UNIVERSITY OF READING

Linda Enow

TITLE: Teacher Cognition: a study of secondary English teachers.

Thesis submitted in partial fulfilment for the award of the degree of Doctor of Education at The Institute of Education, University of Reading.

SUPERVISORS:

Prof Andrew Goodwyn

Dr Daisy Powell

November 2015

Abstract

Contemporary education research identifies the quality of the teacher as a major determinant in the pace of achievement of the learners. In seeking to understand teacher quality, this study investigates teacher cognition. The premise is: how a teacher thinks during the planning phase of the lesson is paramount in establishing the level of expertise in facilitating learning. However, when presented with a lesson focus, teachers with different levels of expertise demonstrate different thought patterns. The key question is: how do expert teachers think? To attain expert performance, it is vital to capture how experts think. With English being one of the core subjects of the secondary curriculum, and also the language of instruction, it is imperative to focus on Secondary English teachers as the main participants in this study. The Dreyfus model of expertise has been used to identify and group participants for this study. The focus is to capture the thought processes involved during the lesson planning phase and to study the patterns generated. An in-depth study of the different groups of participants, using multiple data collection methods and data analysis procedures, situates this study within multimethod research. The interpretive framework facilitates an intrinsic understanding of each group; as well as, identification and analysis of patterns across the different groups. Patterns of teacher cognition therefore become 'overt'. The identification of patterns at different levels of expertise makes the continuum of expertise in secondary English teaching explicit. Progression on this expertise continuum becomes more 'attainable' as the characteristics of each level of expertise are identified. With the establishment of cognition, inherent cognitive processes and their interplay have been captured; revealing the mind of the teacher, during lesson planning, as intricate and evidence of the complexity of teaching.

Acknowledgements

This study has been possible thanks to the guidance, support and wealth of knowledge of my supervisors to whom I express my gratitude for their patience with my pace of knowledge assimilation and growth.

Thank you to all my teachers, especially lecturers on my doctoral course, my personal tutors for Phase 1 and Phase 2 of the course whose support instilled a level of resilience essential for progress.

This study has been made possible because teachers were willing to give me their time and share their knowledge with me as participants in this study. The study has been shaped by your contributions. Thank you.

My interest in teacher cognition is borne from my interaction with all the students I have had the opportunity to teach; a very enriching process.

I am also indebted to my family and friends for their understanding over the extended period of academic studies. Your kindness is much appreciated and your understanding has been invaluable.

I declare that apart from the influences here identified, I take full responsibility for the quality of the work which has been produced. I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

NAME: Linda Enow SIGNED: *Linda Enow*

Contents

1.0 INTRODUCTION:

Contemporary researchers (Hattie, 2003; The McKinsey report, 2007; Ingvarson, 2010) have isolated the pivotal nature of teacher quality in improving learning outcomes. This places an emerging interest on teachers, and on what teachers do. There seems to be a gradual movement within Education, not only towards exploring what teachers do, but understanding how this is done, as well as what knowledge teachers have and how this is used (Shulman, 2002). Within the current emphasis on what generates impact on learning, this study will seek to unearth teacher cognition. Considering there is an immense body of research over centuries on learning (Winch, 1998; Pardoe, 2009), and studies on teaching (Squires, 1999; McEwan, 2011), leading to more contemporary advocacy for teaching and learning as interdependent (Vermunt and Verloop, 1999; Loughran, 2010; Loughran, 2013), this study on teacher cognition will delve into the thinking which precedes teaching; while taking the perspective that teaching and learning have a congruous relationship. With this foundation established, this multimethod study (see Meijer, Verloop and Beijaard, 2002) examines teacher cognition. The ontological and epistemological considerations (see 3.0 and 3.2) of this qualitative study comprise constructivism, interpretivist framework, and an exploratory approach. The specific focus of this research on teacher cognition is secondary teachers of English. This means, this study seeks to understand teacher cognition by exploring how secondary English teachers exemplify it. The basic form of this exemplification will be lesson planning. Participants in the study have been drawn from English departments across secondary schools in the Midlands in the UK, creating a family of teachers united by the descriptors of their subject. This cross-context union is similar to the perspective presented

by Grossman and Stodolsky (1994), Goodwyn (2011) and Gannon (2012). There are various phases and descriptions of what teaching is and how teaching is done (Halsey, 2011; Strauss, Calero and Sigman, 2014). However, the current study will narrow down to the planning phase; that is, what teachers do before teaching a lesson. The existing body of research identifies the effect of, and sometimes the outcome of, lesson planning on teaching (Cain, 1989; John, 2006; Haynes, 2010). This study examines how the teacher thinks when planning a lesson. In seeking to understand teacher cognition, it will delve into the domain of developing teacher expertise in a bid to explore the thought processes of teachers at various levels of expertise. The range of expertise will be a sample from three of the five stages introduced by Dreyfus and Dreyfus (1986), in the Dreyfus model: novice, competent, expert. The Dreyfus model of skills acquisition is a developmental model. This model is derived from computing-based research which explores how expert performance is achieved. It has been developed from extensive work in computing and mathematical understanding in combination with philosophical knowledge. Considering the current broad spectrum of research on teaching and learning, the current study isolates lesson planning as the domain to investigate what differentiates levels of expertise among secondary English teachers with a view to exploring cognition within these expertise development stages. The premise is: how a teacher thinks about a lesson is a precursor to how the lesson unfolds during the delivery phase. Therefore, a significant differentiating factor in the expertise continuum seems to be teacher cognition.

This background to the current study of teacher cognition generates two main research questions: the first is ‘which patterns are evident in the lesson planning process of novice

teachers, competent teachers and expert teachers?' and the second research question is 'what is evident in the cognitive process of lesson planning to differentiate a novice teacher from a competent, and a competent from an expert teacher?' In seeking to answer these two research questions, this study situates itself within the contemporary and innovative field of research on teacher expertise. Leading on from the research questions, teacher cognition will be captured using a variety of data collection methods, and then investigated for patterns representative of the different levels of expertise, and also the interplay of cognitive processes of lesson planning using a holistic approach.

On a personal basis, embarking on this study of teacher cognition is for the intrinsic benefit of professional learning (see Eraut, 2004), as well as contributing to a growing body of research. The findings from this study will contribute towards filling a gap in the area of teacher cognition at secondary school level, in relation to teacher planning and developing teacher expertise in secondary English teaching. Research is available on teacher cognition in the Teaching English as a Foreign Language (TEFL) sector (Woods, 1996; Tsui, 2002; Johnson, 2005a and Johnson 2005b; Ericsson et al., 2006; Borg, 2006; Burns and Richards, 2009; Feryok, 2010), but there are limited resources within Secondary education, specifically on English teaching. Primary education has seen some input (Traianou, 2007; Sangster, 2013), and so have other secondary subjects (e.g. Li and Kaiser, 2010). Added to this, novice level, competent level and expert level cognition characteristics, regarding thinking about an English lesson, have not yet been captured in research. In order to highlight the importance of capturing levels of expertise, it is necessary to specify the seminal example from nursing (Benner, 2001), similar to teaching, with the element of care embedded in its core principle

(Seery, 2008; Nilsson et al., 2015). This care prerogative of teaching as a profession is also captured in Trout (2012).

According to the influential Mckinsey report (2007 p.16) "the quality of a school system rests on the quality of its teachers"; the report states clearly the need to search for ways to develop expertise in teaching becomes imperative. A confirmation (Hattie 2003, p.17) and a request for "the need for a focus on dependably identifying, esteeming and encouraging excellent teachers" locates the increasing contemporary interest in understanding teaching and understanding teacher quality. This current study of teacher cognition should highlight levels of expertise, at least, at the level of identifying how teachers' thinking could reflect levels of expertise. Calls for research into developing expertise in teaching continue to emerge (Kennedy, 1987; Lampert and Clark, 1990); House of commons education committee (2012), Goodwyn's (2011) on teacher expertise, and Gere and Berebitsky (2009) focusing on teacher quality and teacher expertise, specification on subject-focused research rather than a generic one; which is the case of the literature on developing teacher expertise in general. This decision to embark on this research to capture the thought processes of English teachers at secondary school level, heeds these calls.

This interest in studying teacher cognition is situated specifically in what teachers do before the lesson. To be able to capture this, the focus will be on lesson planning. Thinking, due to its intangible nature, is not the easiest to capture; not even advances in modern technological development seem able to provide assistance with this (Howard-Jones, 2006). Added to this,

is also the reality that, events during the lesson affect the previous plans of the teacher (Brown and Coles, 2003), with the reminder inserted by Dudley-Marling et al. (2006) that many of the factors which affect teacher quality rest outside the domain of the classroom with teachers having minimal influence and/or control over these. This current study will contribute to existing research in capturing patterns of thought processes of secondary English teachers at different levels of expertise. Thus, teacher cognition research at the planning stage (preactive phase) should complement research on the lesson delivery phase or interactive phase (e.g. Perrot, 1982; Ethell and McMeniman, 2000) and reflective phase or postactive phase studies (e.g. Schön, 1991; Loughran, 1996). In my opinion, a basic combination of what happens before the lesson, during the lesson and after the lesson, might unify researchers in arriving at appropriate paradigms regarding studies on the different facets of teaching; the ultimate goal of this unity being enriching knowledge of ways of developing teacher expertise. This current study, however, limits itself to what happens in the mind of the teacher during lesson planning; before the teaching phase.

1.1 Why the focus on secondary English teachers?

Being an English teacher myself, with experience of working in secondary schools, this study is intrinsically valuable. Added to this, English as a subject encapsulates issues relating to its pedagogic borders (Davies, 1992), which at times could be problematic. Passmore (1980, p.215) describes English thus: “of all school courses, English has been the most chaotic, the most fragmented in its objectives”. This description is correlated to the bigger complexities involved in deriving a philosophy of teaching; revealing that the task of the English teacher is exceptionally complex. Political agendas, for example; the National Literacy Framework,

The National Strategies, and recurrent curriculum changes; for example, educational modernisation (Jewitt et al., 2006); indicate that the chaos of English within the curriculum is a continuous presence, making the job of the English teacher even more interesting to investigate. Grossman and Stodolsky (1994) also highlight similar issues with secondary English presenting it as a subject in constant change. Goodwyn (2012) utilises the ongoing changes in teacher professional standards to reflect contemporary challenges of teaching as a profession, and English as a school subject. As is the case with the United Kingdom (UK), the situation with English as a school subject and its relationship with national dictates is evident in New Zealand, Australia, the United States (US), and Canada (Sperling and DiPardo, 2008; Colarusso, 2010; Matthewman, 2014; Exley and Chan, 2014). It is important to highlight that the national focus for each country is different. However, the pertinent issue across all these education systems is English in its role as a school subject; regarding what it should do and how far it must go. There is, it seems, an even stronger emphasis placed on the role of the English teacher in 'enacting' the ever-changing focus of the national curriculum; whichever one it might be, with increasingly limited understanding of the borders of English as a secondary school subject, especially with the case of England, as Goodwyn (2012) points out, with no subject-specific descriptors of teacher standards.

English, as a subject, has retained a core subject position within The School Curriculum (2007) despite various curriculum amendments over the years since the creation of The National Curriculum by the Education Reform Act 1988, culminating in the amendment in DfE (2014a). The central position of English within the curriculum presents English as a subject, as well as a language of instruction, requiring cross-curricular literacy skills. The

core position of English within the school curriculum is prominent and 'visible' in schools with at least one School Leadership Team (SLT) position with a designated focus on whole school literacy. This could be viewed as a reflection of the status of English as a subject in general. In this context, this study considers Literacy and English within the umbrella of English as a subject, by-passing the debate as evidenced in Goodwyn (2004) relating to English and Literacy. Beyond education at the school level, entry requirement for some non-compulsory schooling phases stipulate at least a GCSE 'C' grade, its equivalent, or a pass in Functional Skills tests usually including English as one of the key subjects. Due to its necessity within and beyond school, expert English teaching is vital in ensuring successful outcomes for the learners. With the 2013 legislation coming into effect and subsequent 2015 legislation (The Education and Skill Act, 2008) in place for compulsory education until 18, following on from DCSF (2008) reforms, and a key requirement for English and Mathematics success evidence, prominence of English is again highlighted. This central position of English (Gere and Berebitsky, 2009) brings with it an immense responsibility for the English teacher to ensure the learning of English retains this prominence in the school curriculum. This type of social responsibility typifies what Shulman (2005) describes and Davis (1992) highlights. It seems it is the responsibility of the English teacher to ensure all learners engage with the subject in a manner enabling achievement of all its tangible, and also perceived, goals and outcomes. It is therefore essential to understand how English teachers seek to ensure quality learning happens.

Sperling and DiPardo (2008) review research on English and explore the role research on English as a secondary school subject should play in the myriad requirements of English

from English teachers. One of the recommendations by Sperling and DiPardo (2008) is capturing the thinking of English teachers. This resonates with the current study which works with English teachers, seeking to understand cognition relating to the lesson planning phase. The insight into secondary English teacher cognition should create a window into the mind of the teacher in terms of how their thinking facilitates the realisation of these short, medium, long term goals, and the wider frame of national goals and/or demands of English as a school subject. Considering the discussion about English as a subject and the national prescriptions, it is helpful to include the idea expressed in Clark (1988, p.7) "…many now see planning as the instrumental linking process between curriculum on the one hand and particulars of instruction on the other". Planning, added to cognition, being another key area of focus of the current study. Studies on secondary English, appear to have generally examined policy and curriculum aspects; for example, Gibbons (2009), knowledge; for instance Doecke et al. (2007) and beliefs; with Sperling and DiPardo (2008) as an example. Teacher cognition has not been thoroughly researched in a holistic way, neither has the specific discipline of secondary English been focused on extensively at the preactive phase of teaching, in exploring the mind of the English teacher.

1.2 Definition of key terms

To facilitate the exploration of the two research questions, explanation of some key and recurrent terms is necessary. The research topic uses 'cognition' as a keyword. Cognition, and the inherent cognitive processes will be clarified, followed by a brief link to expertise, since the teachers in this study are representative of different levels of expertise.

1.2.1 What is cognition?

First, there will be a focus on understanding what cognition is. Teacher cognition, should then be explored with regard to how the key term, cognition, relates to a teacher. In seeking to understand cognition, other associated vocabulary, for instance, thinking, will be utilised depending on how researchers have chosen to use them. Some different theories which surround cognition will also be examined.

Loughran (2010, p.142) defines cognition as "the mental processes used to code, store, transform and retrieve information, ideas and knowledge". This definition of cognition is firmly based within an understanding in the context of education. Malin (1994, p.137-138) says "thinking can be defined as the process involved in manipulating information, either collected through the senses or stored in memory from previous experience so as to be able to respond to the immediate situation". The emphasis on storage and use of knowledge or information is the unifying feature of these two researchers. Vast quantities, concerning information to be stored, also undercuts both definitions and this seems to highlight potential difficulties in capturing, storing and retrieving information on cognition. Haynes (2010) stays within the confines of education and raises the difficulty in establishing accurately what cognition is. There is, however, an awareness cited which makes the understanding of what cognition is, implicit in what a teacher teaches. In light of this entrenchment of cognition in teaching, Haynes (2010) then seeks to create a model which could be used to understand cognition. Hence, from the perspective of cognitive psychologists, cognition is understood

to be “processing that takes place in the mind” (Parker and Winne, 1995, p.6). When the word ‘processing’ is included in the definition of cognition, there seems to be a close association with mechanical systems which generate cognitive processes, implying a cognitive model can be created. This study rests within the domain of education, in terms of considering cognition as a human identifier or quality, and understanding cognition to be what happens in the human mind.

In line with cognition from the perspective of education, teacher cognition has been used to separate what happens in the mind of the teacher in the execution of the duty of teaching from what happens in the mind of other professionals. Borg (2005, p.190) uses the term teacher cognition “to refer to the unobservable cognitive dimension of teaching – what teachers know, believe, and think.” While Borg (2005) centres on that which cannot be observed in the work of teachers, with the realisation by Loughran (2013) that teacher thinking cannot be easily observed, Berliner (1987) adheres to teacher behaviour, and it seems, that which can be observed. Hewitt (2008) counters this perspective of teacher cognition relating to observed behaviour by highlighting the complexity of teaching, and the analysis of teaching and learning which involves elements of thinking and learning which are not tangible and cannot be accessed through observation. Thinking is the new item introduced by Hewitt (2008) in this attempt to establish exactly what teacher cognition is. Some studies have circumvented the term ‘teacher cognition’ and chosen to seek to express what happens in the mind of the teacher explicitly as teacher thinking. Loughran (2013) maintains thinking is the bedrock of teaching, however despite its vital importance the thinking which drives practice is very rarely presented in a perspicuous manner; implying a

tacit dimension to the knowledge base of teachers and also introducing knowledge as core in understanding teaching. Tacit knowledge, according to Von Grogh, Ichiji and Nonako (2000) in the field of Business, drives innovation and Toom (2012) emphasises its collective properties. Lejeune (2011) on the other hand presents tacit knowledge within educational contexts as perceived to be of the sole ownership of the individual, with Toom (2012) introducing the idea that there is tacit knowledge as a product, and tacit knowing as processes. Calderhead (1987) therefore advocates for an understanding of both tangible and tacit representations of knowledge as defining properties of teaching. As already indicated by Loughran (2013), a need to explicate the tacit component of the knowledge bases of teachers is pertinent in research on teaching. Shulman (1986) explains the knowledge bases of teachers comprises; content knowledge, pedagogical content knowledge and curricular knowledge. Ownership of tacit knowledge within organisations exhibits differences. Within Business, there is shared responsibility whereas Education presents tacit knowledge as the sole responsibility of its owner. Returning to thinking, Adair (2013) clarifies that the whole process of thinking is a very untidy one, but thinking must be consciously engaged in in an orderly fashion.

Various theories have been generated about cognition. One theory refers to embodied cognition; for example Chatterjee (2010) which advocates for the understanding of cognition as a combination of the body and the mind, thereby seeking to study the brain and how it operates in generating the cognition. Educational researchers have tended to explore cognition in terms of an amodal theory, as alluded to in Chatterjee (2010), discounting the body and sticking solely on the mind and cognition. The amodal theory of cognition supports

the inclusion of non-cognitive elements which impact on cognition. Within amodal cognition, there is also reference to situated cognition (Powell, 2000). Situated cognition isolates the requirement of a specific place and/or context for cognition. Similar to amodal cognition, with the incorporating of non-cognitive elements, Bender and Beller (2013) introduce hot and cold cognitions. Cold cognitions refer to the standard identifiers of cognitive processes while hot cognitions are generally based on typically non-cognitive elements of motivation and emotions. Beaty et al. (2014) add another dimension labelled creative cognition; which examines how associative cognitive processes and executive processes are used in equal measure to generate cognition, showing an emerging paradigm of combining processes rather than isolating them as has been the case so far in research. In light of this emerging view of cognition, Storkerson (2012) advocates for naturalistic cognition, which is holistic in nature.

Among the various theories of cognition, that of information processes has been found to be particularly relevant to teaching (Frederiksen, 1984). Kugel (1986), within the context of information processing and computing, highlights a precise definition of thinking is unavailable. This compounds the issue with defining cognition, especially with researchers who have included thinking as an in-road into how cognition should be understood. Insightfully for information processing studies, Kugel (1986) points out the need to break up thinking into specific aspects rather than trying to understand thinking in holistic terms. This is a system which could work efficiently in output – input domains. However, within teaching where this dichotomy is not so clear-cut, I wonder whether this compartmentalising of thinking would be equally productive.

1.2.2 Cognitive processes

According to Leahey (2003) the key issue in the study of human thinking, in the example given of decision making, reverts to the amount of access individuals have into the cognitive processes. Malin (1994, p.1) presents cognitive processes as relating to "those functions which have their control within the higher brain centres of the cortex"; referring to cognition as being concerned with conscious, rather than unconscious processes. From this definition, thought, is one of those aspects referred to as being conscious. The emphasis on cognitive processes involving conscious effort sits well within the realm of the current study although the interest of this current study is the mind rather than the brain. Adair (2013) states, the brain and the mind are distinct, and the mind is a complex unit which drives daily practical thinking.

Within literature on cognitive processes (e.g. Kahneman, 2003), irrespective of the discipline, recurrent areas constituting cognitive processes are: decision making, problem solving, judgement, memory, reasoning, perception and intuition. Studies specifically on teacher thinking have predominantly covered decision making. Borg (2005), within TEFL, has sought to understand decision making by using the method of observation, while Wagner (1987) has employed Stimulated Recall (SR) as the main method. Shulman (1999) has focused on school teachers and decision making. Woods (1996) also focuses on decision making, and in language teaching within an in-class situation. A substantial amount of research has sought to understand decision making, some examples are: McNergney et al.

(1988), Westerman (1991), Byra and Sherman (1993), Copeland et al. (1994). There has been some work on judgement; Tripp (1993) and Doddington (2013) explore judgement, specifically teachers' professional judgement. It seems, when memory has been studied, the focus has been on novice teachers; typically mental space, also studies about cognitive load (Nathan and Petrosino, 2003; Feldon, 2007), another main interest has been the learners; for instance, Normand and Tannock (2014) investigated the impact of lack of teacher expertise in understanding issues of memory in children. There has been limited research on intuition particularly with teachers; in the sense of intuition as it is presented by Dreyfus and Dreyfus (1986; 2005), which Kahneman and Klein (2009) term professional intuition, although some insights have been generated with the review by Harteis and Billett (2013). Equally, there has been work on 'noticing' (Kleinknecht and Scheider, 2013; Stürmer, Könings, and Seidel, 2013; Seidel and Stürmer, 2014), which is beginning to focus on the not-so-obvious elements of teacher cognition which could define intuitive acts or outcomes tied to quite advanced or implicit processes. Problem solving seems to have been reserved mainly for studies of Mathematics teachers, with numeric calculations as main examples of interest in problem solving and teacher thinking (Depaepe, De Corte and Verschaffel, 2010; Sutherland et al., 2000), although Frederiksen (1984) raises this as an issue and presents the central nature of problem solving to other cognitive processes, for example decision making and memory, as well as its importance in reading and writing similar to the other numeric-based school subjects. In instances where problem solving has been linked to English, the reference has been Literacy and its impact on problem solving in Mathematics (Orosco et al., 2013). The more generic feature of problem solving has been linked to learners rather than teachers, it seems; for example, behaviour and behaviour management (Isbell and Jolivette, 2011;

Griffin, Jones and Kilgore, 2006) and thinking skills (Wallace et al., 2012). Research on reasoning, I infer, has not been explicit with regard to teachers. Shulman (1999) introduces the term 'pedagogical reasoning', and Fenstermacher (1994) develops this concept in great detail. However, there are limited studies exploring this area of teacher cognitive processes, although Livingston and Borko (1989) have clearly highlighted "this form of thinking is unique to teaching". More recently, especially with trying to explore the typically non-verbal knowledge a teacher has, there have been studies on perception, for example; Le Fevre (2014) and Schempp and Johnson (2006), with one centred on teacher professional development and the other on teacher expertise. Although Kagan (1992) does not explicitly seek to study perception, the majority of the studies reviewed constituted a focus on perception.

These studies highlight cognitive processes within the field of teaching have been studied either as individual and distinct items, or in more generic terms; typically termed teacher thinking. Berliner (2001), while identifying the differences in expectations of performance of expert teachers compared to experts in other fields, identifies a key similarity; that of cognitive processes. Also revealed from this brief literature exploration; decision making has been the main focus of research on teaching where any reference has been made to teacher thinking or the cognitive perspective. Grossman and McDonald (2008) while listing what teaching and teacher education have been involved in over the past fifty (50) years identify only decision making, confirming the position by this current study that decision making has been the dominant one of the cognitive processes in educational research so far and a similar extensive interest is necessary for all the other cognitive processes involved in teaching. The

stance taken by this current study, however, is in order to understand teacher cognition, it is vital to seek an understanding of each of these key cognitive processes, not in isolation but more holistically; similar to what Storkerson (2012) describes but terms naturalistic cognition. Despite the introduction of the term naturalistic pending validation from the research community, that which Storkerson (2012) describes raises awareness of the need to move away from cognition as it is currently envisaged as distinct components, and the necessity to begin to explore the interconnectedness of these components in a manner typical of its existence in the specific domain or social context. Cognitive processes will therefore be explored holistically in terms of their interplay as the teacher engages with their work through planning. From this insight, this study develops on the premise that the cognitive processes could be interwoven. What might be of interest is finding out whether there is a sequence involved in the interplay of these cognitive processes. It would also be interesting to find out whether teachers at various levels of expertise show similar or different patterns of interplay of cognitive processes, and what the inherent nuances of these similarities or differences could be. Berliner (1987, p.84) states "teacher behaviour is substantially influenced and even determined by teacher thought processes." Inference from this is the notion the act of teaching is predetermined by the act of thinking; an understanding of thinking should foster, hopefully, an even more improved understanding of teaching and learning. The key for me as a researcher is to seek to understand cognitive processes in a more holistic way. Compounding this holistic approach to understanding cognitive processes is emphasis widely presented in expertise literature on the domain specific nature of expert performance (Hattie, 2003; Berliner, 2004; Ericsson et al., 2006). In the current study, domain specific relates to subject specific focus of secondary English teaching; the

importance of which is also highlighted by Gere and Beresbitsky (2009), and by Dudley-Marling et al. (2006) regarding policy making, also Goodwyn (2012) in examining the curriculum as it ignores the benefits of a subject specific perspective. It is worth noting the criticism by Mahon (2007) of the term holistic, which in its fixation on how holistic is used paradoxically reveals a pertinent point: that successful teaching is based on analysis, while also claiming learning cannot be holistic. This argument by Mahon (2007) could be applicable in the strict sense of understanding terminology, however in applying holistic to understanding cognitive processes, it is lucid in its collective outlook. The point Mahon (2007,p.90) raises about analysis as the bases of teaching is useful in terms of the current study's bid to understand the interplay of cognitive processes involved in teaching. Inference could also be made from Mahon (2007) that because learning is analytical, holistic cannot apply to learning since learning is a conscious process. The current study on teacher cognition agrees with Mahon (2007) in understanding learning as a conscious process but finds it incomprehensible to hold on to the limited, albeit fixated, definition of holistic which ignores variations in its application to research on teaching. To conclude, the reminder by Frederiksen (1984) of the vital necessity to continue research on cognitive processes should be included.

