	32	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
238	FNM003	0	1	32	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	1	1	1	0	0	0	0	0	1	0	0	0

239	FRM004	0	1	33	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	0	1	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0
240	FRM006	0	1	33	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	1	1	1	0	1	1	0	1	1	0	1	1	1	1	0	0	0	1	0	1	0	0
241	FNM003	0	1	33	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	0	1	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
242	FRM001	0	1	34	1	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
243	FRM002	0	1	34	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
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250	FRM002	0	1	35	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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254	FRM002	0	1	35	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
255	MRM002	1	0	35	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
256	FRM003	0	1	35	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
257	FRM001	0	1	35	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
258	FRM001	0	1	35	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
259	MRM003	1	0	35	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
260	MRA001	1	0	35	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
261	MRM002	1	0	35	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
262	FRM001	0	1	35	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
263	FRM002	0	1	35	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
264	MRA006	1	0	36	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
265	MRA006	1	0	36	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
266	MRA001	1	0	36	1	0	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
267	MRA001	1	0	36	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
268	MRA006	1	0	36	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
269	MRA007	1	0	36	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0
270	FRA005	0	1	36	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0
271	FRA005	0	1	36	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
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273	FRA004	0	1	36	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
274	MRA001	1	0	36	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
275	MRM003	1	0	36	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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277	MRA006	1	0	36	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0
278	FRA005	0	1	36	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0

279	FRA005	0	1	36	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
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284	MNA001	1	0	37	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
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286	FNA005	0	1	37	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
287	MNA001	1	0	37	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
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295	MNA001	1	0	37	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
296	FNA005	0	1	37	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
297	FNA004	0	1	38	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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306	MNA002	1	0	38	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0
307	FRA004	0	1	39	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0
308	FNA002	0	1	39	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
309	MRA004	1	0	39	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
310	MRA006	1	0	39	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
311	MRA007	1	0	39	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
312	FRA005	0	1	39	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
313	FRA005	0	1	39	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0
314	MRA006	1	0	39	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
315	MRA006	1	0	39	0	1	1	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0
316	MRA006	1	0	39	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
317	MRA004	1	0	39	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
318	MRA007	1	0	39	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0