1.3 What is expertise?

From a generic viewpoint, expertise is understood to be the niche point of human performance ability. This means when engaging in a specialist area, an individual is able to excel to the highest point humanly possible. Sorensen (2014) captures the notion of authority

from society and from peers to underpin the title of expert. This current study on teacher cognition explores expertise in teaching. In the first instance the focus is to understand how expertise is defined in teaching, what the different levels could possibly be, the forms it takes, and possibly how to capture, share and evaluate expertise. The contention primarily is acknowledging that teachers are experts. With extensive debates and research over decades, seminal works such as Hattie (2003) have entrenched the idea that expert teachers are currently working in schools. This is also clarified with the accreditation procedures already in place globally to recognise and certify teacher expertise. Nomenclature to identify expert-level professionals includes the following: the US focuses on proficiency in teaching and calls a practitioner showing this level of expertise an accomplished teacher (NBPTS, 2014), Australia uses Highly Accomplished and Lead teacher (AITSL, 2012), Scotland's model, until very recently, has been the Chartered teacher (Ingvarson 2009; Carr and Skinner, 2009), and England's Advanced Skills Teacher (AST) and Excellent teacher, currently being phased out. A Master Teacher (Coates, 2011) label proposal for England was made, probably sprouted from the US format (see Mayo, 2002) for in-state certification for Math and Reading teachers, however, the Specialist Leader in Education (SLE) is now in place in England (DFE, 2014b). With recognition confirmed, the current study takes the next step of understanding the journey towards expertise. This leads to the realisation that there are various levels of expertise. Levels of expertise will be examined in this study by using the influential Dreyfus model. After an examination of contemporary expertise development models, it became clear that the Dreyfus model encapsulates the 'journey' towards expertise, with its five stages, as I believe is a realistic reflection of the experience of a teacher, and also as described incessantly in research (e.g. Sorensen, 2014) which captures the complex

nature of teaching. Not only does the current study explore the stages of expertise development, with its focus on cognitive processes it seeks to understand the nature of expertise, that is, the tacit and tangible explications and/or expression of expertise. The interest in cognition for this study and its research questions steer the study beyond that which is observed into areas of the workings of the mind generating a deeper understanding of human performance ability within teaching. The relative confidence in identifying stages of expertise development should however, not detract from ongoing debates within expertise research concerning that which Eraut (2002) and Berliner (2001) present - a unified definition of expertise, and as Shulman and Shulman (2004) state its identification, capturing, and aptitude for expertise measuring. Expertise research is clear in stating that which an experts undertakes effortlessly is relatively challenging to a non-expert.

1.4 Why the focus on the preactive teaching phase?

Planning is a prerequisite for teaching. Expert planning potential, it seems underpins an expert interactive teaching phase. Outcomes of planning have sometimes been attributed to rigour in its application by some teachers (e.g. Laurie, 2011), and sometimes to extent of teacher experience. There is also the generally accepted understanding that planning should retain flexibility taking into account input during the interactive phase (Fleming and Stevens, 2015). Hattie (2003), in addition highlights the deep representations of expert teachers in combining, changing, adding and making lessons uniquely in tune with the needs of their learners, this implies an intricate planning foundation. A generous amount of focus has been placed on the interactive teaching phase and also there is great emphasis on the postactive phase. The current study argues for a paramount extensive exploration of the planning phase

not only in the form and structure as the current case in literature is, but beyond into the mind of the teacher. It is generally acknowledged in research on teaching that teachers spend an extended amount of time planning. Of importance is also the understanding that this planning stays in the mind of the teacher and it is on-going. The focus of this study is to seek an understanding of teacher cognition; that is the thinking that happens in the mind of the teacher specifically when they are planning a lesson. Dillon and Maguire (2011) identify thinking, teacher thinking, as one in the trio of teachers' beliefs and actions that creates learning experience of significant impact. Although the nature of the current study does not take a longitudinal form to gain an understanding of the ongoing process of teacher planning in the mind, it at least probes to reveal how the mind of the teacher works when it is performing a planning task. As already stated, this is more of a snapshot at a particular point in time. It is also relevant to state, because for some of the participants data collection happened at three different points in time, this was not a single opportunity snapshot; it was recurrent. Some of the data collection methods, for instance Stimulated Recall (see 4.3.5) also linked back to a previous task undertaken by the participant. This is also the case of the Expert Commentary (4.3.6) which contains the potential for the expert to refer back to their own planning. This means there has been some potential in this study to capture teacher cognition with a semblance of an ongoing process reflective of the typicality of teaching. Despite the central nature of the preactive phase, limited research is currently available, and even more significant is the domineering position of one model of planning; the rational model over approximately six decades (John, 2006).

1.5 Context of the study:

Exploring teacher cognition within the context of the secondary English classroom and secondary English teaching generates reference to the professional and wider societal context of teaching. Teachers, and by extension, secondary English teachers have been affected by political, economic and social circumstances (Hennessey and McNamara, 2013). A brief examination here should consolidate the notion of the specific context within which this study is situated. Secondary education in England has political strings as governments implement their strategies for national improvement, resulting in curriculum changes (Olson, 1992; Goodwyn, 2011). This study is timely as it is situated within a transitory phase, as evidenced in current changes in teaching standards proposal (Coates 2011) for the introduction of the Master teacher, a proposal which has been abandoned in favour of SLE as a replacement for AST. The SLE totals approximately 6000 members (DFE, 2014b). The issue of how the teacher is perceived within each society has been a constant presence in literature of teaching as a profession, with the resulting debate exposing the intricacies which make teaching a profession. Welker (1991) reports of societal perception of the teacher as a custodian of teaching professionalism. Darling-Hammond (2005) presents the merits of teaching as a profession. Within the economic domain, this study on teacher cognition and its potential outcomes, could be situated in the exploration of ways of rewarding (as highlighted by Ingvarson, 2011; and Armrein-Beardsley, 2012), and or supporting through recognition (Andrews, 2011) the extended professional, that is, one who goes beyond the call of competence. With the current context of teaching established, it is necessary to refocus on existing research on teacher cognition.

2.0 LITERATURE REVIEW

Underlying theoretical concepts which form the basis of this study are: cognition, expertise, lesson planning. The literature which underpins this research has been organised to explore these key areas.

2.1 Cognition:

This study on teacher cognition has two research questions. One seems underpinned by the cognitive model while the other verges towards the non-cognitive model; non-cognitive as highlighted by Olson (1992). The first research question emphasises identifying patterns in the lesson planning process of teachers at different levels of expertise. Identification of patterns reflects elements inclusive of a non-cognitive dimension. Reference, however, in the second research question to the cognitive process of lesson planning, highlights a dimension to the study resting within the spectrum of the mind. It could be argued, because all methods of data collection are based on teacher cognition, both research questions enable the researcher to delve into the cognitive realm of teaching. By this, it is meant, how teaching is conceptualised in the mind of the teacher; particularly when a lesson is being planned. In order to delve into teacher cognition, it was necessary to determine the stage of professional development of the participants. The rationale for this; the understanding that teacher cognition could be influenced by other factors, for instance, context, culture as highlighted by Bender and Beller (2013). A good model showing differentiated levels of expertise is the Dreyfus model. Although the Dreyfus model is yet to be applied to studies on teacher cognition, the decision was arrived at that the developmental approach (Berliner, 2004), also

advocated by Hallam (2010), and the five stages highlighted by Kagan (1992), will be most suitable for this study, since the staged approach groups all the participants into one team of professionals, albeit at varied levels of expertise. It is worth highlighting the Dreyfus model is generally used in studies under the nomenclature of non-cognitive model or heuristic model (Berliner, 2004), which takes a developmental approach (Benner, 2004), and also Gossman (2008) although Gossman (2008) suggests some changes to the Dreyfus model for the proficient and expert stages to make it more applicable to teacher professional development. This could be because the model identifies characteristics of levels of expertise which do not specifically depend on how the mind works but more on how information is processed as a computer-based model. It seems contradictory to combine cognitive and non-cognitive models, but it is also important to understand teaching as involving both cognitive and non-cognitive requirements explored in Olson, (1992).

2.1.1 Brief history of cognition research

As part of the introduction, 1.2.1 above has established what cognition is, based on how researchers within education conceptualise it. In this part of the literature review, it is important to establish the history of cognition research. This should provide the basis for exploring how cognition research has developed over time reaching its current state. Weisberg and Reeves (2013) highlight the cognitive revolution began within the 1950s and 1960s. According to McDonald, Kazemi and Kavanagh (2013), in the 1960s and 1970s research on teaching used the behavioural mode of learning as its theoretical framework. Feldon (2007) provides a timeline of research on teachers' cognition dating back to 1978, while Kagan (1988) specifies 1974. Grossman and McDonald (2008) count twenty years of

research on the cognitive demands on teaching estimating effective work in the cognitive domain beginning in the late 1980s.The arrival of the 1990s introduced a more scientific focus on the brain (in addition to the mind) with research exploring its application in education research (Ansari, Coch, and De Smedt, 2011; Schrag, 2011). Chatterjee (2010), within the specific context of cognition, examines the link between subjective and objective views of research on cognition and how to find a common ground. This has led to Chatterjee (2010) identifying two types of cognition: amodal cognition and embodied cognition; with the clarification that amodal cognition leans towards psychology and cognitive sciences while embodied cognition, currently standard in neuroscience, has its roots in neuropsychology and neurology. This direction into the brain was resisted in terms of its application in the classroom due to philosophical divides in understanding classroom experiences (Ansari, Coch and De Smedt, 2011). There are also some studies which highlight a third type of cognition; situated cognition, for example Powell (2000) and Mena Marcos and Tillema (2006), and other theories have been emerging; creative cognition (Beaty et al., 2014), naturalistic cognition (Storkerson, 2012), and distributed cognition (Akkerman et al., 2007; Hung, 2013). Although Abramson (2013) does not situate the onset of the cognitive revolution, this recent article indicates the cognitive revolution is still on and phasing out the remaining behaviourist perspectives. This apparent revolution arrived as a key contrast to behaviourism; behaviourism very strongly discounted any research which related to studying consciousness or any topics relating to studying the activities of the mind. Because behaviourism focused on observable phenomena, it therefore excludes thinking because it is unobservable. Edwards (1997) indicates it might not be easy to study cognition without fully incorporating cognitivism; in this case referring to the processes involved in generating a

cognition. Both Weisberg and Reeves (2013) and Edwards (1997) assert cognitive processes should be knowledge-based. It should be clarified, by moving away from understanding teaching based on observed behaviours using a competency-based approach (McDonald, Kazemi and Kavanagh, 2013), there was a gradual replacement of this with knowledge as the new focus for teaching. Kagan (1988, p.488) examines research on teacher cognition and traces three key areas: teachers' planning, interactive cognitions, and knowledge bases.

At the onset of research on cognition, as already established, the study of cognition and its inherent cognitive processes was firmly within the domain of psychology. However, with a cognitive revolution in the 1950s and the 1960s, it seems the decades that followed have introduced a divide in the academic groups which study cognition; with one group focusing on the mind and the other on the brain. This has generated a range of fields and subfields; cognition, teacher cognition, social cognition, cognitive psychology, neuropsychology, cognitive development, etc. in a variety of academic disciplines; Psychology, Sociology, Anthropology, Education, Neuroscience amongst others. It should be recalled, the great philosophers who have influenced modern thought had already introduced thinking on human cognition, and philosophy today continues to provide insights into cognition (Garrett, 2002; Bornedal, 2010). Despite the semblance of a divide and continued compartmentalising of research groups within the wider field of cognition, there is a constant call for interdisciplinary collaboration and many studies show clearly how other disciplines can benefit from research on cognition, for example; Pickering (2006) on cognitive psychology and education, Brook and Akins (2005) for cognition and neuroscience, Bar-Eli, Plessner and Raab (2011) and cognition and expert performance in sport, and for neuroscience and

classroom application there has been significant contribution from Ansari, Coch and De Smedt (2013).

2.1.2 Application of Cognition research to teaching

Considering the impact cognition research has had on various fields, this subsection of the literature review seeks to examine how cognition research has been applied to teaching. Shulman (2000) lists disciplines which have shown significant interest in teaching: psychology, sociology, anthropology, obviously including education as well as individual academic subjects. Over the last three decades, there has been some interest in understanding teaching from the cognitive perspective (Calderhead, 1987; Copeland et al., 1994; Loughran, 2010). However, currently there still appears to be a strong reliance on providing evidence of teaching from a behaviourist (psychology) perspective; a key characteristic of which is observation or observed behaviour, an issue raised in Kagan (1990) and the inferred advice on using cognitive paradigm methodologies for understanding teaching in the age of cognate-based research in teaching. I wonder whether, despite the divergence away from behaviourist based paradigms in education research over the decades (McDonald, Kazemi and Kavanagh, 2013), teaching is one of the fields which still relies heavily on the behaviourist epistemology particularly in assessing performance or competence. There are some advantages derived from studying observed behaviour and there is plenty of evidence of this in research. Based on research on observed behaviour there are still great difficulties especially within teacher education research to reconcile research findings to classroom practice, a critique embedded in the response by Shavelson and Berliner (1988), and also the implementing of cognition-based research as explained by Kagan (1990) while discussing teacher cognition. Ethell and

McMeniman (2000) showcases a pertinent issue with lesson observation; the ability to see the action without access to the thinking which underlies this. From the understanding that teaching as a profession is a cognate discipline, it is more likely research on cognition and cognitive processes should be better suited to understanding teaching. Perhaps if teaching were to be perceived as a craft; machinicist or technicist, vehemently criticised by most educational researchers, for example Clark and Lampert (1986), Rubin (1989), Hufford (2009), observed behaviour could be more appropriate. With the cognate nature of teaching, it is the belief of this current study that there is expertise at play which requires in-depth and more focused study, for tangible applicable progress to be made in the profession. The example provided in teacher education by Ethell and McMeniman (2000) could be an insight into methods to be used in capturing teacher cognition.

Some areas where teaching has been understood within the foundation of cognition are Language acquisition / Language Learning, and Additional Educational Needs (AEN) studies. Based on Noam Chomsky's contribution (Marschark, Siple and Lillo-Martin, 1997; Weisberg and Reeves, 2013), the understanding of how language is learned has contributed immensely to research on cognition in general, and language is understood to be a cognitive process in its own right. This seems to imply the learning of language, and hopefully its teaching, relies very heavily on the cognitive processes involved. Whether this understanding generates desired learning gains is another area of contention. There is therefore a solid foundation of placing language within cognition, in terms of this on-going debate, however, the wide remit of language as a cognitive process is out of the scope of my current study on teacher cognition. Returning to cognition research and teaching, situating cognitive

processes as the basis for understanding and researching teaching, is not currently commonplace across all teaching subfields. Another area of research within teaching with remarkable emphasis on cognition is Additional Educational Needs (AEN). It must be highlighted AEN, as it is understood in this study refers to more able, gifted and talented provision, and special learning needs (to bring attainment to developmental levels typical of a Key Stage).

2.1.3 Language acquisition / Language Learning

Within teaching, one area with keen attention on cognitive processes has been language acquisition and language learning; whether in terms of understanding how humans come to acquire a language, or whether having acquired a language understanding what is involved in learning the prescriptions of the language, or even learning an entirely new language. Marschark, Siple and Lillo-Martin (1997) establish the link between research in language acquisition and language learning and Philosophy. Central to philosophical examining is the human mind and thinking. How thinking was understood by the earlier philosophers, it seems, led to the creation of a new group of researchers who focused on psychology. A situation which resonates today with the nature and nurture divide in understanding human ability and experiences. As highlighted, thinking is an area of controversy especially when seeking to understand how the human mind works when creating or using language. There are various perspectives: language and thought go hand-in-hand, language is independent of thought, language is vital in determining how thinking happens while the reverse of thinking preceding language is also available, as established by Marschark, Siple and Lillo-Martin (1997). Lee (1996), in examining the complexity of the Whorf theory; based on the

conceptual and experiential understanding of reality, raises the difficulty in identifying the line of dichotomy between language and thought. Zlatev et al. (2009) introduce a consensus that the two have a link which is very tight. However, this raises the issue of situations where there is no language in the standard form (for example, Daza et al. 2014) and the impact this has on thinking. An even more pertinent perspective is taken by Lee (1997, p.432) in seeking to utilise understanding of language and thinking with regard to its implication on learning and teaching; that of an incorporation of language within cognition and the mediating effect this has on understanding. In discussing the implication on education, Lee (1997) brings in an element of expertise stating; even when using the same language to experience the same reality, novices and experts come out with varying degrees of divergent comprehension. This current study on teacher cognition is undertaken with the understanding of these longstanding debates about language and cognition.

2.1.4 Additional Educational Needs research

Additional Educational Needs (AEN) research has seen contributions from cognitive-based foundations in two key areas; first the area of exceptional performance, gifted and talented or more able learners and second, low attainers, Young and Balli (2014) and Normand and Tannock (2014); Boyle (2010), respectively. While Young and Balli (2014) hint at how to teach more able learners, Normand and Tannock (2014) and also Boyle (2010) delve into the cognitive processes involved in learning, specifically memory. Schrag (2011) explains, research on the brain and education has made significant contributions in exposing the material foundation of human cognition. The study identifies three key areas of progress, although it does not foresee a future in which neuroscience can have a significant impact on

standard classroom practice, the three areas are: imaging technologies and brain structure in problem solving, how molecules and cells function in learning and memory, and understanding the mechanisms relating to genes which generate brain development dissimilar to standard progression and activity. It could be inferred, learning has benefited from educational neuroscience in the area of learners with non-standard brain development. There have also been some benefits from cognitive sciences (Strauss, Calero and Sigman, 2014). Although most examples in this subsection have shown just one of the cognitive processes, memory, it should be noted, this burgeoning interest in the cognitive outlook on teaching and learning is an important contribution. Posner and Rothbart (2014) also focus on learning and examine how to develop expertise in learning, particularly for high ability learners. There is also the requirement in this case to keep this learner expertise development within subject specificity boundaries; similar to what research on teacher expertise (Goodwyn, 2011), teacher education (McDonald, Kazemi and Kavanagh, 2013) and also teacher quality (Gere and Beresbitsky, 2009; Dudley-Marling et al., 2006) have suggested. Added to the examples on memory, for Posner and Rothbart (2014) attention was used as the cognitive process to be investigated. The positive element of this focus on AEN has been the interest to improve learning outcomes. This has implicit implications for research on teaching, however, it might be necessary to establish a more explicit focus on research on teaching of these two groups and how this then impacts on their learning. It seems, so far the impact of research on cognition has been more on learning than on teaching.

2.2 Current trends in cognition research

Neuroscience is making headway in the area of cognition research, specifically with research on the brain (Ansari, Coch, and De Smedt, 2011), particularly on Reading (neural correlates) and Mathematics (number processing). This has led to important contributions to historic debates about key issues in cognition research (e.g. types of cognition: amodal, embodied, distributed). Neuroscience therefore focuses on that which can be 'seen' whether this is through observation with the human eye or with the aid of technology as evident in neuroimaging studies. Ansari, Coch and De Smedt (2011) recommend, to bridge the gap between laboratory-based studies of neuroscience and the real world classroom environment of teaching, neuroimaging could be used as a tool to measure to what extent some educational approaches have been successful. Having shed some light on historic debates in observable domains, it remains to be seen what the contribution of neuroscience will be to non-brain based areas of education. Using the bridge of neurophenomenology, Thompson, Lutz and Cosmelli (2005) advocate for the combination of qualitative approaches, for example verbal reports, with quantitative approaches of neuroscience in terms of research methodology and subsequent data analysis. There is a clear indication in this instance of the role neurophenomenology seeks to play in bridging divides relating to epistemology as well as methodology. Some education researchers (e.g. Turner, 2011) believe these defining differences of neuroscience and education make it almost impossible for the two to go hand in hand. At the moment, research in psychology dominates the understanding of non-brain domains (Chatterjee, 2010) that is, the mind. So it could be inferred that psychology remains consistent in the study of the mind while neuroscience rests in the physical properties of the brain, although psychology depends on behaviour.

While generally researchers have focused on understanding cognition in terms of an individual, there is a more recent movement towards collective cognition or distributed cognition; for example Hung (2013), typifying this in the study of distributed cognition in problem solving. The move from the individual to collective or team based cognition has some similarities with the way in which knowledge creation and knowledge sharing is developing in the field of Business (see 1.2.1 above). Underlying basis for this conceptual shift is the idea that some knowledge, and or some problems are too big to be of the sole repository of one individual whether in the quest for innovation or the need for problem solving. This is also generating thoughts about cognition relating to culture (Powell, 2000; Bender and Beller, 2013), highlighting situated cognition; a phenomenon also raised by Berliner (2001) although in this case referring to how expert teachers are different, from the understanding of expertise or experts recurrently studied in other fields, adding that with teachers what constitutes expertise can change depending on place (or culture, or context) and even time (across decades).

2.2.1 The future of cognition research – as shown in areas for future development

Education research has benefited significantly from the field of psychology, evident in the creation of the subfield of teacher cognition. Insights have been derived from various subfields of psychology. Some in-roads have been made in education due to the improved understanding of cognition (Ethell and McMeniman, 2000). However, there are discrepancies to do with methods and methodology, but there is a recurrent call to carry out

cognition research using methodologies and methods which ensure full implementation within educational contexts (Thompson, Lutz, and Cosmelli, 2005). Among researchers on teacher education themselves there are divisive differences in the way cognition is presented in research, and also in the language used to construct the field of teacher cognition research (Borg, 2003). With reference to cognition research within cognitive sciences, it seems so far it has been laboratory-based and the transition from laboratory to classroom is not, as yet, ensuing in a seamless manner. Strauss, Calero and Sigman (2014, p.38) confirm, "surprisingly, little research and theory-building in the cognitive sciences has been done on the topic of teaching. While learning has been studied extensively, human teaching whose intention is to cause learning has been mostly neglected". There is, however, a word of caution when Bonawitz et al. (2011, p.329) allude to teaching potentially not being totally beneficial to some groups of learners, in this case very young learners, with preference given to discovery learning rather than teaching, or, in the case of focusing on teaching, there should be a careful balance between "direct instruction and discovery learning". Grossman and McDonald (2008, p.188) also declare; "much of the research on teaching in the past two decades has focused on teachers' knowledge – of specific subject matter, of learners and learning, of ways to teach specific content – and teachers' beliefs". On this basis, there was a call to generate an expanded perspective which views teaching as a process to which cognition is vital.

2.2.2 Holistic view of teacher cognition with cognitive processes

Following on from the definition of cognition (e.g.1.2.1), Loughran (2010, p.142) defines cognition as "the mental processes used to code, store, transform and retrieve information,

ideas and knowledge", this subsection will examine the literature on teacher cognition. Research in the field of teacher cognition has been very clear that it is important to understand cognitive processes involved in teaching (Calderhead, 1987). However, Kagan (1990) wonders whether the combination of issues studied under the generic term of teacher cognition makes this field too vague. In any case, these cognitive processes have been identified clearly; with some explored more profusely in research (decision making), also problem solving and judgement, and more recently perception, than others (reasoning, memory, intuition). Recent interest in the study of perception has taken on the term teacher perception (Schempp and Johnson, 2006; Le Fevre, 2014). These studies on perception, I think, have propelled towards an understanding of other cognitive processes: decision making; specifically the element of risk taking, and also 'noticing' by expert teachers; assumed to be linked to intuitive ability. Perception in these examples hinges on other cognitive processes rather than standing on its own as an individual cognitive process. On the one hand, this could be signalling the interweaving of cognitive processes in teaching; on the other hand introducing embedding within cognitive processes. Building on research by Garrett (2002) which highlights the philosopher David Hume as the initiator of the term 'perception' as one of the cognitive processes, and also work by Borndal (2010) highlighting Rene Descartes, the philosopher, there is a convergence on the point that perceptions are impressions, and duration is a key determinant of whether initial ideas remain as deep impressions or are consigned to the imagination. From this perspective, perception is embedded in, rather than having an interplay with, one or more of the key cognitive processes. From another perspective, perception permits the introduction into the cognitive domain of affect-related issues; similar to those affective attributes and perceptual qualities

of expert teachers presented by Hattie (2003), and emotions as highlighted by Berliner (1988), which feature predominantly in literature on teaching and teacher education. Alexander (2003) inserts a reminder that motivational factors (an element of perception) must be included in studies of expertise in order for expertise to be fully explored, or if referring to teacher quality, Goldhaber and Anthony (2007) cite motivation and enthusiasm. Consistently, much of the cognitive approach in research on teaching has arrived from the basis of psychology. Jarvis and Parker (2005), while advocating a holistic view of learning, explain that social factors or the social context is generally discounted in psychology when it comes to talking about learning. As Shulman and Carey (1984) conclude, as psychology finally got to the point where it was able to clearly focus on the mind, the payback was its total detachment from any links to studying or understanding feelings. This is an area which needs to be addressed should educational researchers be serious about using psychology-generated phenomena. At this point in the study, handling perception within the cognitive processes should explore the cognitive base as well as the social context, meaning there is the potential for perception to be examined in relation to its evidence within other standard cognitive processes or introduced as a unique entrant or addition to the cognitive processes in teaching. Irrespective of the stance eventually taken later, it is evident in studying teacher cognition, perception has an important place in the discussion.

Having identified the main cognitive processes evident in teacher cognition, it could be perceived, when teacher cognition has been studied within secondary education, there has been the propensity to study this in formats not inclusive of the cognitive processes which are recursive (or recurrent). When cognitive processes have been mentioned in educational

research, it has generally been a combination of typically two; for example Feldon (2007) combining memory and reasoning, Shalveson and Stern (1981) linking judgement to decision making, or no more than four cognitive processes (McNergney et al., 1988; Guthrie, Taboada and Wigfield, 2011), or very often just one of the cognitive processes, and even in some cases embedded in other areas of study with no explicit identification as cognitive processes, for example the case of Hattie (2003) and also Berliner (1988) making reference to teachers as decision makers and problem solvers. Some examples of studies which explicitly state cognitive processes and focus on just one of the processes are: Depaepe, De Corte and Verschaffel (2010) and problem solving, McNergney et al. (1988) and decision making, Copeland et al. (1994) and perception, and Shulman (1999) with pedagogic reasoning. However, by closely examining the literature on cognitive processes, a group of cognitive processes typically studied by educational researchers has been generated by this study. This has led to the birth of a holistic sense of cognitive processes; a stance which reflects the interest of this study. Ultimately, from the literature of cognitive processes, a list of recurrent cognitive processes has been generated. These are: decision making, problem solving, judgement, reasoning, memory, intuition, and perception, which will be studied holistically. The holistic view of teacher cognitive processes is, I believe, essential as a conglomerate of existing research on teacher cognition. Turner (2011), while defending the unique nature of educational research when compared to neuroscience research, identifies neuroscience's susceptibility to breaking concepts down into manageable proportions. For Turner (2011), concepts in education do not necessarily have to be understood in this way. It is important to retain the complexities embedded in educational contexts and seek to understand them as they are, rather than try to create an external reality which is significantly

different because it is so simplified. A holistic perspective also taken by Olson (1992) with reference to the nature; non-cognitive, of expertise. This might be one of the reasons why research in neuroscience has not been easily transported into the field of education. It is the position of the current study on teacher cognition that when concepts are broken down into parts, the outcome of an eventual piecing together, should this be carried out, might not be a true reflection of the original concept. This current study, therefore, takes an innovative turn in teacher cognition research by seeking to understand these cognitive processes holistically. This has been made explicit in the main research questions guiding the study. The second research question stipulates the holistic understanding of cognitive processes as evidenced by teachers at various levels of expertise. The way in which teacher cognition is studied in the current research is guided by assertions of understanding practice, for example Clark and Lampert (1986), not to prescribe how it is that teachers must think.

2.3 Expertise

Studies on expertise present intuition as one of the key attributes of experts. Simon (1987) cited in Hodgkinson et al. (2009, p.283) describes intuition "as analyses frozen into habit and the capacity for rapid response through recognition", with the understanding that the practitioner tends to have workable outcomes. This is a naturalistic description based on intuition as a decision-making process. Eraut (2002) focuses on capturing know-how gained from experience readily and intuitively incorporated in the performance of professionals. One study explores intuition as a decision-making process among others, while the other goes beyond and investigates the extent to which professional knowledge can be made explicit. The question, I think, is whether experts are good solely at solving known and

unknown problems or whether expertise is the ability to extend known problems to a level of new knowledge creation and application of understanding. There is evidence in this exploration that cognitive processes are embedded within expertise development and this is captured in the references to intuition, decision making, problem solving. Another example of this link between expertise and cognitive processes is captured in Schoenfeld (2014) with expertise and decision making. This study proceeds while holding onto the notion that it is possible for researchers, and also teachers themselves, to capture intuition (John, 2003).

Gossman (2008), Berliner (2004) and Eraut (2002), explore teaching expertise using the Dreyfus model investigating classroom examples and professional development respectively. This teacher cognition study confirms capturing examples in teacher thinking during lesson planning is vital. For effective professional learning, such as that described by Eraut (2004) to happen, teachers need an understanding of precise areas of expertise development in combinations reflective of domain (subject) specific requirements. Berliner (2004), in describing expertise using the Dreyfus model, confines intuition to the proficient practitioner and the expert. The question then arises whether intuition is stage bound or whether it is the effective use of intuition which is actually stage-bound. In trying to capture the intuitive features of expertise in teaching, the mind of the teacher remains the focus. How does the mind of the teacher work when a lesson is being planned? Are there any patterns evident? How is each pattern evidenced by teachers at different levels of expertise? Which aspects influence and/or affect the thought processes of teachers? These questions have contributed in guidance towards research methods and methodology choices of the current study. The nature of the Dreyfus model generates one level study, and/or cross level study

or even comparison (Berliner, 2004; Smith and Strahan, 2004), with pluralisms generally considered commendable practice in research. According to Ericsson (2006) some pertinent areas; measurement and capturing expert performance, remain challenging for research.

In working out definitions of expertise within teaching, Kennedy (1987) takes the prescriptive position - accumulating knowledge of what teachers need to do. To Scott and Dinham (2008, p.116) "teaching expertise is something of a mystery even to those who practise it", while Goodwyn (2011) sheds some light by identifying characteristics which typify definitions of expertise. Strong, Gargani and Hacifazlioglu (2011) present expertise, or educational effectiveness, as relating to outcomes –learner's success in examinations and value-added measurements. Hattie (2003) draws attention not just to outcomes but also commitment in recognising excellence in teaching, and also provides excellent descriptors of what expert teachers do. Berliner (2001) and Eraut (2003) isolate the difficulty of researchers in the field of expertise finding a consistent definition of expert. Consequently, the search for expertise circumvents excellence, effectiveness, outstanding among others. Educational researchers have found agreeing on a selection criteria for expert teachers who have been participants in their studies equally difficult (Berliner, 2004; Palmer et al., 2005; Krull, Oras, and Sisask, 2007). There is also the pertinent problem of how long it takes to become an expert (Berliner, 2004), should it be possible to 'teach' people how to become experts. Time scale in developing teaching expertise is estimated at between five (5) to seven (7) years of deliberate practice (Berliner 2004, p.201) that is, "if one works hard at it", whereas Ericsson et al. (2006) go for ten thousand hours of deliberate practice. Vivid here is, a significant amount of time is essential in the journey towards expert performance and a

substantial amount of intensive work; a combination of learning and everyday performance in a specific domain, for some in-road into expertise growth to be made. Shulman (2005) provides two key elements: discipline and commitment, in applying the knowledge that most competent level professionals already have about what constitutes best practice. As a researcher, considering "perhaps unsurprisingly, coming up with a decisive list of qualities is a difficult and complex exercise" (House of Commons 2012, p.16), particularly in finding a definition for the best teachers, with confirmation by Benner (2001) of this difficulty relating to nursing, I delve into this study with the knowledge that developing teacher expertise will benefit immensely from further research.

2.3.1 Identifying expertise

Research on expertise is steeped in discussion surrounding who an expert is. Some identifying characteristics have been provided regarding what an expert is able to do. In order to ascertain the dichotomy between the expert and non-experts, a range of comparative studies have been carried out. Hattie (2003) uses an assessment based approach to choose experts and generates sixteen (16) key attributes which constitute the prototype of expert teachers and these are evidenced across five (5) dimensions. Expertise explored from the perspective of dimensions has been explored in Winch (2010) and Garrett et al. (2009). While Winch (2010) uses the lens of educational assessment, Garrett et al. (2009) seek to find middle ground between pro-behaviour and pro-cognitive explorations. Rather than dimensions of expertise, Sorensen (2014) proposes an understanding in teaching of 'expertises'. Smith and Strahan (2004) indicate, expert and non-expert comparisons have focused on the behaviour and performances of these two groups and also highlight that this

has been the case of research in teaching as well as other domains. The resultant recommendation is, rather than follow the inclination to look at differences to gain an insight into expertise, interest in identifying similarities within each group, that is, expert and novice, for instance should be encouraged. The problem though is, the specific requirements for this expert /novice demarcation are not universally accepted across academic disciplines. Within the realm of expertise as developmental, also highlighted by Hallam (2010), Berliner (2004) acknowledges that the cognitive processes of teachers, that is expert teachers, are similar in sophistication to those used by experts in various other fields. The distinguishing one of the cognitive processes at expert level is intuition (Mayer, 1983; Tsui, 2005). Similar to Smith and Strahan (2004), Berliner (2004) asserts the importance of the developmental outlook towards expertise and adds, this way of conceptualising expertise allows teacher educators to have a more in-depth manner of thinking about what student teachers should be able to do, and what they must be competent at, as they grow in their professional learning. This, it appears, is a phased process towards attaining a possible 'recognisable' peak which is expert level. Regarding cognitive processes relating to teaching expertise, Hattie (2003) isolates problem solving, decision making and perception, embedded in the descriptors of expert teachers. When identifying qualities of expert teachers, Berliner (2001), similar to Hattie (2003) makes reference to problem solving. One main recommendation by Hattie (2003) is understanding teacher expertise at a deeper level. While Hattie (2003) asserts, expert teachers already exist and are working in schools, other researchers are moving on in the direction of understanding and also developing expertise. Some models of skills development which have been used and/or recommended for use in teaching are: the Dreyfus model, MDL – Model of Domain Learning, CLARION - Connectionist Learning with Adaptive Rule Induction

Online, the Kinchin and Cabot model, the Yielder model, and the Dall'Alba and Sandberg model (see 2.3.5). In sum, there is the focus on who experts are; how to identify experts, what experts do; what differentiates the expert from the non-expert, how experts do what they do; the cognitive and context specificity of expertise, and having understood all of these, how to develop expertise in others.

In seeking to understand expertise, the knowledge base of experts is primary. Accessing the knowledge base of experts by researchers on teaching has sometimes been through seeking to understand the mind of the expert. There is the focus on what happens in the mind of the expert when they are engaged in an activity, as well as before and after this performance. In presenting the kind of knowledge that experts have, Sternberg (1998, p.13) makes it very clear "expertise involves the acquisition, storage and utilization of at least two kinds of knowledge: explicit knowledge of a domain and implicit or tacit knowledge of a field". This implies expert knowledge spans intensive (domain) and extensive (field) constitution of an area of specialism. Studies, for example, Bedard and Chi (1992) are noteworthy, and evidence in the research by Hattie (2003) with teachers, views the knowledge that experts have to be domain-specific. Within the context of ethics of the teaching profession and professionalism, teaching expertise is viewed from a holistic perspective (England, 1996; Day et al., 2007); that is, context expertise and process expertise. A teacher can therefore have expertise in a specific context; for example, type of school, students in a group, group composition, as well as expertise in the process of teaching. Although there is a consensus between Sternberg (1998) and Bedard and Chi (1992) that knowledge is key to expertise, Bedard and Chi (1992) clarify that the way in which the expert organises their knowledge is

different to the way in which a novice does this. There is a rather careful inference embedded in the perspective taken by Sternberg (1998); expertise as something which could be developed by any professional, implying expert performance is not exclusive to specific individuals (confirmed by Ericcson et al., 2006), inclusive of expertise as developmental. Whether all professionals who embark on this journey to achieve expertise do eventually get there is not really the issue; emphasis is on the expertise journey, an outlook also echoed by Alexander (2003). Viewing expertise as a journey recalls descriptions of becoming a teacher as a journey (Powell, 2000).This developmental perspective resonates with the Dreyfus model, also validated in "The key to developing expertise is purposeful and meaningful engagement in a set of tasks relevant to the development of expertise, something which any individual is capable in some degree" (Sternberg, 1998, p.18), a very explicit stance on developing expertise. The issue, for this current study on teacher cognition, is gaining an insight into the cognitive constituents of this 'set of tasks' which are so vital to the development of expertise, a showcase of which is, as Eraut (2003), Benner (2004) and Goodwyn (2011) state, the finesse in execution. If the cognitive components of these tasks could be identified, this could be an in-road into what constitutes expert level performance, hopefully leading towards an understanding of how experts do what they do. It is worth noting, most studies on expertise in teaching have contained an element of observation, and when there has been some reference to the cognitive domain, this has been generic or not using cognitive processes in a holistic way.

2.3.2 Capturing expertise

There have been great developments in understanding what teachers do and say (Smith and Strahan, 2004). To get to this point, both cognitive and non-cognitive frameworks have been used. Behaviour-based and cognition-based literature recurrently generate alternating perspectives. Having made explicit what teachers know and do, the focus has now turned to understand why and also how some teachers are able to perform in ways that are relatively more fluid than others (Fairbanks et al., 2010; Rubin, 1989). However, it is the opinion of this researcher that the problem has been a big jump into novice - expert differences or comparisons without a vehement embedding of the knowledge that there exists a massive gulf between the novice stage and the expert stage. Research to bridge the gulf between the novice and the expert is essential. As stated by Hufford (2009), this journey is not a straightforward one; there are bumps, reviews, backtracks and detours on the way towards the final destination and teachers, particularly student teachers, must learn to see teacher education itself as the start of the journey; an extension to this, I think, is the idea that teachers themselves have to see this journey and be able to understand their own position on this journey or be able to read their own milestone accurately; something Kinchin and Cabot (2010) suggest will be very difficult for professionals interested in using the Dreyfus model. However, some researchers (Berliner, 1994; Benner, 2001) continue to recommend this developmental approach and research in-roads are currently being made. An understanding of how the teachers at the various stages perform, why they perform in this way, and how what they think affects their performance at each stage, is of paramount importance.

With this background established, the preferred choice here is to explore capturing expertise as a sequence. Because arriving at expert performance is a journey, there is the conviction that a sequential (non-linear) mode of exploration should be a suitable one. This exploration will be based on literature relating to education, cognition and expertise. The first part of the sequence of capturing expertise is deciding who an expert is. Palmer et al. (2005) have reviewed a cross section of education research literature and found no consistency in identifying participants who have been called expert. Some studies have used peer recommendation, others have used years of experience (with more recent focus on years of deliberate practice), yet others have focused on learner performance in standardised test. With emerging criticisms of the selection process of experts in such studies, there is a current growing trend to use outstanding/accomplished teacher certification in combination with a number of other performance measurement tools and/or criteria.

The next part of the sequence in capturing expertise is agreeing on what to look for. At this level, there are already divergent views of whether this needs to be domain specific, in the case of teaching, subject specific (Dudley-Marling et al., 2006; Gere and Berebitsky, 2009) or whether the research can be generic and still be suitable to be disseminated across school subjects. Contemporary research in teaching adheres to cognitive underpinnings, knowledge is central in capturing expertise, hence a proliferation of literature on teacher subject knowledge and teacher pedagogical content knowledge (Shulman, 1986 and 1987; Howey and Grossman, 1989; Turner-Bisset, 1999; Turner-Bisset, 2001). This current study on teacher cognition highlights that explicit layers of knowledge are those actively sought out in research. A way forward potentially is focus on the tacit dimensions of knowledge,

including the cognitive processes; particularly intuition, because expertise researchers identify intuition as the most valuable in understanding proficient level and expert level performance. Stratifying the cognitive processes is slowly emerging in research signalling some kind of hierarchy of cognitive processes (see Figure1, p.218), consolidating the prominence of intuition evidenced in Benner (2001), Berliner (2004), Dreyfus and Dreyfus (2005). Of interest is the idea by Kaufman (2007) locating reasoning (general reasoning ability), and memory (working memory) as the initial stages in domain general expertise. Although Kaufman (2007) comments on domain general expertise whereas this current study considers expertise to be domain specific, stratification is patent. According to Kaufman (2007), after reasoning and memory have been established in the expert, then other cognitive processes become activated; the examples given are perceptual speed and also psychomotor abilities. A hierarchy with a base of reasoning, to memory, then perception, and intuition at the top, begins to emerge. The place of decision making, problem solving and judgement is not clearly visible here. Kahneman (2003) identifies the relationship between reasoning and intuition. Reasoning is presented as a monitoring tool possibly for any excesses relating to intuition. Kahneman (2003) then goes on to explain, after reasoning has monitored intuition, then judgement is activated. Kahneman (2003) also highlights perception as preceding deliberate practice. Dreyfus and Dreyfus (2005), while presenting a developmental model of expertise, first mention reasoning at stage three (Competence) before moving on to intuition at stage four (proficiency) and stage five (expert). Most of the studies on teacher cognition have been principally on decision making and problem solving (see 1.2.2). When Kahneman (2003) explores the interaction of the cognitive processes for experts, problem solving seems to come across as a base from which all the other cognitive processes, typically decision

making, are launched. This idea of hierarchy of cognitive processes is minimal in research on teacher cognitive processes and expertise because there has not yet been a holistic focus in this area. When researchers are able to agree on how to select participants who are experts, what to look for in the highest levels of expertise, then the job of capturing expertise will begin in a way that both researchers and classroom teachers are able to understand, interpret and implement. Moving on to the next step of capturing expertise, the focus is the most effective methods to be used.

With this idea of a sequence established, this subsection solicits exemplification of research in capturing expertise for the purpose of studying it. Ethell and McMeniman (2000) is a good example of capturing expertise. In this case, the target is to enable student teachers to 'see' beyond the actions of the experts and ignite insight into how the mind of the expert works. Findings from this study portray a way forward in understanding teaching and begin to unveil what being a teacher really means from the cognitive realm. The distance in what the student teachers could identify and what the expert explains generates some interesting insights into how perceptions of what teaching is have come into being. Once expertise is captured and studied, it would be possible to see variations simply because each expert is unique. A further step could be seeking to understand these variations, for instance through measurement.

2.3.3 Measuring expertise

Can we really measure expertise? This is the question. Following on from the discussion in 2.3.2 above, this question should be approached with some prudence. This is because, within

teacher expertise development research, until researchers are able to be unified with regard to who our experts are, it might not be suitable to move on to the step of trying to measure expertise. In other areas where there have been extensive research on expertise and growing uniformity in how experts are identified, measuring expertise could be examined. Charness and Tuffiash (2008) acknowledge, expertise research is at the point where there are efficient measurement tools in existence. At the moment, teaching is at the stage where it is only beginning to accept that some teachers can be called 'experts'; having gone through a variety of terms: effective, excellent, outstanding, advanced skills, highly accomplished, master, thoughtful, to name a few.

Considering at the moment, it is not possible to answer 'yes' to the question of measuring teacher expertise, I wonder whether collecting typical elements/ features/ characteristics across cognitive processes could help as a starting point of tools to use in measuring expertise. These identifying features which are based on the cognitive processes of experts could then be combined to begin a 'growing' picture of teacher expertise. With more studies using the Dreyfus model to reveal components of expertise and the cognitive processes involved, attention on levels of expertise and transition nuances could be illuminating, with the overarching aim targeting understanding teaching as a journey towards expertise. In more overt terms existing literature is combined to form a whole and emerging literature is injected to fill in gaps of this whole. This sounds like a simplistic manner of presenting how to capture expertise, but the emphasis (as already indicated in 2.2.1) is to explore teacher cognition and its inherent cognitive processes as a whole; not parts. When parts are studied there should be forward thinking establishing that they are parts of the whole not in anticipation of a potential

rearrangement, possibly retrospectively, to fit into the whole. I think this innovative outlook might be an eye-opener for research potentially usefully applicable to classroom experience; a perspective also taken by Mena Marcos and Tillema (2006) with respect to the fragmented nature of research in the field of teaching and its future direction.

Lack of consensus in naming teachers who have developed their practice above competence, is juxtaposed with general agreement on the concept of teacher quality. Without replacing the nomenclature of expert teacher with teacher quality, an understanding of research on measuring teacher quality is examined. From Goldhaber and Anthony (2007), there is not much success either in measuring teacher quality as there has been a failure to use extensive quantitative data for this type of measurement. Compounding this is the issue raised that motivation and enthusiasm, key components of teacher quality, are embedded in psychological constructs for which numeric measurements might not always be the most reliable, garnering need for further research on measuring teacher expertise.

2.3.4 The Dreyfus Model of expertise - why is this model chosen over other models?

As indicated in the introduction (1.0) the influential Dreyfus model of expertise (Dreyfus and Dreyfus, 1986; 2005) is the choice for this study. This model has five stages: novice, advanced beginner, competence, proficient, and expert, a subdivision which ensures the learning of the novice is piecemeal. Novice stage emphasis is on identifying and understanding rules which govern the particular practice; rules determining actions to be taken. There is no requirement of skill at this stage although there is the expectation that the

novice should be able to recognise the contextual features of their domain of interest. The computer metaphor of action which mimics how a computer programme works could create a lucid picture of this novice stage.

The next stage is the advanced beginner. The principal feature of this stage is implementing action in real world situations. Because with the novice they begin to recognise contextual features, the progress of the advanced beginner is indicated in showing some understanding of these contextual features as they are evidenced in specific situations, inferring there is progress from contextual references to situational features. It appears at this point, there are signs of merging the theoretical, more generic knowledge with specific situations.

At the competence stage, experience features predominantly. With continuous practice the competent performer builds an extensive bank of examples of contextual and situation knowledge. However, this can be overwhelming at this competence stage. At a more advanced stage of expertise, for example the expert stage, this bank is utilised efficiently. At the competence stage practitioners begin to counter the overwhelming nature of the growing expertise, the competent performers tend to limit themselves to specific procedures for ease of performance rather than try to continually make sense of the ever growing knowledge (or in this case examples) of practice. From this understanding of competence, professionals face a choice to or not to remain at this stage; a seemingly secure stage of ‘knowing what to do’, or the point which Ward et al. (2013) call a plateau, with only a limited number moving on, and even fewer arriving at the highest level of expertise throughout their career lifetime, or

as Ward et al. (2013) term; professional life-cycle. Years of experience is also likely discounted as a determinant of expertise (Ericcson et al., 2006), typically for practitioners with competence level characteristics. This raises queries about many years of the same chosen routines or deliberateness for growth in practice. Failure of the Dreyfus model to explain why only a few professionals are able to attain expert level is heavily criticised by Dall'Alba and Sandberg (2006).

So far, at the novice and advanced beginner stages, performance has been rule-bound and a combination of rule-bound and situational respectively, performed in a detached and analytic manner. There is therefore progression from talking about the novice as if they were a machine, for example a computer, to hinting at the advanced beginner stage to the mind of the practitioner; albeit detached and analytical. The third stage of expertise; competence, capitalises on the kind of involvement the practitioner now has with practice. Emotional involvement is signalled at this stage. The characteristic of emotional involvement presented at the competent level is similar to the description in teaching provided by Shulman (2005). For Shulman (2005) anxiety and risk unleash the potential of the true professional. It is important to recall the overwhelming nature of the competence stage and understand the choice the practitioner has to make. The emotional investment evident here relates to choice of action; the competent practitioner is clearly not following rules in a non-questioning manner but querying what is to be done, judging what the best situational examples to use are, deciding or delving in reasoning, on a plan of action. Although this competence stage is not rule-bound, there is a natural tendency to revert to rules in evaluating and eliminating mistakes. It is significant that vocabulary used with cognitive processes begins to appear in

the descriptors of competence. Berliner (1988), while describing the Dreyfus model in its application to teaching, only introduces decision making (one of the cognitive processes) at the competence stage, and even then recommends training in effective decision making of the competent teacher.

Stage four of the expertise continuum, following the Dreyfus model is Proficiency. Perspicuous at this level is the introduction of the term 'intuition'. Reasoning, as well as other cognitive processes were introduced at stage three where the cognitive processing was limited to choice of action. At the proficiency stage, there is some indication that reasoning transforms into intuition; hinting again at graduation of cognitive processes (see Figure 1, p.218). Of interest will be what the nature of this transition is, in teaching. Dreyfus and Dreyfus (2005, p.786) assert; "to understand this stage of skill acquisition we must remember that the involved, experienced performer sees goals and salient aspects, but not what to do to achieve these goals". Guthrie, Taboada and Wigfield (2011) shed light on the salient aspects regarding intuition by stating these have emotional qualities. While the competent performer battles with a choice of action, the proficient performer wrestles with gaining experience of outcomes based on using their bank of examples. In other words, while the competent has a growing bank and worries (emotional involvement) about which one to choose, the proficient is at a stage where they do not have enough outcomes for all the different examples they already have. Therefore at the proficiency level, the practitioner is systematically experimenting with possibilities, discounting or saving outcomes and growing a bank of worthy successful outcomes inclusive of actions. This seems similar to the procedures of self-monitoring, exemplified by Webster and Schempp (2008) and highlighted by Berliner

(2001), in making explicit what expert teachers do to arrive at their peak. Spontaneity is another key term introduced in the Dreyfus model descriptors for proficient. The proficient performer is able to read a situation carefully including pertinent issues and/or challenges, unfortunately this spontaneous trait is not yet supported with action as the proficient performer still has to spend some time in decision making regarding the action to be taken. To make this decision, the proficient performer steps back into rule-governed phases. This stage can be seen as one of intensive experimenting and collecting of results, refining and evaluating with a clear purpose of eliminating mediocrity and saving in memory, prior to using in practice only the very best.

The ultimate stage of this continuum is expertise. Some key terms inserted at this stage are: discriminations, refine, immediacy. The proficient performer sees the problem but stops to think about how to solve it. The expert sees the problem, acts immediately and solves the problem efficiently and effortlessly. The expert is able to do this because from the proficient stage there has been an accumulation of "a vast repertoire of situations discriminations" (Dreyfus and Dreyfus, 2005, p.787). The expert has worked meticulously and in an effortful manner to identify what differentiates one situation from the other and how to act in each of those individually nuanced situations fluidly. It appears to indicate the expert is able to see subtle differential features of what appears to non-experts as similar situations. From seeing the situation differently experts read the situation more accurately than non-experts. This ability to see situations differently and read meaning effortlessly informs the action of experts. It suffices to state, limited ability of the proficient performer to see the subtle

differences in situations impedes accuracy in reading the situation, ultimately slowing down decision making and subsequent action.