#	Code			Age			
319	FRA004	0	1	39	0 1 0	0 1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
320	MRA007	1	0	39	0 1 0	0 0 0 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1 0	0 0 0 0 0
321	FRA004	0	1	39	0 1 0	0 0 1 0 0 0 0 1 0 0 0 0 0	0 0 0 0 0 1	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
322	MRA006	1	0	39	0 1 0	0 0 1 0 0 0 1 0 0 0 0 0 0	1 0 0 0 0 1	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 0 0 0 0
323	MRA007	1	0	39	0 1 0	1 0 0 0 0 0 1 0 0 0 0 0 0	0 1 1 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	1 1 0 0 0 0 0 0	0 0 0 0 0
324	MRA006	1	0	39	0 1 0	0 0 0 0 0 0 1 0 0 0 0 0 0	0 1 1 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	1 1 0 0 0 1 0 0	0 0 0 0 0
325	FRA005	0	1	39	0 1 0	0 0 1 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 1	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 0 0 0 0
326	MRA007	1	0	39	0 1 0	0 0 0 0 0 0 0 1 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 0 0 0 0
327	MRA004	1	0	39	0 1 0	0 0 0 0 0 0 1 0 0 0 0 0 0	0 1 1 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	1 0 0 0 0 0 0 0	0 0 0 0 0
328	MRA004	1	0	39	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0 0	0 0 0 0 0 0	1 1 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 1 0 0	0 0 0 0 0
329	MRA006	1	0	39	0 0 1	1 0 0 1 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
330	FRA005	0	1	40	1 0 0	0 0 1 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 1	0 0 0	1 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
331	FRA005	0	1	40	1 0 0	1 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1 0	0 0 0 0 0
332	MNM001	1	0	40	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0 0	0 0 0 0 0 1	1 0 0	1 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 1 0	0 0 0 0 0
333	MNM001	1	0	40	0 1 0	0 1 0 0 0 0 0 0 0 0 0 0 0	1 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 0 0 0 0	0 0 0 0 0
334	FRA005	0	1	40	0 1 0	0 0 1 0 0 0 1 0 0 0 0 0 0	1 0 0 0 0 1	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
335	MNM001	1	0	40	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0 0	0 0 0 0 0 1	1 0 0	1 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 0 0 0 0
336	FRA004	0	1	40	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0 0	0 0 0 1 0 0	1 0 0	1 0 0 0	0 1 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1 1	0 0 0 0 0
337	FRA004	0	1	40	0 1 0	0 0 0 0 0 0 0 0 1 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1 1	0 0 0 0 0
338	MNM001	1	0	40	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0 0	1 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
339	MNM001	1	0	40	0 0 1	0 0 0 0 0 0 1 1 0 0 0 0 0	0 0 0 0 0 1	1 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 1 0	0 0 0 0 0
340	FRA005	0	1	40	0 0 1	0 0 1 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 1	0 0 0	1 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
341	FRA004	0	1	40	0 0 1	0 0 0 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 0 0 0 0	0 0 0 0 0
342	MNM001	1	0	40	0 0 1	0 0 0 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
343	MNA002	1	0	41	1 0 0	0 0 0 1 0 1 0 1 0 0 0 0 0	0 0 0 0 0 1	0 0 0	1 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
344	FNA004	0	1	41	1 0 0	1 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	1 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
345	FNA004	0	1	41	1 0 0	1 0 1 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 1	1 0 0	1 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
346	FNA002	0	1	41	1 0 0	1 0 0 0 0 0 1 0 0 0 0 0 0	0 0 0 1 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 0 0 0 0
347	MNA002	1	0	41	1 0 0	0 0 0 0 0 0 1 0 0 0 0 0 0	1 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	1 0 0 0 0 0 0 0	0 0 0 0 0
348	FNA004	0	1	41	1 0 0	1 0 0 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	1 1 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 0 0 0 0
349	MNA002	1	0	41	0 1 0	1 0 0 0 0 0 1 1 0 0 0 0 0	0 0 0 0 0 1	0 0 0	1 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 1 0 0	0 0 0 0 0
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351	FNA004	0	1	41	0 0 1	0 0 0 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0	1 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
352	FNA004	0	1	42	1 0 0	1 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 1	0 1 0	0 0 1 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 1 0 0 0 0 0	0 0 0 0 0
353	FNA002	0	1	42	1 0 0	0 0 0 0 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
354	MNA002	1	0	42	1 0 0	0 0 0 0 0 0 1 0 1 0 0 0 0	0 0 0 0 0 1	0 0 0	1 0 0 0	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 1 0 0 0	0 0 0 0 0
355	FNA004	0	1	42	1 0 0	0 0 0 0 0 0 0 1 0 0 0 0 0	0 0 0 0 0 1	0 0 0	0 0 0 0	0 0 0 1 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
356	FNA004	0	1	42	0 1 0	1 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0
357	MNA002	1	0	42	0 1 0	0 0 0 0 0 0 1 0 1 0 0 0 0	0 1 1 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	1 1 0 0 0 0 0 0	0 0 0 0 0
358	FNA002	0	1	42	0 1 0	1 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0

#	ID																																																							
359	FNA004	0	1	42	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
360	FNA002	0	1	42	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
361	FNA004	0	1	42	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
362	FNA004	0	1	42	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
363	FNM003	0	1	43	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
364	MNM005	1	0	43	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
365	MNM007	1	0	43	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
366	MNM007	1	0	43	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
367	FNM003	0	1	43	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
368	MNM005	1	0	43	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
369	MNM007	1	0	43	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
370	MNM005	1	0	43	1	0	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0
371	MNM001	1	0	43	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
372	MNM001	1	0	43	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
373	MNM005	1	0	43	0	1	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0
374	MRM006	1	0	44	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
375	MRM006	1	0	44	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0
376	FNM003	0	1	44	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0
377	MRM006	1	0	44	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
378	FRM004	0	1	44	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
379	FRM006	0	1	44	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	1
380	MRM006	1	0	44	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1
381	MRM007	1	0	44	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0
382	MNM001	1	0	44	1	0	0	0	0	1	0	1	0
383	MRM006	1	0	44	1	0	0	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	0	1	0	1
384	FRM004	0	1	44	0	1	0	0	1	0	1	1	0	1	1
385	MRM007	1	0	44	0	1	0	1
386	MRM007	1	0	44	0	1	0	1
387	MRM006	1	0	44	0	0	1	1	0	1	0	1	1
388	FNM004	0	1	45	1	0	0	0	1	0	1	0	1	0	1
389	FNM004	0	1	45	1	0	0	0	0	1	1	0	1
390	FNM004	0	1	45	1	0	0	0	0	1	0	1	1
391	MNM005	1	0	45	1	0	0	0	1	1	0	1	1
392	FNM004	0	1	45	1	0	0	0	0	0	1	0	1	1	0	1	1	1	1
393	MNM006	1	0	45	1	0	0	1	1	0	1
394	MNM006	1	0	45	1	0	0	1	1	1
395	FNM004	0	1	45	0	1	0	1	1	1	1	0	1	1	0	1
396	FNM004	0	1	45	0	1	0	0	1	1
397	FNM004	0	1	45	0	1	0	1	1	0	1
398	MNM005	1	0	45	0	0	1	0	1	1	1	1	1	1