Some shortcomings of the Dreyfus model of skills development have been identified. Dall'Alba and Sandberg (2006), - see 2.3.5, refer to the non-explicit nature of empirical basis of the Dreyfus model. Another is, the Dreyfus model and other stage models of skills development are based on cross-sectional studies, and it is essential that longitudinal studies are carried out as well. There is also the issue raised by Dall'Alba and Sandberg (2006) of the loss of richness in understanding the nuances incorporated in skills development when developmental attributes are tied to fixed stages. In line with Dall'Alba and Sandberg (2006), Kinchin and Cabot (2010) create a dual process model, rather than a stage model. Although not proposing a different model of skill acquisition, Winch (2010), while examining educational assessment raises issues with the Dreyfus model centering on knowledge, highlighting that the Dreyfus model appears to concentrate on 'know how', as opposed to 'know that' and 'know how to'. However, in agreement with the Dreyfus model, Winch (2010) acknowledges that expertise is developmental.

Levels of expertise for this study are based on the Dreyfus model (Dreyfus and Dreyfus, 1986; 2005); a developmental model effectively utilised by Benner (2004) in capturing expertise within nursing, a profession similar to teaching in its caring characteristics, highly recommended by Hallam (2010) for teaching and elaborated upon by Goodwyn (2011) for English teachers. Eraut (2002) and Berliner (2004) provide clear definitions of the different

stages as stated by the Dreyfus model of skills acquisition. Eraut (2002) explains, competent is the point at which the practitioner is comfortable in their practice; effective application of the rules, proficiency is achieved when decision-making is analytic – guided by experience, whereas expert performance is a combination of situational understanding and more intuitive decision-making. Berliner (1988) although using data which was not collected specifically to study the development of teacher expertise, describes the qualities pertaining to each of the stages. The similarity of the current study to Berliner (1988) is in its use of the Dreyfus model. However, while Berliner is able to match existing data to provide examples of levels of expertise, the current study is based on data specifically collected for this purpose. Due to the fluid nature of the stages, teachers at the milestones of novice, competent and expert have been targeted. Also, whereas Berliner (1988) targets competence for the novice teachers on teacher education courses at university, and their journey towards that milestone, the current study has the high expectation of teacher growth to the expert level. Another area of difference is, while the current study focuses on the mind and teacher cognition, Berliner (1988) makes recurrent references to teacher behaviour. Benner (2001) worked on all the five stages of the Dreyfus model whereas the current study targets the three milestone stages.

2.3.5 Models of expertise used in the caring professions (Nursing/teaching/ Social work)

With reference to skills acquisition, skill learning, or expertise, there have been a number of models introduced with varying amounts of interest in their composition, uptake and use. A small sample of these models, chosen because of their link to learning, teaching, expertise and/or their approach, will be discussed in this section. As already declared in the introduction, the current study on teacher cognition will use the Dreyfus model. The other

models will be introduced; their groundings, content and characteristics, a brief summary of how they have come into being; including their review of other models, and how they compare to the chosen model for this study; the Dreyfus model. Based on this background of models of expertise, there will be a closer look at the models which have been used, discussed or even proposed in the caring professions; teaching, nursing, social work.

One model, similar to the Dreyfus model and based on machine learning is CLARION (Connectionist Learning with Adaptive Rule Induction ONline), introduced in Sun, Terry and Slusarz (2005). This is a computational model based on a connectionist theory. Powell, Plaut and Funnell (2006), while exploring reading, explain that the connectionist model indicates a clear link between machine simulations and renditions by human. The CLARION model, it should be understood, takes the stance of a two level interaction of skill acquisition; that of implicit and explicit learning (Sun, Terry and Slusarz, 2005). CLARION advocates moving away from the standard top-down approach taken by most studies on learning, and focuses on a new take which is a bottom-up approach. Although not specifically agreeing with CLARION, Berliner (2001) also identifies one of the characteristics of experts using information processing terms of top down processors. Simply, Sun, Terry and Slusarz (2005) state, implicit learning happens before explicit learning. The reason provided for this is that of verbalisation, that is, although implicit learning is happening, the subject does not yet have the language to make this learning explicit, this does not mean implicit learning is not happening. In explaining implicit and explicit learning some useful correlations are also made about implicit (procedural) and explicit (declarative) knowledge by highlighting that the bottom-up approach in understanding knowledge could produce some helpful insights.

CLARION as a model is helpful in understanding the area of teaching which deals with knowledge, and also how learning happens by specifying explicit learning is useful in contexts of learning which are simple and input is not multi-dimensional; whereas where learning requires multi-dimensional input exhibiting complex relations, implicit knowledge is essential. As a model for developing teacher expertise, CLARION has limited opportunity since it centres on knowledge and only the dual process of implicit and explicit learning, with limited clarity on sequence of interaction, neither is there explicit identification of combination of the interaction of the dual process, only stating that on mechanistic terms one of the processes can work independent of the other. It is not quite clear how this will compare with human learning although some examples have been provided to show this. The Dreyfus model, similar to the CLARION model in its computational foundation, does not take a connectionist approach as does CLARION. Dreyfus and Dreyfus (1986) use an approach from Philosophy which is phenomenology. Human understanding, human interaction, human skill development is therefore intrinsic to the Dreyfus model which is developmental, and not interactionist as with CLARION.

Similar to CLARION presented in Sun, Terry and Slusarz (2005), Kinchin and Cabot (2010) introduce the Kinchin and Cabot model which is a dual processing model of expertise. Both models seek to represent how learning happens. In doing so, knowledge is used as the foundation. Sun, Terry and Slusarz (2005) seek to understand the dual process of implicit and explicit learning while Kinchin and Cabot (2010) identify nets and chains of knowledge which consistently interact. There is no clear cut identification of implicit and explicit representations of knowledge in Kinchin and Cabot (2010), however learning is linked to

teaching. This model represents university student learning as an interaction of nets and chains of knowledge with the teacher presented as having tacit knowledge. The tacit representation of implicit knowledge is embedded in the chain of knowledge, with the proposal that this needs to be made explicit for the learners to benefit from it. The difference between these two models pertains to the understanding that with the Kinchin and Cabot model, teaching is highlighted therefore deriving a model which is a combination of learning and teaching; that is human-based model of expertise, whereas the Sun, Terry and Slurasz model is a computational machine-based model. Although both claim to be dual-processing models, the dual similarity has distinctively diverse components. Kinchin and Cabot (2010) introduce a new perspective in understanding the nature of expertise by showing that other formats (non-linear; for example dual processing) of expertise development could be used, not only the developmental one as presented by the Dreyfus model.

Before presenting the Kinchin and Cabot model, Kinchin and Cabot (2010) take a critical look at other existing models of expertise, including the Dreyfus model. The Dall'Alba and Sandberg model is introduced. It is also a two dimensional model constituting horizontal and vertical dimensions (Dall'Alba and Sandberg, 2006); the horizontal dimension showing knowledge of, in and for practice while the vertical dimension shows the variations in-between these. The emphasis is professional skills development is not a stepwise process which follows fixed stages. Similar to Kinchin and Cabot (2010), Dall'Alba and Sandberg (2006) critically review the Dreyfus model, identifying a key shortcoming that the empirical basis of the model is not explicit, however acknowledging other researchers have provided this empirical evidence. Burke (2014) also highlights the use of the Dall'Alba and Sandberg

model when discussing nursing expertise, identifying its difference with staged models of expertise development constituting embodied understanding; that is knowing relating to notions of 'in' practice and 'of' practice. This embodied understanding is the key foundation of the model in Dall'Alba and Sandberg (2006). Another model used by Kinchin and Cabot (2010) to validate their need to introduce a new model is the Yielder model. The Yielder model was introduced in 2004 and further developed in 2009. This is based on the transformation theory. The Yielder model focuses on the elements that compose expertise, and not on the stages of development. One key difference highlighted by Kinchin and Cabot (2010) of the Yielder model compared to the Dreyfus model is; it discounts intuition and replaces it with intentionality. Having gone through the Dreyfus model, the Dall'Alba and Sandberg model, and the Yielder model, and not finding a workable model which is non-linear, Kinchin and Cabot (2010) introduce the Kinchin and Cabot model of expertise. The inference is; the Dreyfus model is a workable model, except it is not a dual processing model.

Another model of expertise which has been proposed is Model of Domain Learning (MDL), as evidenced in Alexander (2003), introduced in 1997. MDL, similar to the Kinchin and Cabot model is based on human learning, specifically students in an academic environment. This model has arisen as an alternative to models used in education research which have been based on information processing theory and Artificial Intelligence (AI). Alexander (2003) also highlights most of the models have focused on problem solving only and the typical scenario has been expert / novice performance. Alexander (2003) then moves on to identify reasons why such models have not proven effective in education research application; the main reason is primary focus of such models has never been schools and students. MDL

therefore takes the stance of a model based on the realities (cognitive and social context, including cultural forces) of education and created for the primary use in educational research. Similar to CLARION and the Kinchin and Cabot model, MDL is based on knowledge, but in the case of MDL; subject matter knowledge, and this is categorised into domain knowledge and topic knowledge. Domain knowledge refers to the breadth of knowledge a teacher has about their field and topic knowledge is the breadth of the knowledge a teacher has (Alexander, 2003, p.11).

MDL comprises three stages of domain learning: acclimation, competence, and proficiency / expertise. Since Alexander (2003) rightly presents developing expertise as a journey embedded with complexities, the three stage model proposed, however, contains minimal opportunities to capture enough of these complexities to properly and confidently shape the practitioner as they make their progress through the continuum. Supposing using the Dreyfus model at the novice stage equates to the acclimation stage of MDL, movement from acclimation to competent is a big jump. Also, a possible issue with MDL is the movement from competent to proficient. With regard to stages, this is similar to the Dreyfus model but because MDL ends at the proficient /expertise stage, this becomes a problem because it seems to ignore the intensity of processing of outcomes which the proficient stage of the Dreyfus model clearly exhibits; another case of a potentially giant leap in the MDL model which minimally reflects the typical journey of most teachers. MDL could be seen as an ideal when all conditions (cognitive, social, cultural, political, environmental etc.) are perfect (which rarely are), for the few professionals capable of making it to expert level within the shortest possible time stipulated in education research so far. With reference to the proficient

and expert stages of the Dreyfus model, Benner (2001) presents pertinent examples in nursing of what these stages constitute and how vital they are in the journey of nurses towards expertise. The Dreyfus model and its contribution to nursing curriculum facilitated by the Benner (2001) study is also highlighted by Burke (2014). MDL therefore minimally exploits this competent / proficient transition opportunity.

Similar to teaching and nursing, models of skills development are making their way into social work with a growing interest and burgeoning literature. However, while teaching and nursing share some models, the current models for social work have not yet been used in either teaching or nursing. Satterfield et al. (2009) does not explicitly examine expertise, rather the focus is on evidence-based practice in social work within which expertise is minimally introduced. The core of the research has inter-professional working and use of mutually understood knowledge as the basis for efficiency. In light of professional standards requirements and compliance, Satterfield et al. (2009) present competence in social work as a journey which begins with evidence and progresses onto practice. Although detailed explanation of the stages of this journey, if any, are not provided, there is an engrained understanding that this seems to be a tedious journey made even more complex as the practitioners engage within the community. Two models of Evidence-Based Social Work Practice (EBSWP) are highlighted as regularly used in social work: the Haynes, Devereaux and Guyatt model introduced in 2002, and the Regehr, Stern and Shlonsky model introduced in 2007. The Devereaux and Guyatt model emphasises clinical practice but the Regehr, Stern and Shlonsky model takes a broader view of competence which encompasses managerial and policy influence.

However, Dybicz (2012) argues, social work has traditionally used quantitative methodology to inform its practice as seen in its emphasis on Evidence-Based practice which does not seem to recognise the qualitative relationship embedded in expertise and care. Storkerson (2010) signals a regression into Positivist philosophy being considered in today's postmodern period as a basis for competence in professions, for instance; medicine and education. Dybicz (2012) addresses expertise explicitly in this study focusing on the essential property of care and the dynamic relationship between the two. Similar to Dybicz (2012), Hattie (2003) also identifies care as one of the key components of the affective attributes of expert teachers. It could be inferred from Dybicz (2012) that the traditional dependence on quantitative scientific methodology in social work has succeeded in eliminating the vital component of care which is the backbone of social work. The model of expertise Dybicz (2012) describes is one embedded in a qualitative design facilitating expert level performance of social workers. Social work should therefore exemplify competence using evidence-based practice, but the attaining of expert level performance is intricately linked to qualitative attributes. Reference to qualitative attributes as a key factor for expert performance is also mentioned by Dall'Alba and Sandberg (2006) in the review of literature based on which their own model of skills development is presented.

2.4 Lesson planning:

Clark (1988), at the point where there was growing interest in the cognitive domain in teaching, drew attention to availability of very few studies (counting approximately twenty

studies) on teacher planning. Clark and Lampert (1986) also highlighting the issue of quantity of studies on planning, counted no more than twenty five, raising the awareness of the need to generate more interest in examining this pertinent part of teachers' work. Tanni (2012), stressing there is little research which examines teachers' tasks in general, identifies lesson planning as a key task that teachers carry out. The notion of task as presented by Tanni (2012) resonates with characteristics of the rational model of planning which John (2006) states compartmentalises teaching and learning into behaviours (which are can be observed and evaluated) grouped under objectives, if this model is not used correctly. Clark and Lampert (1986) specify that the existing studies on planning have focused on describing the uncertainties which surround the teacher's engagement with planning. The interest for Tanni (2012) is on the information acquisition behaviour of teachers during planning. For Mena Marcos and Tillema (2006, p.117) planning must have as its key feature "intentionality or purposefulness. To grasp the deliberateness to act as closely as possible". Despite the existence of comparatively fewer studies dedicated to understanding planning, researchers on teaching regularly make reference to lesson planning; also referred to as teacher planning, in their studies. In such studies there has always been a reference to time taken to plan a lesson. Clark and Lampert (1986) indicate, experienced teachers use between ten and twenty hours each week to plan, usually undertaken during non-contractual hours. Although most studies have compared the planning time typically of novices to experienced teachers and found that novices take longer to plan (e.g. Sotto, 1994), Berliner (1988) describes a situation where experts have explicitly requested a longer planning time, especially where there was a change in contextual factors and/or domain. The difference in time needed by the experienced (possibly, competent level) teacher indicates the subtle difference in competent

and expert conceptualisations of a lesson and what is required to plan for one. This also engenders references about what the novice will spend planning time on and what the competent and expert spend their planning time focusing on. And as Mena Marcos and Tillema (2006) conclude, planning produces an insight into the professionalism and expertise of the teacher.

Various definitions of planning appear to show the propensity to present what happens during planning. Clark and Lampert (1986), and Neely (1986) make the link between planning and decision making, with Neely (1986) stating the high dependency of the teacher, during planning, on decision making cognitive processes. John (2006) laments the absence of capturing the problem solving component of lesson planning as well as other in-built creative and intelligent elements. Participants in the study by Livingston and Borko (1989) only used mental plans, indicating the cognitive perspective of planning. Introduction of the element of rehearsal of how to teach the content generated in the plan implies the teacher carries the plan in their mind for some time and revisits the plan to make some spontaneous alterations, and definitely finds the opportunity to rehearse the plan before using it. Livingston and Borko (1989) advise that preparation for the interactive phase of teaching must shape actions to be taken as they unfold in the lesson, not to predict these actions in order to control them. This perspective has the semblance of knowing the uncertainty and putting systems in place to work with these uncertainties rather than controlling them. Imbued in this perspective is almost an in-built propensity to unlock new learning generation opportunities, in contrast to one which predicts and provides answers, which seems paradoxically restrictive for deep level learning in the form stated by Hattie (2003) when describing expert teachers.

Existing research on planning has covered a number of areas sporadically. The participants in most studies have been novices (Cain, 1989; Tanni, 2012) since it is generally accepted that novices tend to find planning quite demanding. Some researchers have advocated the grounding of lesson planning in learning theory (Vermette et al., 2010; Jones, Jones and Vermette, 2011) or education theory (Cain 1989). The small quantity of research on planning introduces concerns relating to methods and methodology used in studying lesson planning. For studies presenting the structure of lesson planning (Craft and Bland, 2004; Courey et al., 2012), a pragmatic approach to create a working (perfect) model is predominant. Subject specific lesson plans seem to be recurrent with the pragmatic approach, for example Panasuk, Stone and Todd (2002) for Mathematics, including a rubric for its evaluation Panasuk and Todd (2005) among others. Criticism of studies taking the pragmatic approach surrounds evidence of very few of such studies having empirical foundations (John, 2006). On the contrary, for studies seeking to understand how the mind works during lesson planning, that is, studies taking the cognitive approach, there exists a pool of research-informed work. The issue is, there is divergence among the researchers in identifying the goal or goals for such studies. Some identify understanding teaching as complex (Livingston and Borko, 1989) while others suggest improving teaching (Neely, 1986), and yet others refer to cognitive processes (Livingston and Borko, 1989), and some authority for the teacher to transform the curriculum into practice; Clark and Lampert (1986) and Clark (1988), while others, for example Matthewman (2014) bemoan the negative effects the curricular demands and pedagogical dictates pose on planning. The rational approach to lesson planning; the Tyler model (Tyler, 1949), appears to be the dominant one and it has been in existence for over

sixty (60) years (John, 2006). The simple nature of the rational model, John (2006) assumes, is central to its dominance, as well as how neatly this approach ties in with Outcome-based Education requirements of policy makers. The rational approach contains four main parts: topic, aims and objectives, teaching methods, assessment, in a sequence. The problem with the rational approach, John (2006) comments, is the propensity for the lesson plan to miss out key areas of teaching and learning which are not emphasised in its key contents. Added to the pragmatic, cognitive and rational approaches to planning, there is the creative approach introduced in Cain (1989). The creative approach emerged from the criticism of the rational model, an outcome based model, found to be limiting in domains relating to what the teacher is able to explore during planning. The creative approach has three parts: preplanning, planning, post planning with the process of planning dependent on seventeen design variables and a big emphasis on the post planning stage facilitating recursive adjustments made to individual lesson plans within unit plans. With the creative approach there is an enhancement of the teacher's ability to create a world which allows performance to flourish; one which is not restrictive.

With regard to formats of lesson plans, Courey et al. (2012) introduce UDL, Universal Design for Learning. UDL, although based on planning for learners in class groups with unique and diverse additional educational needs, claims to be a model which could be used with most groups of learners since the modern classroom reflects similar diverse and unique learners. The stronghold of UDL is its open-ended format which contains the potential to allow the learner to personalise the learning and express their understanding in ways which retain their individuality. UDL, it is stated, is proactive as it caters for each learner and opens

up learning possibilities rather than traditional formats which appear to wait for problems and plan to solve them in a 'new' teaching session.

In sum, Panasuk, Stone and Todd (2002) state, lesson planning is a conscious process carried out by the teacher. These divergent approaches, goals, formats discussed in this subsection reflect the methods and methodologies used in the studies on planning, with most being descriptive as summarised by Clark and Lampert (1986), and also highlighted by John (2006). It should be noted, Panasuk, Stone and Todd (2002), Clark and Lampert (1986), Neely (1986) all make allusions relating to how central decision making is to lesson planning. Courey et al. (2012) recommend embracing open-ended plans, while John (2006) focuses not on the end but on the flexibility of what happens in the 'middle' of planning; the changes, readjustments, eliminations, additions, for example and asserts consideration must be taken of the level of professional development of the teacher (in the specific case of John (2006), student teacher within the dialogical model –see 2.4.1) who is engaged in the process of lesson planning.

Despite all of the examination, proposals and recommendations on lesson planning, contemporary literature has been typically fixated on lesson planning as an outcome-based activity. This could be explained by the assertion by most education researchers that the education climate of today is one based on accountability (McArdle, 2010; Hennessy and McNamara, 2013), therefore lesson plans (as well as or teacher outputs) will be judged, measured and evaluated on outcomes; specifically learning outcomes. Gilbert (2012), in

agreement with Strong, Gargani and Hacifazlioglu (2011), relates teacher performance to learning outcomes. Accountability is the focus here; as well as standardised tests, accountability or evaluation comes in the form of Ofsted inspections (Ofsted, 2010). Gilbert (2012) provides good planning techniques which ensure Ofsted evaluation criteria are met and draws some good examples from English lessons. It is also evident, affect-related elements play an important role (Ofsted, 2011), as well as content based features. Considering that lesson planning tends to happen when the teacher is on their own, having the available scope to explore other pertinent aspects relating to improving lesson delivery and learning outcomes (Perrot, 1982; Livingston and Borko, 1989), attempts are being made to tap into the benefits of collaborative working specifically for the purpose of lesson planning. Collaborative planning has been used as an experimental approach on teacher education courses with some success; its implementation in school has been minimal. Added to this, is the issue in research of capturing the processes (in the case of the current study with interest in cognitive processes) involved in lesson planning being very rare to find in literature, whether it is work done on lesson planning as a verbal activity or work on written lesson plans (John, 2006).

2.4.1 Lesson planning: the debate

The big debate with lesson planning is generically on form and structure. The researchers focused on structure present the lesson plan as a sequence of activities; one activity will be completed before the next begins. This type of thinking about lesson plans is fixated on the structure; almost in terms of what the lesson plan looks like on paper. However, John (2006), while presenting this linear model of lesson planning format, identifies other models. These

models are: naturalistic or organic model, the interactional model, and then goes on to introduce a new model which is the dialogical model. The key point is; the lesson plan should not necessarily solely be seen as a linear document. Therefore, apart from approaches to lesson planning which consider the structure as central, there is a growing interest in examining the form which unfolds during lesson planning. Szekely (2006) extols the benefits of the visual lesson planning format especially in how beneficial this format is to the art teacher. The essential component; thinking, is directly portrayed by Szekely (2006, p.48) by stating: "writing a lesson plan can take away the magic of envisioning a lesson, bringing it to life as a work of art". This conceptualising of a lesson plan in a visual format, first acknowledges the necessity and importance of planning but begins to draw out subject specific requirements and opportunities, that is opportunities for the most efficient use of the mind during planning. There is a hint at the thinking which underpins the lesson unfolding in powerful visualisation. This notion of visual lesson plan caters for one of the many different types of learners, we as teachers are, and this should be reflected in how we choose to plan. It raises the issue of whether documenting a lesson on paper; as it is done currently, leaves the teacher with enough flexibility to plan for, pre-empt and deal with multiple perspectives which each lesson focus provides. Is it not the case that the lesson plan, if it really allows its creator to plan, should be able to spell out these various possible trajectories of a lesson and what could potentially become of them should the lesson veer in one or more of those directions? Clark and Lampert (1986) raise the issue of linear and non-linear models in terms of novice and experienced teacher planning, with the novice using a linear structure and the experienced a non-linear and recursive one.

The debate about the lesson plan is first in its outline; whether as a logical sequence or otherwise. Another issue with lesson planning is its documentation: does a lesson plan always have to be a written document? This second issue about lesson planning is borne from the assertion that all teachers plan what they intend to teach; for some it is a brief sketchy plan which is written, for others it is an elaborate document and yet for some it is mental maps within the mind with no written evidence. Literature has minimal congruence on which of these lesson planning formats enriches teacher cognition or which of these allows for a more engaging and fluid teaching opportunity. What is so far evident in research is, an elaborate planning format or as Berliner (1988) terms it -a scripted lesson, is essential for new entrants into the profession in helping the student teachers prepare for the interactive phase of teaching. The preactive phase shows how a lesson could potentially unfold in the interactive phase. Research on teaching, particularly teacher education has recorded immense difficulties in student teachers 'enacting' their elaborate plans in the classroom (Livingston and Borko, 1989). Worthwhile highlighting also is limited attention in research on lesson planning reflecting a wide enough range of expertise. Most studies on lesson planning have looked at novices, experienced teachers and there is growing interest in experts, but these studies have tended to be prescriptive in nature; telling teachers how to write the best lesson plans, instead of seeking to explore what happens when a teacher is planning; whether this is cognitive or non-cognitive, and most of these have been descriptive, describing what it is that teachers do (the processes) when they plan before teaching a lesson. Limited focus too on capturing the thinking involved in the processes of planning a lesson. With an agreement among researchers of the levels of expertise, it would be interesting to study and understand lesson planning at various stages of teacher development; that is, for

example using the Dreyfus model. Considering the issues raised, a closer look at lesson planning is imperative.

2.4.2 Lesson planning: the importance

It is generally accepted that lesson planning is the most important part of teaching. Commendations of impressive classroom performance have been linked to planning and also ineffective outcomes of classroom performance cite planning among other variables (Wilkerson and Scheffler, 1992; Torff and Sessions, 2009). This helps in validating the importance of lesson planning. In showcasing the importance of lesson planning, researchers have revealed the complex nature of this activity. The complexities are generally presented as barriers to some novices; although a few explore the creative opportunities lesson planning presents (John, 2006). Presumably, when novices overcome the barrier of lesson planning they become efficient at enacting the lesson. In spite of the acknowledgement by teachers of the importance of lesson planning, there is not enough time dedicated to teacher professional development to focus on lesson planning; as highlighted by Prytula, Hellsten and McIntyre (2010) based on a study of preservice teachers, neither is there a significant amount of the budget allocated to professional development (Dudley-Marling, 2006). In the case of England, planning time is allocated on the timetable for each teacher but very rarely do whole school professional development opportunities have a dedicated amount of time for collaborative lesson planning in the manner proposed by Prytula, Hellsten and McIntyre (2010). The dedicated amount of time proposed is to enable up-to-date findings of research on lesson planning to be engaged with; not necessarily to change formats but more to inform practice and possible future amendments. Dudley-Marling (2006) identifies planning time as

the biggest variable affecting teacher quality, and this is based on teacher perceptions. The importance of considering teacher evaluation, analysis, input etc. on research in these collaborative lesson planning sessions is an outcome of research identifying that lesson planning formats currently in use rarely are from research-informed empirical studies (John, 2006).

2.4.3 Lesson planning: the English teacher

English as a secondary school subject presents opportunities and constraints. These could be dependent upon the level of expertise of the English teacher and/or linked to variables which the teacher has limited control over. However, lesson planning as it is originated in the mind of the teacher comes with a measure of freedom. Some element of power or authority is embedded in how the English teacher chooses to create the world in which the learning happens, as suggested by Cain (1989), reinforced by John (2006). An example of constraint on English is evident in minimal research on subject-specific research on contemporary concepts such as teacher quality (Gere and Berebitsky, 2009). Considering the central nature of English, and/or literacy in accountability targets, Hancock and Scherff (2010) investigate attrition rates of English teachers and explain why new entrants to the family of English teachers are reluctant to stay in the profession; a further evidence of the central nature of English as a subject and its effect on English teachers, inferring a considerably more intensified demand on the nature of the work of the English teacher, planning inclusive.

Secondary English can be visually represented in two axes: one for skills; listening, speaking, reading and writing, and the other for content; poetry, prose, drama. English is perceived by some English teachers as abstract, especially the grammar components, possibly because grammar tends to be rule-based learning with limited flexibility. Literature, and love for reading has been found to be motivation for new entrants to the profession (Goodwyn, 2011). Although English literature is generally enjoyable for most English teachers, poetry or rather the prescriptions regarding what should be focused on in the teaching of poetry, seems to have taken away the joy of experiencing poetry in the classroom (Hennessy and McNamara, 2013). Probably, a sample of these perceptions and teacher dispositions influence how the English teacher engages with planning. Sperling and DiPardo (2008), with an eclectic choice of studies, reviews subject-specific research. Quite revealing is the focus on reading and writing research both from the perspective of the teaching and how learners engage with this, flagging up the neglect of research on listening and speaking. Howey and Grossman (1989) examine sources of pedagogical content knowledge of preservice English teachers revealing their beliefs about teaching and conceptions on English, for instance whether the core of English was to facilitate communication, focus on improving writing skills or for the Literature content. These perceptions and teacher dispositions are relevant because of emerging insights on self-identity and self-efficacy.

2.4.4 Lesson planning: secondary school level

At the secondary school level, most teachers are single subject specialists, although training offers opportunities in multiple subject areas, hence lessons are planned with optimal subject-specific content knowledge. Subject specificity is highly recommended by teacher expertise

researchers; and expertise, in this study is taken to be domain specific. At the secondary school level, lesson planning seems geared in the right direction for the purposes of developing teacher expertise. As already identified, knowledge is key in cognitive-based studies, and ultimately vital in understanding expertise. Recurrently, there is the quest to understand the kind of knowledge which experts have and also how they come to have it (Shulman, 1999). With knowledge as the bedrock, teacher subject knowledge and also teacher pedagogical content knowledge are essential in lesson planning. Rather than at primary school level where general knowledge is important; although there is contemporary gradual move into subject specificity (Grossman and Stodolsky, 1994; Gere and Berebitsky, 2009), at secondary school level rich and in-depth subject-specific knowledge is required. It seems this focus on knowledge and its importance explains the rich literature on teacher knowledge already in existence. Not enough studies, however, have delved further into the defining knowledge of experts; for example tacit knowledge, and how this is used and/or evidenced in lesson planning. Lesson study; an approach which has gained much interest recently, and it is the case with lesson study as is with previous research, that the structure and the physical content of the lesson plan are given priority with little or no exploration of underlying cognitive processes. Shen et al. (2007) for example, despite locating the urgency for research on the process involved in lesson planning, only discuss the explicit form of a lesson plan. The way in which many of the studies have presented lesson planning is as if it involves constructing a list of activities and procedures to be carried out. This could run true if a craftsmanship; one of the paradigms highlighted by Squires (1999) or technicist approach to teaching is taken. It is a more professional approach to lesson planning which goes beyond what can be seen on paper and unearths the intricacies of teacher planning which make

teaching so complex, yet so rewarding, such as the complexity of teaching presented in Shulman (2000). Lesson study as presented by Etscheidt, Curran and Sawyer (2011) falls within the first level of a three level ladder (technical level, deliberate level, critical level) of skill acquisition by preservice teachers, careful consideration should be taken should lesson study be used at the post teacher education phases of teaching.

2.4.5 Lesson planning: lesson evaluation

This part of the literature review will begin with the affirmation in generic terms of what happens in schools. All teachers will, on a yearly basis at the minimum, have their lesson observed by peers, novices, evaluators, pupils (for example, pupil council representatives, pupil voice data collectors) parents, school-based practitioners and non-school based practitioners, either as a passive or an active process. Passive in the case of students being partakers in the unfolding of events, or active in the form of performance evaluation sessions, or even didactic for professional learning of peers. Judgements are continuously being made about teaching whether these lesson observations are fleeting visits or lesson-long, irrespective of these judgements being formal or informal. Variations in how teachers plan and prepare for lesson observations abound. For some teachers their planning style and teaching style remain the same. For other teachers these will change. Whether or not planning and teaching change is not an issue. What most teachers have expressed in informal discussions is; the lesson planning document will be significantly different, usually more elaborate than they would use routinely. Time has usually been quoted as a reason why routine lesson planning is not done in formats which are as elaborate as lesson planning for the varied purposes of lesson evaluation. Visibly, because a teacher is working with learners

during a teaching session they are being observed. The difference is, the learners are not making 'official' recorded judgements. Also, this is not a one-off, termly or yearly kind of observation; it is on-going daily observation. This appears to be a collaborative kind of lesson observation between the teacher and the learners with the teacher very often receiving feedback or lesson evaluation comments; sometimes spontaneous, sometimes solicited, other times inferred. Could it be a format which could be adopted by evaluative classroom visits; formats of collaborative 'observation' of teaching over time? In this case, the observer takes an active part (collaborative professional learning) in the lesson; including collaborative planning and identification of a specific activity or activities to be engaged in, a productive combination of cognitive base and interaction. The postactive phase could then be based on reflections on and professional dialogue about the preactive and interactive phases. Until the alternative model of lesson planning suggested here is taken up and trialled, credit should be given to peer planning and peer teaching, peer observation and other collaborative systems (for example, Santamaria and Thousand, 2004), already in place but which could benefit from some rethink permitting a holistic picture of teaching to be captured (Mena Marcos and Tillema, 2006).

Emerging directions in teacher planning are highlighting the possibility of observing teachers while they are planning. This proposal could be tapping from generic studies on human factors and their impact on practice. Matthewman (2014) describes a rare opportunity where a teacher is observed while their lesson is being planned and Tanni (2012) comments, studies which observe teachers while they are planning are extremely rare. While not discounting the perceived benefits of using observation as a method to research teacher planning, careful

consideration should be taken of the approach to be chosen, and the place for observed behaviour in studying relevant areas of teaching. Kagan (1990) notes, there is a place for classroom observations, however observation must be grounded in cognitive epistemology not behaviourism, adding annotations could be used to identify non-observable elements of teaching. When it comes to learning, Kagan (1990) asserts, learner cognitions should also be taken into consideration in addition to test scores. Another way of assessing teacher cognition, it reveals, is an evaluation of teachers' ability to predict the cognition of students. Accuracy in predicting how students are thinking is one skill identified by Berliner (1988) responsible for the fluid performance of experts. Observation could also be applied in teaching, that is, teacher planning observation, in the developmental opportunity provided by human factors analysis. Human factors studies, outside of teaching, have produced some helpful insights which have resulted in time saving outcomes, for example, across a range of professions (Charness and Tuffiash, 2008). With the seemingly constantly increasing demands on the teacher's time, external influences on their use of time could contribute in understanding where changes could be made and efficiency improved. Should thinking be the focus, it is incomprehensible how observed behaviour, grounded in behaviourism, could be helpful. As Nissila (2005) advises, in doing an evaluation of teaching, there should be movement away from concentrating on the product, with more emphasis placed on valuing the mental processes involved in arriving at the product.

The focus on lesson evaluations is consistent with the contemporary culture of accountability. It is useful that some form of evaluation is done to ascertain teacher professional learning and development, however whether this should be based on lesson

observations as is the case in schools today might require reviewing. Berliner (1988) while discussing development of expertise based on the Dreyfus model of skills acquisition, recommends routinised behaviour which is easily observed as essential in ensuring that the novice is equipped for the basics to enhance smooth running of a lesson. This can be evaluated using an observed behaviour pro forma. The warning from Berliner (1988) is that this pro forma should not be generalised to all levels of expertise. Berliner (1988) states, this behaviour-based evaluation format will do nothing to capture the work of expert teachers, if anything they interfere with the evaluation process, highlighting their evaluative irrelevance. In addition, the sorts of qualities exhibited by proficient and expert teachers demand post evaluation discussions which novices will not be able to understand. Therefore, with reference to lesson evaluations, the behaviour based low-inference pro forma could be effective in checking the basics of teaching; use of routines, at the novice and advanced beginner stages. Feedback from this will guide the novice through to the advanced beginner stage in their journey towards attaining competence level, which Berliner (1988) states take three (3) to four (4) years of working intensively, with a small number of teachers moving on to the proficient stage in their fifth year of teaching. Beyond the competence stage, it could be inferred, high-inference measurement mechanisms, different to those used at the novice to competent stage, are essential as they seek to capture the aesthetics (set of principles governing practice; clean lines of performance) of teaching and connoisseurship (delicate discrimination of aesthetics) of the proficient and expert teacher. There seems also to be a movement from feedback, linked to the behaviour-based format, to professional dialogue at the proficient and expert levels which exhibits, not behaviours, but possibly cognitions which are implicit and intuitive, requiring an interpretative approach to the

dialogue. Also embedded in this exposition by Berliner (1988) is the notion that after the competent stage, training should be provided to the teacher to improve on their decision making ability. This sense of training seems to be the case with the extensive Continuous Professional Development (CPD) programmes in schools. A closer look at the content of such programmes might be required in order to ascertain whether they are guided theoretically by premises similar to this. Introduction of the cognitive processes after the competent stage is an interesting proposition. It is not that thinking is not happening, what is clear is; training towards more efficient use of the cognitive processes in their application in the expertise development of the teacher is essential. A comfortable position for this to begin, as indicated by Berliner (1988), is after there is no need to worry about the standard routines which a teacher needs to follow. What this seems to imply, from my perspective is, with training and deliberate practice over three (3) to four (4) years, the novice will become competent and there is a significant proportion of competent teachers in schools (Berliner, 1988). The issue is whether these teachers remain competent, or choose to engage in even more intense cognitive processes development effort, inclusive of affect growth, through pedagogical content knowledge refining at the proficient stage, working towards expertise, or avoid this effortful process and continue to function at the competent phase.

2.4.6 Lesson planning: teacher cognition

At the cognitive level, for most studies on lesson planning, decision making has been the main one of the cognitive processes worked on. This seems logical with the trend of teacher cognitive processes studies or work on teacher cognition which has a high proportion of studies based on decision making. There is some evidence of work on problem solving and

lesson planning. Evidence of other cognitive processes with regard to research on lesson planning is rare. Comparatively, work on identifying the physical content of a lesson plan; that is the parts of a lesson plan and the specific key terms which should be written in the lesson plan is extensive. This has been known to be helpful to teachers. I believe teaching is at the stage where it should go beyond the physical document of a lesson plan; whether linear or otherwise and seek to understand the thinking behind the lesson planning format. Robert Yinger is one of the innovators in research on lesson planning and cognitive processes. Although Yinger (1979) uses decision making as the main cognitive process, this still signalled burgeoning interest beyond lesson planning documents or the written lesson plan.

Forester (1991) takes a step away from the superficial nature of planning and engages with professional planning. This is in order to gain an insight into how professional planners carry out their duties, seeking to 'see' beyond the verbal utterances and related behaviours. As Schön (1991) summarises, the story Forester tells (Forester uses narrative approach in this study) leads to an illumination. The illumination could be presented with regard to the tacit insight of what happens during planning. Forester (1991) finds out that planning includes a number of cognitive processes; problem solving, decision making, judgement and tacit elements relating to intuition. These keywords are explicitly presented in the discussion about the job of planning analysts. Considering that most studies on teacher planning have typically identified decision making as the mainstay of planning, Forester (1991) is an eye-opener to rethink teacher planning. There is generally an interplay of these cognitive processes, in the discussions of professional planning analysts. However, in order to 'pin down' and try to understand these cognitive processes, a sequence was developed based on

how this narrative discusses planning, which is; problem solving, reasoning, decision making, judgement, intuition (based on tacit knowledge). Beginning with problem solving, Forester (1991) states, the role of the planner is not to solve the problem, but their job is to envision the problem; this might be similar to using the knowledge base of teachers which Clark and Lampert (1986) refer to as speculative. The next step is to intervene. Intervention involves anticipating implementation, in order to respond to particular opportunities and problems, this includes what others bring into the equation. In this step, there is a noticeable element of diverse anticipatory 'tools' in place. Within anticipation, there are other defining features. It must be clarified first of all, anticipation comes along with a logical structure, it is not random, also various determinants must be considered in this logical structure; first functional elements, next normative elements and finally cultural worlds. The idea that planners create a world in which to interact or be interacted in, signals a link with the idea present in Cain (1989) with reference to the optimal ability in the hands of teachers of creating a learning world (classroom), by using planning as a central tool. Still within anticipation, taking the three determinants listed above, the planner must then move on to "prepare and manage the arguments, and the processes of argumentation, available to consider potential outcomes" (Forester, 1991, p.211). At this stage, processing of arguments begins to highlight some level of reasoning involved in the planning process. After devising these arguments, the next step for the planning analyst is to present this to the decision maker. The job of the planning analyst is done to an extent at this stage, and someone else has the responsibility of decision making. For the teacher, unlike the professional planner, the role of the teacher as a decision maker takes over. It seems prior research into planning missed out on a few stages in the thinking about teacher planning and focused mainly on the decision

making. It should be noted, previous research is possibly effective in determining the central position of decision making, but should a methodical approach to planning be engaged in, the items that are missing could hamper thorough understanding of what teacher planning actually entails. This should be especially useful to new entrants into the profession and others seeking to understand how to further develop their expertise. After decision making, the step which follows is judgement. Judgement is based on all that has been going on so far, Forester (1991), while studying planning analysts identifies the following: mandates, rules, regulations and normative judgements of how they are interpreted, and also procedural elements related to the strategies in choosing these, as well as arguments to add to or withhold from the discussion. As already highlighted, collaborative work is the premise of the planning processes of the analyst; some elements being individual and some being collective. There is good reason for this to be the case for a new focus on planning in teaching, however careful consideration should be taken of where the individual planning stops and where collective planning starts, and instances which could necessitate full individual, part collective, full collective planning along with their benefits, limitations and shortcomings.

Having looked at the cognitive processes involved in planning as explored in Forester (1991), it is important to state there are in-built mechanisms which exist within this tentative sequence which I have tried to construct. The first one is; anticipation involves an element of engagement with related events. The second idea is; predicting or expecting indicates a detachment with the events, taking less responsibility for them, almost as a spectator. This sense of attachment and involvement and detachment is also highlighted by Dreyfus and Dreyfus (1986) and exemplified in teaching by Berliner (1988). Berliner (1988) shows that

novice and advanced beginner stages show a characteristic of detachment whereas the more advanced stages show increasing levels of attachment, effective harnessing of which is a reflection of the stage of expertise development. A third idea embedded in the insight from Forester (1991) is the context in which the planning analyst works. This context is similar to the classroom context of the teacher as it is described as complex and involving uncertainties, typifying shifting and evolving conditions. Similar to teaching, it must be stated, Forester (1991, p.195) indicates "planning analysis is not a frozen content of a static document". I believe teachers have come to realise this, however the problem remains of how best to plan to capture the fluidity of any documented planning. Another key component of the planning analyst's work is taking a holistic view of the plan. Therefore the plan or, for instance the problem envisioned by the plan, is as it could potentially impact on the conditions of its implementation and everything must be factored in with a holistic view in mind. The understanding of this generates some thoughts about differentiation from my own classroom experience and I wonder whether a more holistic view of differentiation rather than a 'targeted' view (as it appears to be the case currently) of differentiation in the domain of planning, is the way forward.

It is important to turn now to the more subtle attributes of the planning analyst. As Forester (1991) highlights there is the potential to solve problems even before they occur, thereby stopping these problems before they even occur. This seems to resonate with classroom descriptions of the know-how of expert teachers. The downside of solving problems before they occur, as fascinating as this might be, is that it could be very difficult to show evidence of success, captured in the question by Forester (1991, p.203) "how does one measure

something that never happened?" This implies, within conceptualising of lesson planning as problem solving, this is a product-based approach of; there is a learning problem, and we are successful in solving this problem through our teaching. Evidence is relatively tangible. Measurement, as introduced in the implicit quality of planning seems antithetical to measurement as it is envisaged in the current climate of accountability. The ever present query by teachers is level of congruence between areas of measurement by policy makers and those of practitioners and the embedded goal and/or impact calculations. This suggests some level of dissonance between the evidence-based method and methodologies of policy makers and the almost helpless experience-based insights of teachers as professionals, dissonance which might need revisiting. As highlighted, Cain (1989) reveals the power the teacher has to create a world in which learning occurs. Forester (1991) presents a dual nature of this world as it is captured during planning; the anticipated world and the observable world. The success of the planning analyst is defined by the fact that this problematic world, which has been averted primarily through planning, does not exist. I wonder whether this is what it means when non-experts observe experts and leave with the inability to see what was tangibly different in the performance of the expert except for a smooth flow of the lesson and a productive classroom environment, a situation which is not really helped by the typical nature of the expert not being able to explain what it is that has led to this finesse in performance, warranting recommendations similar to that in Berliner (1988) that mentoring of student teachers should be reserved for competent level and proficient level teachers rather than experts. It is my opinion that the wealth of experts should not be left to waste, it must be captured. The awareness from Forrester (1991) is one that, with further research, could allow experts to regain their role of teacher leaders, non-administrative, which is what most

experts seek as evident in Goodwyn, Fuller and Protopsaltis (2009) with the work on ASTs. This, I believe, will be a very helpful contribution in the area of developing teacher expertise. As Forester (1991, p.203) concludes about the tacit elements of planning, "what has been prevented does not exist, cannot be observed, is difficult to measure, and is perhaps still more difficult to appreciate!"

It could be summarised planning, as presented by Forester (1991) is not technical, and definitely not rule-bound (should it be rule-bound there is the inference the teacher should be working at the novice or advanced beginner stage of the Dreyfus model), but should involve an intricate mix of elements which are descriptive and also have normative components. This type of planning includes normative components which are systematic, not arbitrary, guided by theoretical consideration. For the planning analyst, Forester (1991, p.204) identifies three main theoretical frameworks to be used: functional, normative and moral-cultural. More research on lesson planning might be necessary to arrive at a unified understanding of the theoretical frameworks for lesson planning in teaching.

3.0 METHODS AND METHODOLOGY

Constructivism is the ontology which drives the study. According to Cohen, Manion and Morrison (2011), ontology refers to the nature of reality, in the case of qualitative research social reality, or the nature of a phenomenon. Cohen, Manion and Morrison (2011) present a paradigm as a way of conducting research which involves descriptors which are generally accepted by scholars within that community. Historically, approaches have included positivism evident in its use of the normative model, with offshoots of post-positivism, post-modernism, and post-structuralism. There is also the existence of mixed methods research with its controversial stance of combining paradigms which are symmetrically opposed, indicating as Bryman (2008, p.17) asserts "particular epistemological principles and research practices do not necessarily go hand in hand in a neat unambiguous manner". Complexity theory is introduced by Cohen, Manion and Morrison (2011) as an emerging paradigm suitable for the understanding of educational studies since reality in educational settings is consistently described as complex, generating a system which is holistic and non-linear. Another education-focused paradigm is Critical theory. Critical theory is composed of three key areas; curriculum research, participatory action research, and feminist theory (Cohen, Manion and Morrison, 2011). This current study on teacher cognition which focuses on secondary English teachers, is situated within the ontological consideration of constructivism. Savin-Baden and Major (2013, p.29) explain that "constructivism is the notion that knowledge lies in the minds of individuals, who construct what they know on the basis of their own experiences". Cognition is an ongoing process. This ongoing process of teacher cognition, including the embedded cognitive processes, are suited to be studied

within the constructivist paradigm. This is because the constructivist paradigm provides the opportunity to reinforce the idea of constructing and reconstructing social reality. This is the social reality of the secondary English teacher, a socially constructed reality which as Bryman (2008) identifies is affected by the presence of the researcher in terms of the researcher's interaction with the participants, allowing for multiple layers of interpretation. Added to this, the social reality of the secondary English teacher is one which is in constant change. This element of constant change necessitates a constructivist ontology (Bryman, 2008).

This constructivist ontology facilitates the interpretive framework or epistemology, embedded as a key descriptor within the constructivist paradigm, which is used in the analysis (Cohen, Manion and Morrison, 2011). While ontology depends on how the social reality is 'seen', the epistemology is how we come to know this reality. The epistemology for this study is interpretive in nature. The ontology of constructivism, epistemology of interpretivism, leads to situating this study within the methodology of qualitative research. Other established methodologies are: quantitative, mixed methods, with complexity theory as an emerging methodology specific to education research (Cohen, Manion and Morrison, 2011). According to Marshall and Rossman (2011), qualitative research is interested in the complexities of social interaction. These complexities are examined as they occur in daily life. These interactions are understood through the interpretations which the participants themselves provide of their experiences. Interpretation of social interaction is key in qualitative research, and this is interpretation by the participants and also another layer of interpretation by the researcher. Bryman (2008) identifies three levels of interpretation of the

social reality; the first is that of the participant, the second is of the researcher based on those of the participant, and third how the researcher uses the literature to interpret the data. This therefore generates in-depth analysis which is highlighted by Staller (2010). Marshall and Rossman (2011, p.2) and Baguley (2013) elucidate this methodology is centred on people and Marshall and Rossman (2011) go on to explain this focus is on people and their lived experiences. This focus on people is in contrast to quantitative research which can be laboratory-based. Some pertinent requirements for qualitative research are: naturalistic setting, multiple methods, context-specific, emerging and evolving nature of theory and the use of the interpretive approach. Another difference with the quantitative paradigm highlighted by Marshall and Rossman (2011), is confirmed by Cohen, Manion and Morrison (2011) that theory in qualitative research emerges from experience of the participants and is grounded in the data. In contrast, the quantitative paradigm begins with the theory and then follows this up with research. The view of their world, by qualitative researchers, is one which is holistic and complex.

As already indicated, the epistemology of this study is interpretive. This interpretive episteme will utilise an exploratory stance. According to Curtis, Murphy and Shield (2013, p.2) “this form of educational research [exploratory] aims to flesh out and broaden our understanding of specific issues”. The exploratory stance also allows for innovative combination of methods in emerging areas where conceptual understanding is ongoing. An exploratory stance is suitable for this study on teacher cognition as ample opportunity is provided for new meaning to be identified since studying teacher cognition using the Dreyfus model of expertise is innovative and also understanding teacher cognitive processes in a

holistic manner is relatively new in research on teaching. The exploratory stance therefore creates the opportunity for meaning to evolve and interpretation emerge from new insights from the data as it is interpreted recursively. The qualitative methodology, and a multimethod design, is the logical one to have been chosen for a study such as this.

To conclude this introduction to methods and methodology, it is important to state this work on teacher cognition is a study. First of all it must be clarified it is not a case study. Bryman (2008) identifies setting as one of the defining descriptors of case studies. It could be argued, because the current study is based in the Midlands there is some attention paid to location. The attention paid to location was, however, not a defining element of the research design as this was for the purpose of manageability of the study. Observation which is generally favoured by case study researchers is not used by the current study. Although the study was conducted in a specific region, the Midlands, participants worked in schools in various areas, sometimes different types of schools, defined by distinct and unique ethos. Where research has been done with more than one case, it has been referred to as multiple case study (Bryman, 2008); another terminology which does not appear to describe the current study on teacher cognition. Multiple case study might not be suitable as a design for this research. This is because although the study targets secondary English teachers as a generic family, the use of the Dreyfus model retains three distinct groups of novice, competent, and expert being targeted. In this light, multiple case study might have some limitations. Bryman (2008) suggests the term comparative study if more than one group or setting is targeted. Again, the use of the Dreyfus model is to understand the developmental process of skill development without necessarily engaging in a detailed comparison of the participants pertaining to levels

of expertise. The reason for not engaging in this study using a comparative focus is; this is the first time the Dreyfus model has been used in empirical studies in teaching, and the lines of distinction of the levels of skills development are only being constructed as the data is interpreted. With future studies using the Dreyfus model a comparative approach could be taken. Cross-sectional study portrays some similarities with the current study with the attention to more than one case. However, there is a penchant for the cross-sectional design to be linked to quantitative studies although Bryman (2008) indicates how this design has been used with qualitative studies. Another determining characteristic of the cross-sectional design is its focus on a single point in time. Data for the current study on teacher cognition was collected over a period of approximately two (2) years; thereby not conforming to the criteria of a single point in time of cross-sectional design. This study is a qualitative multimethod study.

3.1 Preliminary phase of the study and link to the current study

There are two main research questions for this study: (1) which patterns are evident in the lesson planning process of novice teachers, competent teachers and expert teachers? And (2) what is evident in the cognitive process of lesson planning to differentiate a novice teacher from a competent, and a competent from an expert teacher? The methods used in data collection have been carefully chosen to reflect the type of data to be used in this study, and the methodology to ensure the richness or thickness of the data is secured, as well as making sure ethical requirements are fully complied with. This study on teacher cognition, was preceded by a "small scale, short term qualitative research" (Cohen, Manion and Morrison,

2011, p.219) submitted as an assignment; part of the assessment process for the Education Doctorate (Ed.D) programme. The short term study involved six participants. The research was preceded by a pilot which helped in shaping interview questions and ensuring effective use of the Think Aloud method, which as a budding researcher, I was using for the first time. Cohen, Manion and Morrison (2011) indicate the importance of a pilot in dealing with the more technical elements of a study; some examples are: time, clarity of questions, ease or difficulty of activities. Multiple methods of data collection were used: Think Aloud, semi-structured interview, lesson plan document, Ofsted (2010) grading criteria. The multimethod approach was apt in facilitating capturing of the complexities involved in thinking, as well as the complex nature of teaching and learning. In addition to this, Kagan (1990) affirms the multimethod approach expedites triangulation. The multiple sources of data when studied, generated in-depth single source analysis as well as cross-source analysis. Multisource involved the use of the following for data collection: think aloud; audio recording, lesson plan; written document, semi-structured interviews; audio recording, Ofsted (2010) grading criteria; secondary source, reflective log; written document.