#	Code																																																									
399	FNM004	0	1	45	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
400	MNM006	1	0	45	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
401	FRM006	0	1	46	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
402	FNA004	0	1	47	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0
403	MRM007	1	0	47	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
404	MRM007	1	0	47	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
405	FRM006	0	1	47	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
406	MNM001	1	0	48	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
407	MNM001	1	0	48	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
408	MNM001	1	0	48	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
409	MNM001	1	0	48	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
410	MNM001	1	0	48	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
411	MNM001	1	0	48	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
412	MNM001	1	0	48	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
413	MNM001	1	0	48	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
414	MNM001	1	0	48	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
415	MNM005	1	0	49	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
416	MNM005	1	0	49	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
417	MNM005	1	0	49	1	0	0	1	0	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
418	MNM001	1	0	49	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
419	MNM001	1	0	49	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	1	0	1	0	0	0	1
420	MNM001	1	0	49	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
421	MNM001	1	0	49	0	1	0	0	0	0	0	0	1	0	1	1	0	1	0	0	1	0	0	1	1	0	0	0	1	0
422	MNM005	1	0	49	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
423	MNM001	1	0	50	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0
424	MNM001	1	0	50	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
425	MNM001	1	0	50	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
426	MNM001	1	0	50	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	1	0
427	MRM006	1	0	51	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
428	FRM004	0	1	51	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0
429	FRM004	0	1	51	0	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	0	1
430	FRM004	0	1	51	0	1	0	0	0	1	0	0	1	0	1	0	0	0	1	1	0	0
431	FRM004	0	1	51	0	1	0	0	0	0	0	0	1	0	0	0	1	0
432	FRM004	0	1	51	0	1	0	0	0	1	0	0	0	0	0	0	1	0
433	FRM004	0	1	51	0	0	1	0	0	0	0	0	1	0	1	0	0
434	FRM004	0	1	51	0	0	1	1	0	0	0	0	0	1	0	1	0
435	MNM007	1	0	52	0	1	0	0	0	0	0	0	1	0	0	1	1	0
436	FNM004	0	1	52	1	0	0	1	0	0	0	0	1	0	1	0	0	1	0
437	FNM004	0	1	52	0	1	0	0	0	0	0	0	1	0	1	0
438	MNM005	1	0	52	0	1	0	0	1	1	0	0	0	0	1	1	0	1	0

| Total | | | 140 | 275 | 58 | 159 | 80 | 69 | 20 | 8 | 31 | 160 | 38 | 117 | 5 | 3 | 91 | 126 | 56 | 41 | 25 | 138 | 231 | 101 | 28 | 69 | 18 | 73 | 13 | 147 | 46 | 30 | 27 | 19 | 25 | 22 | 27 | 46 | 14 | 94 | 160 | 50 | 62 | 31 | 88 | 52 | 51 | 34 | 49 | 37 | 8 |

Appendix 20: Space for Reflection Questionnaire (resource for reviewing provision for reflective practice).

Adult role

- How do you plan for reflection?
- How do you observe, record and analyse children's reflections?
- How do you ensure all children have opportunity to reflect?
- What vocabulary do you use to promote reflection?
- How do you allow time for children to reflect?
- What strategies do you use to support reflection on past, present and future events?

Resources

- How do resources reflect children's interests?
- How do resources allow children to transfer learning and reflecting between different areas of the setting?
- How do resources reflect both children's homes and the setting?
- How do resources allow for repetition?
- What specic resources promote children's reflection on 'objects' and on their 'actions'?
- Which resources promote reflection on past, present and future events?

Environment

- What physical space for reflecting exists in your seting?
- What emotional space for reflecting exists in your setting?
- How does the environment promote reflection?
- What provison is made for quiet reflection?
- What opportunities exist for solitary play?
- How does the indoor and outdoor provision support reflection?
- How do you mitigate against noise and interference?