Data for the small scale study was also from books, reports from current large scale studies and peer-reviewed journals on contemporary trends in teacher cognition and developing expertise in teaching. Carrying out this research on teacher cognition, involved working with six participants; secondary English teachers. Participants were targeted to reflect three different levels of expertise; novice, competent, expert. For the assignment, novice was taken to mean teachers doing PGCE, GTP, TeachFirst or NQTs, competent teachers - minimum of approximately five (5) years' experience and/or have a leadership responsibility within the

department or school, for example, second in department or head of department, expert level teachers were ASTs or Excellent teachers (ET) and also practising teachers with Local Authority (LA) advisory experience. Selecting the participants necessitated the use of purposive sampling (Morrison, Cohen and Manion, 2011). All participating schools had LA recommendation, with data collected from schools in three different LAs in the Midlands.

This current study is based on the ideas which originated from the small scale study (for the Ed.D assignment), enhanced by changes in methods and a deeper understanding of teacher cognition as revealed by existing literature. Similar to the small scale study, the current study uses multimethod; a qualitative design, and multisource data (although methods of data collection with the experts have changed significantly compared to the previous small scale study), and remains within the qualitative tradition, steeped in constructivism with an interpretive epistemology or framework. This current study of teacher cognition was also preceded by a pilot phase, which revealed both problematic and useful insights into the processes of method implementation (use) and data collection. Two expert level participants (male and female); Brian and Alice, took part in the pilot. Experts were targeted for the pilot since all data collection methods were used when working with experts, and only some when working with the non-experts. The methods and methodology discussion is undertaken with the reminder by Kagan (1990) that methodology used in cognition studies have come from a range of epistemological traditions which are sometimes antithetical. An awareness of the foundations of the methodology used in this study is necessary, but also vital is how its application and/or implementation relates to the two research questions, as well as conforming to the qualitative paradigm and constructivist ontology. It is logical that this

study on teacher cognition goes beyond educational boundaries in its quest for methods and methodology because studies of the human mind cut across most disciplines.

3.2 Epistemological considerations

3.2.1 Why qualitative research?

Teaching, by its very nature encompasses qualitative elements, especially as the interaction between teacher and learner is built on human interactions. To enable a natural flow of information and relevant data analysis, this study will be grounded in the qualitative tradition (Bryman, 2008). Baguley (2013) explains that contemporary research within the domain of education, has people as pivotal. With the focus being on people, and teaching involving people, logically the qualitative paradigm retains preference in this study, particularly drawing participants from schools. Seeking to understand teacher cognition, conforming to characteristics of qualitative research (Heaton, 2004), the processes involved in teacher cognition during lesson planning will be targeted. Teaching by its very nature is complex (Clark and Lampert, 1986; Livingston and Borko, 1989; Shulman and Shulman, 2004; Hewitt, 2008; Loughran, 2010; Lampert et al., 2013), and this complex world of teaching encapsulated in the teacher's mind, I believe, requires in-depth exploration, an opportunity nested within the qualitative paradigm (Staller, 2010).There will be a heavy reliance on generating insight based on the data which is collected from the participants. Data collected from the participants is in the form of verbal utterances; words being one of the differentiating features of qualitative research when compared to quantitative research (Bryman, 2008). It should be specified that verbal utterances could also be used in

quantitative studies, however their use in analysis is fundamentally different to the typical focus of qualitative researchers. The flexibility which qualitative research offers to the research process is essential to this study with regard to insight into the data, analysis, and understanding of the processes involved in teacher cognition. The exploratory nature of qualitative research (Bryman, 2008; Denscombe, 2009) also ties in with the manner in which this study on teacher cognition seeks to understand the mind of the teacher. According to Staller (2010, p.1159), "Most qualitative research starts from a constructivist epistemological position and from one of a variety of theoretical perspectives, such as interpretivist… Constructivists believe in the socially constructed nature of reality". Reference to the nature of reality generates the necessity to clarify the ontology of the study. Bryman (2008, p.20) indicates, constructivism "essentially invites the researcher to consider the ways in which social reality is an ongoing accomplishment of social actors rather than something external to them and that totally constrains them". This study will therefore be guided by constructivist premises (see 3.0 above). The constructivist premise permits an intertwining of reality between the researcher and the situation which the researcher is exploring. This therefore enables a critical analysis, sometimes of situations which seem obvious, also there is emphasis on specificity of each research situation, a correlation between the research processes and how knowledge of this area develops, as well as action relating to the social environment in which the research is taking place (Staller, 2010).

Goertz and Mahoney (2012, p.130) in examining qualitative and quantitative traditions identify these areas of distinction: individual cases (within-case focus for qualitative and cross-case focus for quantitative), divergent understandings of causality and causal models

(with qualitative seeking an understanding of while quantitative ascertains the cause of), populations and data (small sample for qualitative and large for quantitative), and concepts and measurements; qualitative and quantitative respectively. Some examples of studies in Education which use measurement are: Klassen and Tse (2014), identifying and measuring expertise, in this case self-efficacy and personality, and also Goldbaher and Anthony (2007) assessing teacher quality based on student performance, also delved in by Hattie (2003). However, Ericsson (2006) has referred to measuring and capturing expertise as a challenge. The recommendation is to use protocol analysis to gain access to where the expert places their attention when carrying out tasks. Klassen and Tse (2014) have chosen to use quantitative values to measure self-efficacy and personality as these have been considered as showing rigour and objectivity when examining cognitive processes. Similar to Klassen and Tse (2014) with the focus on cognitive processes, Migo, Mayes and Montaldi (2012), measure memory. First of all, memory has been broken down into declarative and implicit memory. The two main types which are sub-divided into semantic and episodic memory (for declarative memory) and familiarity and recollection (for implicit memory). Added to these memory compartments, there were also seven different test formats to be used in measuring memory. Embedded within these examples is the focus on cognitive processes.

One of the defining features of quantitative studies is codifying evidence with numeric values (Cohen, Manion and Morisson, 2011; Bryman, 2008). Goertz and Mahoney (2012), while listing four main components to distinguish qualitative tradition from quantitative, discount the idea that the whole dichotomy of the traditions should be based on discussions about numbers and words. While advocating a pluralistic outlook towards methodology, or at least

a more welcoming perspective, they propose a mathematical understanding based on inferential statistics for understanding quantitative research, and logic and set theory geared towards unearthing meaning derived from qualitative research. In this light, Geortz and Mahoney (2012) verge towards similarities, rather differences. With regard to expertise, the view of quantitative researchers is towards narrowing down evidence of expertise; isolating components which could be compartmentalised and measured. The argument from quantitative researchers, as expressed by Turner (2011) is; by separating concepts into parts, they are able to study and achieve accurate measurement. There appears to be a strong underlying foundation to isolate items and study each one independently. Ansari, Coch and De Smedt (2011, p.42), while examining the epistemological and methodological differences involved in trying to establish cross disciplinary collaboration and its potential impact on Education, asks "how can synergistic collaborations create a whole that is more than the sum of the parts?" Beins (2010) suggests, some constructs which are psychological, in the example here of intelligence, might need to adhere to other rules, not necessarily numeric-based rules, in order to try and understand them. Tauber (1988) has also raised the issue of psychological constructs and the need to carefully balance objective and subjective measures in fields like Education.

Qualitative researchers, on the other hand, it could be viewed are constantly aware of their own social identities and how this shapes their interpretations, allowing for a systematic reflection on how the research has been conducted. Meaning, is therefore generated through the complex nature of reasoning from the lived experience of the participants, using an inductive grounded theory foundation. This implies meaning is multifaceted; this is a

reflection of human experience. In seeking to understand social reality, Cohen, Manion and Morisson (2011) reflect on whether or not reality is that which is a product of the cognition of one individual, that is, whether social reality should be treated as external or internal to the individual. Fundamental to the side taken in answering this question about social reality is the subsequent approach taken in any study. With the interpretive outlook of social reality, a subjective perspective of the world is taken and great effort to understand human experience within this world. That which is being investigated is taken as it is and of the greatest importance is "efforts are made to get inside the person and to understand from within" Cohen, Manion and Morrison (2011, p.17). The current study on teacher cognition seeks to delve into the mind of the teacher and explore cognition and cognitive processes involved in planning of an English lesson.

Some examples of qualitative studies within fields relevant to this current study include Kagan (1992) and expertise development of pre-service teachers, mainly focusing on the cognitive perspective, and Mylopoulos and Wood (2009) on adaptive and efficiency expertise. Qualitative studies fundamentally seek a richer more in-depth view and understanding of concepts and their attributes whereas quantitative studies focus on indicators and the relationships which they generate with their variables which are generally causal in nature. Qualitative research, by aiming to achieve an in-depth understanding evolves in a holistic manner.

To conclude, this discussion on qualitative and quantitative traditions and cognition and cognitive processes, it should be clarified, in trying to avoid the inferred pitfalls of education research on cognition (Kagan, 1990), this research takes a holistic view of cognition specifying that it is firmly within the qualitative tradition. The danger of taking a holistic view is, this in itself is potentially too diverse to be properly studied in an in-depth manner true to the qualitative tradition. In this light, adherence to studies (e.g. of teacher expertise) which have called consistently for subject specific research, for instance, Dudley-Marling (2006) have guided this work, and also studies on teacher education and teaching (McDonald, Kazemi and Kavanagh, 2013). Thus, a combination of cognitive processes holistically and subject specificity should narrow down the current study. A further helpful subdivision is the use of the Dreyfus model of skills development (Dreyfus and Dreyfus, 2005), which constitutes graduated stages. Hopefully, this organisation of the study keeps it focused and contained enough for rich qualitative analysis to ensue.

3.2.2 Why the interpretivist approach?

Having established (in 3.2.1) that the methodology adopted for the study is qualitative, and exploratory in nature, with the ontological consideration of constructivism, it is important to assert that an interpretivist stance (Bryman, 2008) will be taken throughout. The interpretivist approach will guide how the reality exemplified by the participants will be understood by the researcher. The focus is to capture the cognition of the teachers, concentrating on the ways in which words are used to create their reality, in the first instance, and then, based on the way in which their reality is constructed, another layer of meaning is brought to bear by the researcher's interpretation of the reality in relation to how they have been expressed. As

Cohen, Manion and Morrison (2011, p.17) stipulate "the central endeavour in the context of the interpretive paradigm is to understand the subjective world of human existence." In sum, this is a multimethod study within the qualitative methodology, based on constructivism, using an interpretive epistemology or framework, and taking an exploratory approach.

3.3 Ethical Considerations

Ethical approval for this study was submitted to and approved by The University of Reading. Seeking ethical approval was vital in ensuring the study conformed to recommended standards of research practice (Willig, 2013; Frost, 2011); at the level of procedures and also face-to-face engagement with participants. In order for ethical approval to be granted by the Ethics Committee at The University of Reading, acknowledging the recommendation by Christians (2005) of the place of institutional review boards and research ethics, a summary of the research methods and rationale had to be made available to the committee, as well as data collection documents; consent forms and information sheet. With the ethical approval granted, and because the data collection was to be undertaken in schools, the headteacher of each participating school was provided with an Information Sheet and a Consent Form, as recommended by the Ethics Committee. Upon acquisition of headteacher consent of the participation of the school, the participating teacher was given an Information Sheet and a Consent Form to be signed prior to data collection.

3.4 Methodology

As evident in the discussion in 1.0 and 2.0 about teacher cognition and cognitive processes as they apply to the two research questions, as well as the Dreyfus model of skills acquisition, there is evidence that antithetical operations are in play (Olson, 1992). Therefore, to facilitate this research, careful thought has been put into how to combine approaches which reflect some aspects of divergent epistemological foundations, and ensure these approaches lead to non-conflicting outcomes. The approaches, referred to here, constitute the use of semi-structured interviews, analysis of secondary sources, as well as within process analysis, involving pattern matching and process tracing (Collier and Elman, 2008), for example, as evidenced in the research questions for this study. One possible solution is to use the multimethod approach for this study. By multimethod, it is meant the use of multiple methods within one paradigm. Goertz and Mahoney (2012, p.226) explain, research can be carried out successfully by importing some "practices and procedures" from another research tradition with no requirement to fully embrace that tradition in its entirety. This perspective therefore distinguishes multimethod from other forms of methodological pluralism, for instance mixed methods. This current study, it should be emphasised is qualitative and uses the multimethod design.

3.4.1 Why multimethod?

As Collier and Elman (2008, p.783) explain "the idea of multimethod can be understood as encompassing three different meanings: the heterogeneity of qualitative methods, the interconnections between qualitative and quantitative research procedures, and the relationship with interpretative and constructivist methods". This explanation is based on the

understanding that the research carried out is situated firmly within the qualitative domain. The choice of multimethod fits in with my ontological stance of constructivism. Similarly, constructivism welcomes combination with interpretative epistemology (Bryman, 2008). Kagan (1990, p.459), "The use of multimethod approaches [in research on teacher cognition] appears to be superior, not simply because they allow triangulation of data but because they are more likely to capture the complex, multifaceted aspects of teaching and learning". Cognition, used interchangeably in this section with thinking, is quite fluid. This fluidity is a human characteristic in terms of how the mind works. It was therefore important to be able to use a research design, for example multimethod, which is hospitable to collection of data which could be synchronised to reflect a thought sequence, and also which could be cross-referenced to check for reoccurrence of sequences, patterns or even ideas.

It appears when reference has been made to multimethod in research literature, there has been a tilt towards using multiple data sources. Based on Bryman (2008) and the classification on approaches taken in research, it could be useful to present multimethod as cutting across a range of approaches; not only data collection methods. Kagan (1990) identifies the fact that multimethod cuts across epistemological traditions. In the case of the current study on teacher cognition there is the use of a Questionnaire and Bryman (2008) classifies the questionnaire under the survey approach, the use of the Dreyfus model shows some elements of cross-section approach, focus on Midlands could generate some links to case study approach, Reflective Log, Stimulated Recall borrowing from cognitive psychology as some examples. Cohen, Manion and Morrison (2011) classify the Interview under naturalistic enquiry form of data collection but present the case study as a prototype

of mixed methods research. The use of Reflective Log (FL) and Critical Incident Reports (CIR) appear to fall into the category of accounts as presented by Cohen, Manion and Morrison (2011). Although Cohen, Manion and Morrison (2011) list Critical Incidents under the data collection method of Observation, CIR used in the current study on teacher cognition is a narrative form based on cognition rather than a physical observable incident. Multimethod design ultimately uses multiple data sources and also cuts across multiple research approaches.

3.5 Methods of data collection:

The following methods were used in data collection for this study: Think Aloud (TA), Interview, Reflective Log (RL), Questionnaire, Stimulated Recall (SR), Expert Commentary (EC) and Critical Incident Report (CIR). The participants were purposefully sampled to reflect the three 'milestone' stages of the Dreyfus model: novice, competent, expert. In accordance with the stages of development, data was collected in two main strands. The experts, highest level of expertise development using the Dreyfus model, where grouped into a same family grouping and the non-experts were also grouped based on this expert / non-expert dichotomy. The non-experts constituted four (4) of the participants; two novices – Katie and Jennifer, two competent level teachers – Courtney and Eric, and there were five experts – Daniel, Heather, Felicity, Ivan and Gemma. Experts, took part in the study by using all the data collection methods: think aloud, semi-structured interview, reflective log, questionnaire, stimulated recall, expert commentary, and critical incident report. Data collection methods for non-experts were: think aloud, semi-structured interview, reflective log. For all participants, the same sequence of access was used; first of all contact at the LA

level necessitating recommendation of schools, and/or access to schools in the locality, and specifically English departments to work with, before links with schools, involving headteacher consent and participant consent. The schools came under the following descriptions; Local Authority school, academy / independent school, single gender school (boys), single gender school (girls), mixed schools, faith school (Christian), grammar school, comprehensive. No free schools were involved in this study. All of the schools catered for the 11–19 age range of students.

3.5.1 Think Aloud (TA)

The Think Aloud (TA) method involves participants talking through their thought processes as they engage in an activity (Robson, 1993). For this current study, participants were given a topic based on one of The School Curriculum (2007) targets and individually, each participant had to think aloud creating a verbalised form of their plan for that lesson. Each participant was given an A4 size plain paper with the think aloud topic as a heading. There was only one TA session per participant. Participants had to think aloud and write a lesson plan on the topic provided. All participants had the same TA topic with task difficulty (Farringdon-Darby and Wilson, 2006) considerations established during the small scale study and also the pilot for the current study. Think aloud is a method which helps to "reveal processes that are normally hidden; they have the potential to make the covert overt" (Johnson, 2005 p.27); possibly a reason for think aloud consistently a favourite in expertise studies. Hewitt (2008) reiterates that some aspects of thinking are not concrete; therefore cannot be observed, since the activities of the brain are not overt. Concurring with this, Goswami (2004) reveals limitations to brain activities which can be captured. Mayer (1983)

classifies different types of knowledge in a bid to understand differences between experts and novices. This classification reveals schematic knowledge can be observed while strategic knowledge could be examined through verbal protocol. With these considerations, thinking made tangible in the TA protocol (the transcripts), is one of the data collection methods for this study. Critics of the TA method have raised issues of credibility of the verbalised form of the data as expressed in Shavelson and Stern (1981), while advocates have advised TA should be used in combination with other data collection methods. Ericsson and Fox (2011) on their part emphasise the difference between TA and other introspective approaches.

3.5.1.1 Lesson plan draft

The lesson plan draft is a product of the TA session. This is not a compulsory component of the think aloud. For the think aloud, participants were given an A4 sheet with the TA activity as the heading. The rest of the sheet was left blank in case the participant wished to make notes or draft ideas while they were verbalising their thoughts. From the small scale study prior to this current study, it was clear participants had different preferences; some preferred only to verbalise their ideas, others to talk first and then write or a reversal of this, and for some it was interspersed verbalising and writing. Although the TA activity remained the same from the small scale study (in order to retain consistency with the Expert Commentary part of data collection) it was made clear to the participants that they had no obligation to write a lesson plan as the thinking was the focus. Perrot (1982) highlights the internal and non-communal nature of lesson planning; externalising and sharing of which is hopefully facilitated by TA procedure. Calderhead (1984), while also acknowledging the efforts of teachers' lesson preparation and design which are unobserved, raises the issue that teacher

planning is undervalued. Of greatest value and/or interest to researchers and evaluators is the face-to-face interaction with the learners. My focus on teacher cognition at the planning stage seeks to extricate the value of this vital component of teachers' professional lives, which is, planning. Woods (1996) predicts addition to professional knowledge for teaching of research focusing on teacher planning. Planning seems to be one of the areas of teaching with limited empirical studies, as already discussed in 2.4. Literature on planning so far has verged on the prescriptive; usually matched to standard evaluative procedures, for example Ofsted grading criteria in Gilbert (2012). It is also important to remember that cognitive as well as affective aspects influence lesson planning (Ofsted, 2011). A lesson plan draft, if produced by the participants has been considered as an addition to any transcripts already generated from the TA session. One way in which the written lesson plan draft has also been used is as a prompt for the expert commentary (see 3.5.6).

3.5.2 Semi-structured Interviews

Another source of data for this study is semi-structured interviews. Brinkmann and Kvale (2015, p.115) introduce an innovative perspective of the Interview as embodied communication, emphasising the effects of bodies (face-to-face interaction) and nonhumans in the interview process. In this study of teacher cognition, one interview per participant of approximately thirty (30) minutes was conducted immediately after the think aloud session was completed. Interviews were face-to-face, and recorded using audio equipment, recorded data was then transcribed word verbatim (Willig, 2013). As Brinkman and Kvale (2015) highlight, the recorder has context-related impact on interview data gathering, an issue taken into due consideration as this method of data collection was undertaken. Interview questions

and probes (Bryman, 2008; Brinkman and Kvale, 2015) explored changes made to lesson plans. The interest in changes reflects the divergence of the mind, capturing whether changes are made, also reasons, types, and influences. Oppenheim (1992) extols the benefits of using interviews in research while Kvale and Brinkmann (2009) subtly introduce the power-play evident in interviews, an awareness guiding the researcher during data collection. With the understanding that qualitative interviewing can be problematic, specifically regarding context (Brinkmann and Kvale, 2015), this study on teacher cognition employs multiple methods of data collection. Context in this case assumes the position of the 'technology' involved in the interview situation; that is, normal everyday conversation takes on a completely different nature immediately questioning begins, and in most cases with the use of a recorder signally the switch in the nature of talk.

3.5.3 Reflective Log (RL)

The third method of data collection was a Reflective Log (RL). Following the inconsistencies with returning the reflective log via email as it was used in the small scale study, an adaptation was made to the method of data collection using RL. The reflective log was audio recorded immediately the participant completed the semi-structured interview. A guide handout (see Appendix D) was provided consolidate task consistency across participants. This was a major revision which ensured the positive outcome that all participants provided an RL. After the think aloud and interview sessions, an RL prompt was given to the participant and the participant had to use this prompt to verbalise a reflection relating to any lesson of their choice. With the RL, an opportunity was generated to investigate retrospective thinking. The impromptu nature of the RL was embedded with the flexibility of the

participant to choose any lesson they had taught in the past to a class and on a topic of their preference. How long ago that was remains irrelevant to the purpose of this method of data collection. The purpose of the RL was to collect thought patterns and embedded cognitive processes.

With the goal to code the RL and generate themes alongside the think aloud and the semi-structured interview, the components of this phase of data collection methods result in the first stage of data collection involving all the participants in the current study. RL is considered as a completion of the thinking cycle for this first stage. The think aloud provides data before lesson delivery or preactive lesson planning, the semi-structured interview provides the avenue into insights during the interactive phase, and the RL ties in thinking after the lesson or the postactive phase with actualisations in the classroom context. Here again, the focus is not necessarily to reflect on the lesson planned during the think aloud session. Importance is placed on the patterns already being established with transcription and coding of the think aloud, and the semi-structured interview examined against the patterns evident in the reflective log, with the intention of capturing a degree of coherence per participant. Degree of coherence as stated by Kagan (1990), should assist in stabilising the cognition of each participant, especially if the nature of thinking as fluid is taken into consideration.

3.5.4 Questionnaire

Think aloud, semi-structured interview and reflective log were considered as the first stage of data collection. The questionnaire, stimulated recall, expert commentary were grouped together as the second stage of data collection. Stage two of data collection only involved the experts. Stage two of data collection contained three activities. The first was the questionnaire. The experts had all been targeted using purposive sampling but this was combined with peer recommendation. The questionnaire, as well as collecting background information, education; qualification, career trajectory and years of experience, hobbies and interests, also allowed the experts to acknowledge their own expertise status since they recorded their expert status titles, for instance; AST, SLE, PhD. Questionnaire turned out to be a good system for self-validation (potential evidence of self-efficacy and self-identity) which ties in neatly with peer recommendation, also mollifying apprehension raised in Goodwyn (2011) of teachers being called expert. Turner-Bisset (2001), in highlighting the controversy surrounding the term 'expert teacher' resolves this by centring her work on expert teaching. It was therefore important that having been recommended by their peers, teachers were themselves comfortable in acknowledging that they were experts. Questionnaires have illuminated the journey of the expert –minimum amount of time taken to arrive at expert status, and also to be recommended by peers as an expert. This minimum amount ties in with existing research. It also shows the trajectory of experts; for instance the average of how long experts stay in one school, the number of schools they work in their career life-cycle and the sorts of roles they choose. Through the use of a questionnaire the natural curiosity in knowing or gaining an insight into who an expert really is as a person, apart from the professional, that is, the holistic portrayal of an expert teacher, was launched.

Setting out on the use of a questionnaire in building a holistic portrait of an expert teacher has been engaged with as a starting point in understanding who expert teachers are.

3.5.5 Stimulated Recall (SR) -using Think Aloud (TA) transcript

Stimulated Recall (SR) was one of the methods of data collection used by the experts. This constituted the second stage of data collection. Data from stage one of data collection, specifically transcripts of the think aloud from each of the experts was used as the stimulus for stimulated recall. This means, the target was for each expert to go back through their initial thinking of their verbal plan and revisit to answer some questions about their thought processes. Therefore, a first layer of meaning is evident in the TA transcript, but the SR grants the unearthing of a second layer of meaning. To get a second layer of meaning, the TA transcripts were embedded with questions. The questions were generated so the experts could provide more detail on processes, content, and methods. Ethell and Meniman (2000) explain, SR facilitates capturing of underlying theories and implicit beliefs. Questioning was informed by literature on verbal protocol (e.g. Baker and Lee, 2011). During the pilot phase a system of embedding the questions within the transcripts was trialled and this worked well in creating a smooth activation of SR and spontaneity in response to questions. This way of deducing stimulated recall is different to its more traditional applications. Traditionally, SR has involved video recordings (see Calderhead, 1987; Fogarty, Wang and Creek, 1983; Meijer, Zanting and Verloop, 2002) of a lesson which the participant has taught. Participants had to watch the video recording and effect the stimulated recall using prompts. Because the current study is not directly involved with the interactive phase of teaching, only the preactive or planning phase, this method of using video recordings did not seem to be the

most applicable. In addition, the sorts of criticisms on the use of SR levied in Calderhead (1987) might not be applicable to the current study because the studies Calderhead (1987) refers to used observed behaviour through video recordings to generate thinking. One other shortcoming of the SR method is that with experts, once automaticity has been reached, there might be limited access to any prompts which could generate a stimulated recall opportunity (Krull, Oras and Sisask, 2007). Considering these shortcoming, the constraint was to find an amendment of SR which could focus on the planning phase. An added worry was the idea of how best to keep the participant focused on the thinking and the specific question prompts. A method was designed where the transcript was embedded at intervals with questions. To make the questions prominent, the transcript was word processed with, for example, a standard font size of 11 in black, and the question was written using a red colour and font size 14. The participant was given a brief explanation of what to do. The participant was to read the transcript (no requirement to read aloud) but to give a response to each question as they encountered it. This method worked effectively because it maintained minimal interference from the researcher with the thinking process of the participants (see Appendix E SR sample). The stimulated recall was audio recorded. In designing this method, one challenge was capturing the link between the think aloud and the responses to the questions. But the transcriptions during the pilot showed that there was an effective link between the two as the participants typically read each embedded question aloud while they were thinking about it, and also in responding, they very often used keywords from the questions. It was therefore relatively easy to use a copy of the think aloud transcript and match that to the copy of the stimulated recall transcript. What was also most helpful was most of the responses to

the questions were quite detailed and sometimes included additional information which the embedded questions did not ask explicitly.

3.5.6 Expert Commentary (EC)

Expert commentary (EC) also constitutes Stage two of the data collection processes. The first component of stage two was the questionnaire, which was emailed to the participants, then the stimulated recall, before expert commentary. EC involved the use of a stimulus which each expert had to study and provide professional commentary on; the stimulus was three (3) lesson plan drafts. These were lesson plan drafts since they were a product of a think aloud session. It should be recalled that in the think aloud session, the participants are encouraged to verbalise their thoughts. They are also provided with a handout which contains the TA activity as a heading. Participants are encouraged to talk but are given the option to make notes if they wanted to. Some fairly elaborate lesson plan drafts were collected from the small scale study which was done as an Ed.D assignment (see 3.1 and 3.5.1.1). These 'written' lesson plans were used as the stimulus for EC. The requirement was for the expert to read the draft idea of a lesson and provide expert commentary, typical of what they would regularly use in professional development opportunities with peers, conversant with their expert status. Miller, Patterson and Woods (2001) confirm EC is important to explore the knowledge of non-experts and to provide support. In schools, the typical scenario is for an expert to observe a lesson when supporting a colleague. As Miller, Patterson and Woods (2001) point out EC is ideal in situations inclusive of observation where there might be some hindrance to access to the practitioner to be observed. However, for the current study, expert commentary has been purposefully chosen because data collection does not include lesson

observation. EC tools are flexible in their design. The focus is generally contextual factors to retain the best output from the expert. Having clarified that these were not formal lesson plans, they were draft notes, I was aware of how limiting this could potentially be for the experts and the impact this might have on the quality of the data. The expertise of the experts, however, was vivid in how much they could comment on based on such basic information as the data analysis reveals (see 4.3.6). According to Miller, Patterson and Woods (2001), EC espouses variability. This means, the researcher is able to capture nuances in a data set; possibly how grouped together or how far apart experts are with their commentaries.

Regarding the first research question, expert commentary creates one more opportunity for pattern identification. For the second research question, there are some implicit and explicit links between EC and cognitive processes. Goeke (2008) explicitly expresses the link between expert commentary and the cognitive processes involved in reasoning. In the study by Goeke (2008) EC was used to explore preservice teacher reasoning of cases, based on the use of case study methodology. Goeke (2008), in reflecting on the criticism of the manner in which they have chosen to combine case study methodology EC reveals the importance, I believe, of EC as an outlet for expert knowledge and possibly an avenue for making the tacit elements of expertise more overt. For Miller, Patterson and Woods (2001) and Goeke (2008) EC was a novice / expert engagement. Unlike these two studies, the current study uses the knowledge base of experienced teachers as the prompt for EC. In this case reference to this data source as that of experienced teachers rather than competent teachers is done to introduce a level of caution since this data set of 'written' lesson plans drafts is based on the small scale study carried out prior to the current study. The defining parameters of who a

competent teacher is were modified before the current study; an explanation for the current use of the term ‘experienced’. Both Goeke (2008) and Miller, Patterson and Woods (2001) identify the utility of EC as a training tool.

3.5.7 Critical Incident Report (CIR)

Scott and Morrison (2007) and Gettinger, Stoiber and Lange (1999) both identify Critical Incidents as part of a story telling genre. These narratives are based on classroom experiences of teachers, and Gettinger, Stoiber and Lange (1999, p.259) clarify, “incidents that teachers deem ‘critical’ typically are not major classroom events; instead, they are small, but meaningful aspects of inclusion as it is enacted on a day-to-day basis”. The small but meaningful quality of critical incidents is confirmed by Harrison and Lee (2011) as they become turning points in the professional life of a teacher. Nilsson (2009) and Gettinger, Stoiber and Lange (1999) ascertain the importance of both collection of the critical incidents and interpretation of the critical incidents. Teachers do not learn just by collecting the critical incidents, learning happens when reasons are provided for the choice of the specific incidents and the impact these have had or are having on practice. Harrison and Lee (2011) present the opportunity for insight, change, or not, with reference to the use of critical incidents for professional learning. Griffin and Scherr (2010) capture the proactive quality of critical incident report with regard to the ‘why’ process of problem solving, in contrast to the reactive understanding of practice as a ‘so what’ process. There is also the inferred link between critical incident analysis and problem solving in Harrison and Lee (2011). This paper presents Critical Incident Report (CIR) as a better quality of reflection and makes a direct link between CIR and problem solving; problem solving being one of the cognitive processes

of the current study. Most of the studies mentioned here have focused on the use of critical incidents by preservice teachers therefore highlighting its relevance to training. The use of CIR for the purpose of training across professions is captured by Griffin and Scherr (2010). This facilitation of the training of professionals has been evidenced in the use of Expert Commentary as well. Having discussed the usefulness of the narrative form of CIR, the method of data collection is utilised taking into consideration the shortcomings of narratives as highlighted by Kluwin, McAngus and Feldman (2001), stating these narratives might be 'constructed' from memory during participation in the study since teachers do not save experiences in narrative forms. This critique from Kluwin, McAngus and Feldman (2001), first of all introduces memory which is one of the cognitive processes, therefore showing a direct link between CIR and memory, and secondly introducing some validation of the choice of the current study to combine the CIR with other methods of data collection.

An extract based on the idea in Tripp (1993) and adapted by Griffin (2003) was used as the stimulus or instrument for the CIR (see Appendix D). The CIR was a targeted reflection opportunity. This was targeted reflection because it allowed the expert to search their mind for defining moments in their teaching. As the prompt suggested, these are moments which had an impact on their teaching. This method of data collection is similar to the Reflective Log used by all participants at Stage one of data collection, but it should not be confused with this. Griffin and Scherr (2010) introduce the idea that CIR is a better quality reflection. With the RL at Stage one, all the participants (novice, competent, expert) provided an on-the-spot reflection, almost impromptu, although they were encouraged to take some time, or as much time as they needed, to think. However, with the CIR, which only involved the

experts, they were provided with a digital audio recorder and encouraged to keep this for up to two (2) weeks but no more than three (3) weeks. Two weeks was judged to be just enough time to generate critical incidents in a more 'natural' way of thinking in the professional life of the teacher, but three weeks and beyond was perceived to be a stage at which retaining the recorder began to feel like a burden. It should be clarified, where participants choose to go beyond the targeted timescale, the researcher was flexible to allow this. With the provision of a significant amount of time to think carefully and choose defining moments, experts were able to go as far back as possible into memory and provide thinking which has had an impact on their practice. One purpose of this time frame was to keep the thinking as 'natural' as possible; almost a snapshot of how the mind of the expert would work in 'normal' circumstances. This idea has been generated from literature highlighting that teachers stay with their mental maps, mental lesson plans for a significant length of time and make spontaneous changes throughout, even rehearse the plan while it is still in the non-written form. It has also been expressed that the mind of the teacher stays with their students and their work even when they are not physically in the school environment and/or teaching. Also, the nature of the CIR permitted experts to generate narratives, a methodology which was not actively sought but which turned out as the way in which most of the experts carried out their CIRs. The reports provided tended to include a teaching situation. Although this study on teacher cognition does not particularly focus on the interactive phase of teaching, the participants themselves were able to provide, narratives, descriptions and reports which generated an insight into the interactive phase. Because CIR was undertaken by the experts, there is a possibility it captures a refined level of practice and therefore it is not a report of, for example problem areas as a novice would experience it for the first time, or success in an

example of teaching by an advanced beginner. There is the potential for the CIR to showcase expert level performance when practice has been fluent, or probably proficient level performance where the expert had identified the need to rework an interactive situation which they did not deem reflective of their normal performance.

With the clarification of what CIR entails and its place as a distinct method of data collection, this study examines how CIR has been used in research. When Tripp (1993) used critical incidents, it was part of a collection of work based on teacher judgement; a direct link to the cognitive processes of judgement to be captured. The link between critical incidents and memory has already been highlighted. In-built within CIR are windows into the cognitive processes of memory and judgement. Harrison and Lee (2011) also make direct reference to the use of critical incident reports and teacher professional judgement. Similar to Tripp (1993), Nilsson (2009) mentions that critical incidents are what the individual generating the CIR chooses to pay attention to. Attention has been identified within literature on thinking as a cognitive process sometimes, or at other times as it relates to teacher noticing. Without going into the modalities of whether or not to class this as a cognitive process, it is clear critical incident relates to that which has some link to the working of the mind. Griffin and Scherr (2010) make a direct link between critical incidents and problem solving. The variation, regarding the cognitive processes involved in the use of CIR, first of all, begins to confirm the initial outlook presented in this current study that there is an interplay of cognitive processes, and next the variation could be a product of the evolution of the Critical Incident Methodology and the flexibility of its application. The evolution of terminology and description based on the Critical Incident Methodology is traced by Butterfield et al. (2005),

with Griffin and Scherr (2010) tracking down the basis of CIR as observed behaviour. However, this study on teacher cognition targets the mind of the participants and generates insights into the mind of the participants by an interpretive look into the reports which they have produced, what they have chosen to pay attention to and how this has impacted on their practice.

To summarise about data collection methods, its link with the research questions could be found in the analysis which follows. The first research question seeks teacher cognition by looking for patterns of thinking. These patterns are provided by the range of participants involved in the study. The various methods of data collection means that for each participant there is a minimum of three (3), and a maximum of six (6) thought sequences which could be cross referenced for patterns. Added to this, grouping participants into same family grouping dependent on levels of expertise creates one more opportunity to look at thinking processes and the patterns involved. Cross-family analysis opportunities are also created. For the second research question, although the initial idea to use these methods of data collection to ensure distractions to the thinking process were minimised, and just the 'raw' cognitions and embedded cognitive processes to be collected, it turned out that the data collection methods themselves could be aligned to cognitive processes. Think aloud linked to decision making, interview aligned to reasoning, reflective log linked to memory and possibly judgement, and also linked to problem solving in Kagan (1990), stimulated recall and memory (Schepens, Aelterman and Van Keer, 2007), and stimulated recall and problem solving in Calderhead (1987), expert commentary and judgement, critical incident report and problem solving (see Griffin and Scherr, 2010), and Harrison and Lee (2011) making a link

between critical incidents and teacher professional judgement, as well as problem solving. Because critical incidents tend to be recalled from a past event, there are some links to memory, predominantly it tends to be long term memory. This link to memory between narrative forms of data collection is also captured by Kluwin, McAngus and Feldman (2001). Intuition and perception appear to be embedded across all the data collection methods.

3.6 Participants:

Three key categories of participants: novice, competent, and expert teacher were targeted, nine (9) participants in total; six females and three males. Using the Dreyfus model, these nine participants represented three main levels of expertise: novice (two participants –Katie and Jennifer), competent (two participants –Courtney and Eric), and expert (five participants –Ivan, Gemma, Heather, Daniel and Felicity). The advanced beginner and proficient stages, due to their transient natures, were not targeted because of limited research on teaching of how they could be clearly identified. For novice, there is the designated title of Newly Qualified Teacher (NQT). Novice has the generic description of being new to the profession, and in-school training (induction requirement), that is having completed the training phase, generally working as a teacher for the first year or second year. The potential challenge is the competent level performer, however, existing literature was used to address this. Borrowing from literature on teaching, competent level performers are generally referred to in studies as experienced. For this study, however, an additional component of years of experience, minimum of six (6), including peer recognition through school and/or department responsibility was added. The experts, also have designated titles. Historically, in England, these have been Excellent Teacher and AST. Identifying Excellent Teachers was

viewed as a potential problem because this designation was not common place in schools as established in Goodwyn (2011). This difficulty was evident when the small scale study was carried out as none of the expert participants declared they were an Excellent Teacher. The most prominent title in schools is that of AST and all participants who were recommended were very willing to contribute. Unfortunately, over approximately two years of data collection, changes were underway in the UK with a defining impact on the expert teacher designation. This meant experts were targeted from individuals who obtained the AST accreditation; with or without outreach component, LA subject-specific consultants who were practising English teachers, teachers who have shown highest level of professional learning with Doctorate level certification, and the new terminology of Lead teachers and SLEs. A critical component of expert recruitment was peer recommendation, usually at LA level, Consortium Leadership for academies, and/or senior leadership recommendation, inclusive of headteacher ethical approval.

The target of nine (9) participants potentially provides triangulation opportunities within the three main categories, with the flexibility and possibility of some participants demonstrating cognition which could reflect features of the more transient categories of advanced beginner and proficient. Therefore, my selection of participants was purposeful, yet flexible and non-restrictive in terms of identifying levels of expertise after data analysis. The first point of contact in reaching out to participants was via the local authority. With LA recommendation, schools were contacted, meetings organised with an SLT member, or the Head of Department (English) or equivalent, providing information sheets and discussing requirements of the research as well as setting possible data collection dates. Participants were all English

teachers in secondary schools in England (the Midlands), therefore teachers who adhere to The School Curriculum (2007) and its subsequent revisions. Ongoing deliberation in teaching research focused on levels of teacher expertise is prevalent. Taking the various viewpoints into consideration, purposive sampling was used to target expert teachers. Inherent issues relating to research outcomes and their inextricable link to the methods of data collection necessitated a careful selection of participants for this study.

3.7 Approach to data collection

This study is qualitative in nature. According to Denzin and Lincoln (2005, p.3), "qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them". Also, there is an embedded requirement in the qualitative tradition for regent approaches to data analysis. Using the multimethod design, the data for the current study was examined using both manual and technology-facilitated passes. The manual exploration of the data involved the data collection phase where first of all, notes were taken while each participant made their contribution to the study. These handwritten notes were especially useful when the data was being transcribed, for instance, background noise affecting the audio recording. Handwritten notes were also used to record field notes; information voluntarily provided by participants, for example additional information preceding or post data collection session. Another way in which note-taking was useful during data collection was to minimise interference with the thought processes of the participant. Apart from the interview, all data collection methods were carefully chosen, designed or adapted to enable the participant to verbalise their thought processes in the most naturalistic manner possible. When the analysis was written up,

pseudonyms were used. The participants are: Eric, Courtney, Katie, Jennifer, Gemma, Daniel, Felicity, Ivan and Heather.

Technology facilitated this study at various levels. The main equipment for data collection was audio recorders. Four audio recorders were used in data collection; one mainly used by the researcher and the other three made available to the participants for the recording of the Critical Incident Report. This is because the researcher, sometimes, had to work with expert participants concurrently. Data storage, and transcription was facilitated by the use of a password-protected computer, also used for word processing of the data. The transcription format used could be described as broad (Gibson, 2010). This format of transcription is achieved when "transcription is organised through chronological turns in speech, with the speaker being identified by an initial. Typical punctuation marks such as question marks, full stops and apostrophes are used to give some sense to the talk" (Gibson, 2010, p.297). Although the chronological form of transcription was used, the participant identifier was amended to incorporate the use of Computer Assisted Qualitative Data Analysis Software (CAQDAS). When the data was being transcribed, it was anonymised by using the initial 'P' for Participant, followed by a numeric value: 206, 2 representing second phase of the study and 06, participant number, followed by another initial; either N for Novice, C for Competent, or E for expert. This amendment was made because it facilitated word searches when using NVivo10 (2014), and these searches could easily be activated using 'find' tools on the software program (Lewin and Silver, 2007). A strength of this amendment of participant identifier, using the recommendation by Lewin and Silver (2007), is the potential to query the data during coding for information relating to specific groups of participants.

All the audio data was anonymized, conforming to confidentiality ethical requirements (Willig, 2013), and saved on a password-protected computer. As already stated, the data was transcribed; word processed using a computer, and uploaded onto NVivo 10 (2014). Computer Assisted Qualitative Data Analysis Software (CAQDAS), by the use of NVivo 10 (2014), facilitated coding, and as advised by Merriam (2009) assisted with the data analysis. According to Frost (2011), computer programs used in qualitative data analysis have the primary benefit of data management. Data analysis thus began with coding of each data item from each participant. The next step was to code across the whole data set for each participant. For the non-experts, this second level of coding involved three data items while for the experts it constituted seven data items. This implies data was examined holistically per participant in the first instance. Because each participant was part of a group representative of one level of expertise, coding was done within each group of participants. This means, for the two research questions the data was further examined to understand patterns, characteristics and descriptors. Having established codes at the primary level of the individual, the next level of groups according to levels of expertise, the final step was an investigation across levels of expertise. Frost (2011), in explaining pluralism in qualitative research highlights the use of multiple methods within one research paradigm, in this case qualitative, and extols the strength of increased transparent presentation of the processes involved in the transformation of the raw data to the stage of codes, categories, themes, and subsequently findings. The resultant effect of this transparency, assisted by the use of CADQAS is incorporation of checking systems which are of high quality, ultimately establishing rigour in the research undertaken (Merriam, 2009).

4.0 DATA ANALYSIS AND DISCUSSION

Data for this study is guided by the two main research questions. In undertaking the data analysis, I have ensured vivid description is provided as per the first research question, and analytical tools used effectively to evidence the second research question. With nine (9) participants each generating: one think aloud protocol, one interview transcript, one reflective log, in the first stage of data collection, there are twenty seven (27) data items. Then, the study moved on to the second stage, and third stage of data collection; which involve only the experts. Five experts produced four (4) items of data each; based on questionnaire, stimulated recall, expert commentary, and critical incident report, producing a total of twenty (20) data items. Overall, the study uses seven (7) data collection methods, producing forty-seven (47) data items constituting approximately one hundred thousand (100.000) words.

The huge amount of data was studied qualitatively using QSR NVivo 10 (2014). Firstly, NVivo was used to facilitate single source data analysis. For single source analysis, data was coded using NVivo. By using NVivo, there was the ease through the use of numerical values to notice reoccurring utterances and subsequent codes. Atkins and Wallace (2012) and Gibson (2010) confirm the usefulness of technology in assisting with analysing qualitative data, as well as CAQDAS for data management. Upon completion of the first step of examining the data, the next step was to code, using NVivo, all the data items for each participant. For each participant, coding was done first of all to capture utterances to facilitate coding for the first research question, and after this, coding was repeated per participant to

capture utterances reflective of the focus of the second research question. After the single source data coding, themes were generated. On completion of this initial round of single source data analysis for all the participants on an individual basis, cross analysis was done. Cross data analysis commenced with same family groups of novice, competent and expert. After the same family cross analysis, the whole data set was examined together on a cross family basis. This means the data was explored rudimentarily (Merriam, 2009) by using memos and notes on NVivo 10, initial coding done and initial themes generated for the data set as a whole irrespective of levels of expertise. At this early stage of data analysis, it was important to make notes which collected thinking about the data as the data was being shaped by the different data collection methods. Discipline in establishing what to look for from each data collection method helped to "narrow the study" (Merriam, 2009, p.171). It should be clarified, when the cross family analysis was carried out, it was first of all for research question one and then again for research question two. This means the data was interpreted at multiple levels and this data analysis was done recursively. The multi-layered interpretation led to the generating of various themes. This process refined the themes and has generated thick description (Cohen, Manion and Morrison, 2011), as well as ongoing construction of meaning (Merriam, 2009). As Savin-Baden and Major (2013, p.63) specify, one key focus for constructivists with reference to meaning is to develop patterns, that is, "pattern of meanings".

4.1 Pilot data analysis and discussion

The pilot involved solely experts because experts use all the data collection methods for the study. Novices could not be used for the pilot as they only used three of the seven data

collection methods. It was important to trial all the data collection methods as a group, especially the reflective log, questionnaire, stimulated recall, expert commentary and critical incident report. The think aloud, interview and reflective log had been used before in a small scale study (see 3.1), although the reflective log required amendment regarding how it should be administered; face-to-face rather than via email as was the case previously.

The pilot highlighted three components to expert planning thinking: lesson set up, learning ignition, and ongoing learning (see Appendix C). There were four main viewpoints from which to understand expert lesson planning thinking as captured in the pilot: rationale (why), tools (what), thinking points (how), implications (so what).

The lesson set up prepared the stage for learning ignition. Lesson set-up took up the most, in terms of planning time allocation. Learning ignition was the time for the learners to find out and to experiment. By the standards of expert planning, the learner might need to 'see' the new knowledge with minimal requirement for the teacher to tell them. The ability of the learner to 'see' the learning shows the in-built relevance of the topic or the lesson focus. This therefore covers the rationale (why) of expert planning.

The expert needs to use some tools when planning the lesson. In this pilot it was considered to be the 'what' of the lesson planning. When an expert is presented with a topic to be taught, what happens first in the mind of the expert is work out how to introduce this topic or lesson

focus in a tangible or concrete form. Only when the tangible component is fully installed in the mind of the learner, does the expert move on to link this to abstract or theoretical components of the topic. This link happens during the learning ignition phase of lesson planning thinking and it is done using the following tools: prompts, questions (typically learners asking peers questions or themselves), challenge – teacher using multiple strategies to support learners to think deeply. The final part of the 'what' of the lesson is new knowledge application. This tends to be done on the learner's terms and their context. This independence given to the learner has been earned over the lesson set-up and learning ignition parts. Flexibility of knowledge application to the relevance of the learning (captured in the rationale), is therefore the evidence that learning has happened.

The next area is the 'how' or the 'thinking' points of expert lesson planning. The core foundation of the two research questions of this study is an insight into mind of the teacher. From the pilot, it was evident expert teachers at the lesson set-up phase commence planning by thinking about group learning; how the class as a whole learns, and what is of interest to the whole group. Perceptions around this idea could lean towards ease of access, however, considering the generational gaps of teachers and students, it might not be such an easy task for the teachers to be in-tune with the finer details of the current and changing interests of each teaching group. A reminder from Tyler (1949, p.11) summarises what the experts seek to achieve, "it is essential to see that education provides opportunities for the student to enter actively into, and to deal wholeheartedly with, the things which interests him, in which he is deeply involved, and to learn particularly how to carry on such activities effectively". As well as the positives of shared knowledge of group interests, the expert shows accuracy in

non-overt areas of difficulty at group and individual level. There is also expert efficiency with achieving the appropriate level of challenge for each group. This possibly explains why the lesson set-up phase is the most laborious for the expert. Unless the expert can attain the appropriate degree of challenge, the intended level of learning intensity might not be achieved. Having achieved the targeted lesson set up, the learning ignition phase is used to allow learners to think. Attention is directed towards putting learners in situations which create room to think, whether through introspection or collaborative thinking. The notion of group work for the expert is shared space for collaborative thinking rather than shared writing, problem solving, peer evaluation, as it tends to be the case with non-experts. For the expert, creating the space for learners to think means there could be both negative and positive outcomes of the thinking process. Ultimately, the essence of their lesson planning thinking is the generation and retention of learner interest over time; beyond a specific individual lesson.

The frame of the 'so what' of expert planning thinking is almost foreshadowed in the ongoing learning component of the 'how'. Independence and ownership of the learning is encouraged from the onset of lesson planning, that is the lesson set-up phase. The expert, while planning, creates the opportunity for outcomes which are not pre-empted. The expert works relentlessly to pre-empt possible lesson trajectories based on their extensive bank of lesson outcomes. However, this is undertaken with full knowledge that it can never be exhaustive and the expert therefore welcomes new trajectories from students, which can only go further to increase the expert's bank of outcomes. Ivan in the main study, for instance says "Em, (pause) that, so, start; ask students what we are going to do with the pile of paper containing

apparently random words. (Writing) now at this point it's difficult to actually predict what will be said but not being able to predict is perhaps part of the hooking of the students into the er the lesson." After creating the opportunity for new lesson trajectories in the lesson set-up phase, the expert is open-minded to embrace 'new' ways of thinking from the learner's perspective. Embracing contributions of lesson trajectories from the learners is vital for expert growth. By doing this, there is two-way movement of learning; the expert gets to see the student's alternative perspective to the topic, areas which will engage the learners, therefore gaining an insight into the current interests of the group, while the students grow in independence and ownership of the learning. The dual benefit of the situation created by the expert produces the positive effect of the continued interest in and anticipation of learning ignition opportunities by the learners, inclusive of the tangible knowledge of what is in it for them. This pilot analysis could be concluded bearing in mind Tyler (1949, p.65) and the assertion that the learning experience of each learner is unique although the teacher has provided one approach to the topic. A situation is consequently created where the teacher takes on the responsibility "to set up situations that have so many facets that are likely to evoke the desired experience from all the students".

4.2 Main research analysis and discussion

The data was first of all individually coded per participant; that is focusing on cognition in general. Whatever was thrown up by the data was coded. Some of these are keywords and expressions for differentiation, teaching activities, homework, prior knowledge, contextual factors; e.g. classroom and organisation of desks in classroom, content related aspects, teacher knowledge; content knowledge and pedagogical content knowledge allusions e.g. 'I

need to think about the best way to make / help the students get this', also knowledge about the students; what their ability range is, target, attendance, relationships with the group, social and cultural requirements etc., procedural elements e.g. how to start a lesson, what happens in the middle and how to end it.

The next step of data analysis for each participant was to establish a sequence of cognition. This means how their thinking evolved when planning a lesson; what comes first, next, and what is thought about towards the end. So the first component to establish was the sequence. After the sequence, the quest was for a pattern. To be able to establish a pattern, all the material from one participant was cross referenced. For example, from the novice, three (3) items of data were collected: think aloud, semi-structured interview, reflective log. Having coded all three separately based on cognition, they were then cross referenced to identify the similarities and differences. The similarities were considered the more 'stable' sequence of cognition. The differences were left to be further investigated as the data analysis developed. This is because in cases where the differences were not used to find a pattern, or a sequence of cognition, they were used to substantiate other codes, themes and ideas which developed in the course of the analysis for this participant or in combination with other participants.

After this first stage of data analysis which helped to answer the first research question was completed, the next stage of data analysis targeted research question number two which focused on cognitive processes. As already specified in 1.2.2, the main cognitive processes evident in teacher cognition for studies relevant to secondary education teaching are:

decision making, problem solving, memory, judgement, reasoning, intuition and perception. This study therefore sought to examine cognitive processes from a holistic perspective, that is, the interplay of all of these cognitive processes during the planning or preactive phase of a lesson. Starting again with each participant, the data was coded to identify utterances which explicitly referred to any of the cognitive processes, e.g. decide, remember, solve, judging etc., and also utterances which the researcher, based on literature on cognitive processes, interpreted as indicating cognitive processes grouped into a category. An example is utterances made by the participants along the lines of 'I will assess them to check whether they have got it'; with 'assess' highlighting some method of testing knowledge or understanding, therefore hinting at teacher professional judgement. This was coded for each participant; each individual item of data from that participant, and then across the whole data set for that participant. The first level of coding for cognitive processes involved identifying the cognitive processes from each data item to establish which ones this participant uses. After completing, this first level of coding based on the coding for the cognitive processes for each participant, the codes generated were then examined to check for similarities within the appropriate stage of the expertise continuum. This means I tried to established whether all novices used similar cognitive processes, whether all competent level teachers used the same ones and which ones were used by the expert teachers. This constituted the second level of coding; incorporating elements of interpretation. Having established same family similarities (and differences), the third step or level of coding was comparison across groups. This last level of coding permitted in-depth analysis since it involved the full data set. Similarities within same families were considered insights into the norm in terms of cognitive processes for that level of expertise. Considering that only the three milestone levels of

expertise were targeted, the ‘anomalies’ for each group were categorised and investigated to see whether they fitted into the transitory stages of expertise development. This study has therefore made the inference that the Dreyfus model exhibits two developmental positions: milestone and transitory. The milestones are: novice, competent, expert, and the transitory are advanced beginner and proficient.

In sum, data analysis began with coding of data on an individual basis; across the data set per participant, then progressed to coding within each level of expertise, proceeding to coding across levels of expertise. This was done, in the first instance, to capture the focus of the first research question, and then repeated again to capture the focus of the second research question. Based on these codes, and the resultant categories, themes were generated. Interpretation was done recursively as the data was looked at various points and carefully examined in multiple combinations; within data sets per participant, within each level of expertise, across levels of expertise, within data collection methods, across codes, across themes, and using NVivo 10 (2014) query searches. NVivo searches were mostly frequency searches; word frequency, text search, keyword searches.

4.2.1 Coding

Using multisource data, returned varied information. This variety was evident after coding first for elements of teacher cognition in general, followed by cognitive processes, as already indicated. In order to streamline the data to focus on the two research questions, it became important to identify what to look for in each data item when interpreting the data. This

streamlining also ensured there was consistency when interpreting data across participants. Marshall and Rossman (2011) present coding as the intensive part of qualitative research which showcases its intellectual composition. The immense amount of data collection for this study necessitated recurrent reading of the transcripts, listening to audio recordings of the data, and coding of the transcripts. All of the coding was done using NVivo 10 (2014), facilitating coding, frequency searches; word frequency and also text search, and keyword searches, showing that the multiple reading and listening to the data enriched decision making with finalising codes and first steps into generating themes. Keyword searches provided the opportunity for budding ideas relating to the codes, initially captured through manual transcription, to be further investigated. Atkins and Wallace (2012, p.224) explain, by using technology researchers are able to identify "keywords and recurring themes –with a degree of objectivity which would otherwise be impossible".

With regard to streamlining the data, Think Aloud was coded to identify sequence of lesson planning thinking. Interviews were coded to identify responses to questions about changes made when planning a lesson. The Reflective Log then provided an example of how a change was made during a lesson. Questionnaire data unveiled career trajectory (roles performed, length or service, academic background, degree subject etc.), support systems (family in teaching) and hobbies (life outside teaching). Stimulated Recall was coded for second layer of thinking; based on the transcripts from the think aloud. For Expert Commentary, the focus has been to identify how experts interrogate a lesson. This means making overt the kinds of questions experts will ask about a lesson. Critical Incident Report has been coded for sequence of lesson thinking, identification of critical moments and handling of change during

the interactive phase of teaching. With the critical incident, as well as with the other data collection methods used, through talk the opportunity to delve further into the mind of the expert is created, with the potential to capture how the expert thinks.

There are some key areas from which thinking is captured. The first is thinking during the planning stage or preactive stage, the next is metacognition based on an original thought, then thinking during the delivery stage or interactive stage (albeit captured in retrospect as shown in the reflective sessions), and post-active thinking; founded on the reflection-based data items, and finally thinking based on the planning of another teacher. Accessing the data by investigating these key areas has ensured information gathered from multiple sources could be analysed using varied combinations. These data permutations have been facilitated through coding using QSR NVivo 10 (2014).

4.2.2 Themes

Based on the explorations of thematic analysis by Cohen, Manion and Morrison (2011), it is relevant to indicate the themes in this study have been established by grouping a number of codes from numerous opportunities to engage with the coded data.

After coding the data, and developing categories, the following themes emerged: lesson planning, lesson structure, procedural elements, knowledge items and thought processes. Within lesson planning, the codes were gathered into sub-groups of thinking around the

beginning, middle and ending of a lesson. This was inclusive of activities, texts, as well as cognitive elements. This resulted in another category of lesson structure; capturing predominance of linear or non-linear lesson structure. Feeding into structure elements were procedural elements. Procedural elements grouped codes which showed flexibility or rigidity in lesson planning thinking procedures.

For thought processes, all teachers base their thinking on decision making. This is the foundation of lesson planning. They will all delve into memory, logically, to engage in post-active thinking. However, while experts exhibit problem solving focus of the reflective log, for example, novices tend to prioritise problem identification. With reference to memory, there was the opportunity to capture knowledge elements whether content knowledge, pedagogical content knowledge or curricular knowledge. To the expert a reflective log is an analytical process whereas to the novice it is a descriptive one. Reasoning is recurrent in expert thinking, sporadic in novice thinking and there is some basic evidence of reasoning with the competent teachers. When the novices employ reasoning it tends to be about the specific topic area, competent level teachers make reference to their experience whereas the experts have a fuller picture which cuts across teaching elements, and also learning elements. Evidence of perception is found in all participants. Non-experts tend to comment on student attitudes towards learning and also their own notions of teaching. For the experts, perceptions involve those areas of teaching or teaching situations for which they are still working on at a proficient level criteria descriptor; some of these areas are; pitching the lesson at an appropriate level, finer insight into the interests of a group, the best teaching method for a group being encountered for the first time or before getting to know them very well, dealing

with trajectories which go beyond planned pre-empting. Also for the expert, perception; combined with reasoning sometimes generates language of intuition. There was evidence of all teachers making judgements and these judgements had a big impact on all the decisions that were taken. Novices evidenced a higher proportion of judgements compared to the competent and the expert teachers. With the novices there was a recurrent reference to assessment, and novices tended to be quite decisive with their judgements. Competent level teachers were slightly more cautious than novices and would hint at trying to check their judgement before moving on to the next part of a lesson or making a decision. Sometimes competent level teachers talk of mini-plenary. The experts were more 'evaluative' when they referred to judgement opportunities. They are very keen to make sure they are making the right judgements. This is because lack of accuracy in judgement significantly affects the lesson set up ability of the expert. And to the expert, the lesson set up is crucial. This focus on judgement seems to be the main cause of the occasional slightly less than optimal learning ignition of some expert lessons as described in the reflective log and the critical incident reports.

With reference to context and contextual considerations, it is important to establish that expertise is context-specific. Heather, for instance, had to teach a lesson away from her main classroom, in a non-specialist subject area and found this challenging. Although she performed well 'thinking on her feet' this was an experience that was classified as a critical moment. Another example is Gemma thinking carefully about room space due to construction work at her school as captured in the interview; "So why would I do that perhaps? Em, I suppose, if we're talking I mean, with my experiences, at the moment we're

dealing with changing of classroom spaces; so we do a lot of team teaching in large rooms. I might have an idea that I think no that's not gonna work well in that shared space. That would work better when I'm in a single room on a Friday. Em, so I might have to do that [change] based on, based on space...". Daniel describes the children looking out of his big classroom windows in order to gain inspiration, "Er, what are the factors? What about, certainly I think the environment is a factor. So if I'm in a classroom I I prefer to have a space that is big enough for students to move around, to manoeuvre, to move desks around, I like having something to look at for children, so this classroom that we are sat in, great for a voice recording (chuckle) yes we have lots of windows looking out on the green and trees but something like this is a factor so we tend not to close the blinds a lot em". These examples highlight the importance of context and contextual factors in teaching.

4.2.3 Validity and reliability

In synthesising research on validity and credibility of qualitative research, Bryman (2008, p.377) reiterates, unlike quantitative and realist views on the existence of absolute truths, the qualitative researcher should bear in mind "there can be more than one and possibly several accounts". Truth and ultimately knowledge, according to Savin-Baden and Major (2013, p.63) is created based on the "perspective" taken by the researcher; in this case a constructivist. It is also highlighted by Bryman (2008) that there are some parallels between quantitative and qualitative researchers when trustworthiness of a study is concerned. These are in the areas of credibility, transferability, dependability, confirmability which correspond to the following with qualitative research: internal validity, external validity, reliability and objectivity, also see Morse et al. (2002) as they explore achieving rigour in qualitative

research. The focus, according to Cohen, Manion and Morrison (2011) is to work relentlessly with the target of maximising validity. This means the researcher has to make explicit and also clarify all processes and procedures which have enabled them to achieve what they set out to do. According to Patry (2013, p.58), reliability in quantitative research is achieved when measurement is done using methods which are relatively the same, and for validity to be achieved, methods which are different should be used to effect the intended measurements. In terms of reliability and the accompanying discordance around its application in qualitative research, Cohen, Manion and Morrison (2011) point out ways in which qualitative researchers can aim for a high degree of reliability; stability of observation covering the scope of time and place difference, parallel forms relating to an alternative research focus in the same area, inter-rater reliability which invites a new coder to code and interpret the data. Boudah (2011) reiterates the need to adapt the meaning of validity and reliability to suit the qualitative tradition, while advocating for the inclusion of trustworthiness, a credibility mechanism, within the continuum of validity and reliability. In exemplifying the rigour of the multimethod design, its application in qualitative research and contribution towards improving validity, Meijer, Verloop and Beijaard (2002) demonstrate working within a single research paradigm produces research of quality.

With reference to credibility, a thorough understanding of the social context which is being researched is intrinsic to the researcher's extensive experience of teaching English and working in schools. This personal experience of the social world which is being studied has facilitated careful consideration of and use of data collection methods, choice of participants and access to schools, and ethical considerations, ensuring good practice in research. At the

stage of data collection, data analysis and interpretation, the researcher was fully aware of researcher bias (Cohen, Manion and Morrison, 2011), and throughout the study took careful consideration of this. Transferability is one key component to establish trustworthiness. This has been adhered to by extensive data collection within a small group of participants. There were two participants for the pilot of this study and nine participants in the full study. Each expert produced seven different items of data and each non-expert produced three items of data. The rigour in extricating rich data from each participant conforms to the qualitative researcher's expectation of achieving thick description, heeding to the plea by Morse et al. (2002) to reinstate rigour as central in the ongoing process of a qualitative study. Boudah (2011) identifies the use of rigorous methods as one of three key ways of ensuring the credibility or trustworthiness of a qualitative study, the other two being; researcher credibility and intrinsic philosophical belief in and appreciation of the nature of qualitative research. A position confirmed in Morse et al. (2002) and their focus on achieving rigour within a specific paradigm without needing to use tools from a different paradigm. Since this study on teacher cognition is innovative, it serves as a database should judgements be made on the teacher cognition subfield of research and general research on teacher planning. This means this study does not seek to generalise its findings, as the requirement would be for quantitative research, but to capture, study, and understand the social reality as it unfolded during the period of data collection. However, due to the use of the multimethod design, and the general focus on cognition and cognitive processes, there is the potential for this study, in future, to be understood along the flexible boundaries of multimethod, such as the mathematical perspective of set and logic theory as presented by Goertz and Mahoney (2012). Goertz and Mahoney (2012), advocate crossing methodological boundaries as one way of moving away

from divisive debates about methodology. Although transferability is not the key focus in qualitative research, Marshall and Rossman (2011, p.253) state "designing a study in which multiple cases, multiple informants, or more than one data-gathering method is used can greatly strengthen the study's usefulness for other settings". In addition to transferability, in order to establish the dependability of the study, there has been thorough record keeping. This is available in the form of audio recordings, transcripts, data codes on NVivo 10 (2014), notes. In addition to this, dependability is also shown by the fact that full data sets of two participants; one competent and one expert were made available to a peer, another student on the Education Doctorate course, for coding. Ten (10) data items in total were submitted conforming to the requirements for dependability. Cohen, Manion and Morrison (2011) identify three key questions which qualitative researchers should seek to answer in order to achieve dependability, relating to an alternative perspective. This alternative perspective was actively sought and made possible with peer coding. In terms of confirmability, the researcher embarked on this study with the knowledge that qualitative research is subjective in nature and steps were actively taken to ensure the research reflected primarily the social reality of the participants, their understanding of it, and at times their interpretation of this social reality.

Ensuring that validity and reliability of this study is achieved, has been undertaken amid conflicting literature of its application and necessity. Kagan (1990), while exploring validity and reliability within teacher cognition questions its relevance to research which follows constructivist understandings and concludes that trustworthiness more appropriately explains what is generally referred to by quantitative researchers as validity and reliability. Kagan

(1990) based this on research (by Lincoln and Guba, 1995); Marshall and Rossman (2010) while referencing this ground-breaking study among others, also establish the central nature of trustworthiness to qualitative research. This view of trustworthiness is further taken up by Bryman (2008), Cohen, Manion and Morrison (2011) and Boudah (2011) and as they specify, the unique way in which validity and reliability should be understood by qualitative researchers. This study set out to understand teacher cognition and has achieved this by the rigorous application of multimethod, via careful selection of methods of data collection, data analysis procedure, and following the conventions of qualitative research.

4.2.4 Inter-coder reliability

Second coding was carried out generating a number of codes, and descriptors of teachers at two different levels of expertise, categories and subsequent themes. Boudah (2011) asserts that one technique which could be used to confirm credibility of a qualitative study is peer debriefing. Peer debriefing involves surrendering the data so that an independent review is undertaken. The second coder found a difference in the thinking process of competent and expert teachers. It is also evident from the coding and analysis of the second coder that lesson elements of teachers are similar. The difference, however, is in what is being focused on and also how these lesson elements are being implemented during planning.

The competent teacher, it was found, ‘sticks to set structures and strategies’ while the expert ‘wants variety to keep things new and fresh’. I also found this to correspond to the declaration by one of the competent level teachers that they always divide their lesson into specific parts.

With the competent level teacher, there is ‘little mention of students, their needs, ways to differentiate’, the experts ‘all focused on the needs of groups of students and their prior learning’. This is similar to what I also found because the experts, at the lesson set up stage, externalised their thinking about the whole group. In terms of planning, the competent teacher shows evidence of ‘planning around the content to be “got through”’ and the experts are ‘putting learning into the “bigger picture” of what they [students] already know and what they need to know to progress’. There is evidence that the lesson planning by the competent level teachers is ‘teacher led’ but the experts create the opportunity for ‘student led learning’ in the manner in which they plan. Another link is to the element of control which I found the competent level teachers to hold on to whereas the experts advocated learner autonomy and independence. Added to this, there is ‘no reference to monitoring and reviewing the learning of groups of students’ by the non-experts, while the experts show ‘monitoring of students in lessons and adapting of lesson accordingly’, an outcome of which is ‘little flexibility’ by non-experts in comparison to the experts.

Non-expert planning ‘focuses on technical skills to be demonstrated’ and ‘uses teacher modelling to provide examples’, showing minimal flexibility for students to develop thinking skills. From my own analysis it became clear that the way in which modelling was understood and undertaken by the experts was different to the conceptualising of the competent level teachers. The peer coder discovered that experts, are ‘wanting students to use higher order thinking skills’ and therefore ‘focus on developing students as learners’ and ‘adapting approach to needs of class’, a contrast to the minimal flexibility exemplified by the non-experts. For the non-experts, planning involves ‘planning around assessment and there

being a clear set of skills in lessons'. The experts 'focus on teaching of skills in context'. In the case of effective writing skills for instance, 'evaluate effect and impact'. It is possible to suggest, while the expert aims for the higher level of knowledge application and ultimately new knowledge creation, the target for the competent seems to be transfer of knowledge.

The key lesson components identified by the second coder are: teaching approach; teacher-led and learner-centred, the development of learners, modelling, assessment, monitoring of student learning and teacher self-monitoring, differentiation, the development of thinking skills, which are central in lesson planning. Concurring with the focus of the current study on teacher cognition, it is also clear from the second coder that teachers at various levels of expertise engage with [these] lesson elements in different ways when they are planning a lesson. As already highlighted from my own analysis, the basic foundation or core lesson components are evident in the planning of experts and non-experts, but the implementation shows differences.

4.2.5 Triangulation

According to Cohen, Manion and Morrison (2011, p.379), "triangulation entails using more than one method or source of data in the study of social phenomena". From the perspective of Boudah (2011), triangulation needs to incorporate confirmation properties, implying it is essential to confirm ideas and/or concepts that are being generated. The way in which this can be done efficiently is by the use of multiple sources of data. This current study on teacher cognition, is a multimethod study and it uses multisource data. Cross-referencing of data

within participant data sets, across participant data sets, within data collection methods, across data collection methods, within and across stage of expertise development, has been undertaken in this study with the knowledge of the importance of triangulation in qualitative research. Meijer, Verloop and Beijaard (2002) extoll the benefits of the multimethod design, in particular its entrenchment in triangulation opportunities.

Triangulation in this study has been used, first of all, to pin down the data since it is so transient in nature. This is because thinking is fluid; changes and evolves as the participant continues to provide data. All participants had to provide a minimum of three data items. This facilitated cross-referencing of the thinking which was captured; showing patterns of change, confirmation of previous ideas and new contribution, all highly relevant to understanding how the mind of the teacher works during lesson planning. Furthermore, the expert group of participants provided more data on their thought processes at different intervals; three points of data collection over, approximately, three weeks. Boudah (2011, p.78) suggests "prolonged engagement" is vital in qualitative research contributing towards an increase in the truth value. Corresponding cross-referencing of the experts generated the opportunity to note these changes, confirmations and new contribution, in this instance, over time. These triangulation opportunities were therefore very helpful in this study to create a lucid picture of the thought processes of each participant.

In addition to creating a clear picture of the thought process of each participant, triangulation has assisted in the data analysis. Analysis within data sets per participant was cross referenced across a minimum of three data items and a maximum of seven data items, providing multiple layers of meaning. Some data collection methods were relatively direct with reference to layers of meaning. Where, for instance, the interview was general in seeking reasons for change in lesson thinking, stimulated recall was more specific in requesting why specific decisions were made, reasoning behind change, foundations for judgement and queries about intuitive utterances. Marshall and Rossman (2011) present triangulation from the perspective of authenticity, being able to show that the research has effectively utilised opportunities to reveal uninhibited behaviour by the participant and also ensuring the views presented are specifically those of the participant. Without claiming to completely eradicate all elements of research-generated inhibition, the methods used in data collection were geared towards minimising the risk of compromising authenticity. One example of such a method is critical incident report where the participant had to keep the recorder for approximately two weeks, recording critical incidents as and when they naturally came to mind. Another, is the adaptation of the stimulated recall method of data collection by using transcripts with embedded questions, providing the opportunity for a seamless flow of thinking with minimal researcher interference to the thought processes, interference which

could compromise authenticity. The way in which triangulation has been handled in this study therefore reflects the expected rigour of research within the qualitative paradigm.

A further way in which triangulation was achieved was by the balancing of theoretical concepts with the data analysis as highlighted by Cohen, Morrison and Manion (2011) and Bryman (2008). Theories generated from research on teacher cognition, teacher planning and also from expertise development also contributed towards attaining the targeted goal of triangulation, thereby improving the reliability of this study.

4.3 Analysis based on data collection methods.

4.3.1 Think Aloud analysis

For the think aloud activity, all participants were given the same topic. Participants had to think aloud and plan a lesson on complex sentences. With the embedded flexibility of the think aloud activity, the outcome was lesson planning across all key stages; Key Stage 3 (KS3), Key Stage 4 (KS4), and Key Stage 5 (KS5).

With regard to the first research question, there are indicative patterns in lesson planning as it is undertaken by teachers at various levels of expertise. The novices have a linear structure

which involves using a tick box format; with inclusion of thinking showing close similarity to recitation, during think aloud, of key terms expected to be included in a lesson. For example "I will do questioning", then I will have to add my modelling…." The novices seem to mostly work from a position of 'taught' pedagogical content knowledge, and show evidence of content knowledge which is generally good. However, the content knowledge is not yet handled with enough flexibility. There is evidence from the think aloud that the novice teacher is at an experimentation stage. There is a repetitive use of the word 'might' by Katie, fourteen (14) times for example, when thinking about how to plan the lesson, compared to four (4) times by the other novice; Jennifer. This could point towards levels of confidence of each novice in the domain of lesson planning. When novices have used 'might' it has been at the point of thinking about what to do, whereas the experts have tended to use this beyond what to do, and during thinking on how it should be done. One of the novices (Katie), uses a key term 'learning checkpoint' when referring to points at which an active effort is made to evaluate whether the students are learning. What this might suggest is, the novice will depend on auditory (or visual) response or indicator to check that learning is happening and this is usually done through questioning. Katie says "So before I start, I'm gonna think about how much do they know about sentences in general, so em, what I might do it, hang on, starter activity, which would be may be identifying types of sentences; so I might have a small paragraph, have them read it as soon as they come into the class". The expert, for instance, already has this information and thus facilitates efficient planning and the confidence with which the lesson is approached. It could be the explanation for expert insistence of not changing the lesson which has been planned prior to its delivery, as indicted in the interview.

Based on the think aloud, it is evident the competent teacher also follows a linear pattern of lesson planning. This pattern includes a starter, a main part, multiple plenaries, and planning thinking inclusive of lesson component terms. However, the difference between the novice and the competent is the competent does not use key terms of lesson components in such a repetitive manner as the novice. With the competent teacher, they apply their knowledge of the lesson component (key term), then refer back, along the lines of "that's my modelling". Whereas the novices seems to use a tick-box style to say "I have to find a Bloom's question", the competent uses the Bloom's question and recognises what they have just done is use knowledge from Bloom's taxonomy. There is a subtle difference with the novice using theory as a precursor to lesson planning and the competent using theory as a back pedal to planning.

The experts have a non-linear pattern of lesson planning. The focus of the expert tends to be knowledge application and learner autonomy. The bulk of the planning work of the expert is done during the lesson set up phase. The expert works extremely hard to cognitively develop an idea which typically allows the students to 'runaway' with. The dependence on the teacher evident in the novice and competent level planning, is replaced with learner independence or autonomy during expert planning. The expert focused on knowledge application in order to verify that learning is happening as the lesson goes along, rather than the novices who seem to interrupt the learning in order to verify the teaching of a particular segment. For the expert, there is a sense of confidence that with the rigour of the lesson set

up, learning will happen and their interest then moves onto the reasoning behind this learning, how students are managing memory elements, decision making and problem solving, for example in group activities.

With reference to the second research question, decision making during think aloud is present across all stages of expertise development. For the novice, decision making is usually around functional elements; group size, group work, pair work, to identify who is to be supported. The competent aims to show progress, although the progress is generally not evident in the lesson planning thinking. This implies the competent teacher begins to explore content elements during decision making. However, the expert's decision making surrounds knowledge application. With the novice, reasoning is evident and there is the tendency for reasoning to be linear and also superficial. The competent teacher also shows evidence of a linear pattern of reasoning. However, the difference between the competent and the novice is, the competent shows an awareness of wider issues beyond the classroom, for instance references to departmental policy and whole school policy and their expected impact on the lesson being planned. In terms of memory, at all stages of expertise development teachers utilise memory stores. For the novice, this is to confirm adherence to pedagogical content knowledge, the competent to dip into lesson resource bank, Eric says "I would want something pre-existing for them to work on", and the expert an inclusion of professional learning as well as careful selection from bank of outcomes or stepping back and engaging with the proficiency stage. Problem solving generally comes within the first part of a lesson for the expert. This is usually presented as a lesson set up activity. Generally, the result of this is exceptional level of student engagement as knowledge of child psychology reveals

that children are spurred on by challenge. However, the creation of the problem solving activity by the expert takes careful planning. Competent and novice teachers would only introduce problem solving after ‘teaching’ has happened; almost taking the safe option of input and expected output. From my personal experience, there is always a surprise element in terms of student performance as teachers often express disappointment about student performance in topics which they have ‘taught’ them. The expert approaches problem solving with the confidence that students are going to create new knowledge. Experts are prepared to use memory to create symmetry between the new knowledge which students are creating and the current topic or focus of the lesson, implying the expert has an extensive and rich store of knowledge on the topic which potentially supersedes what the students could possibly think of. While the expert engages in intuitive statements, the novice and the competent have a high frequency of utterances which capture perceptions. Perception utterances for the novice are there to signify transition from theoretical knowledge to practical reality, and for the competent perception seems to validate decision making relating to choice of lesson activities and functionality elements based on classroom experience. Intuitive utterances by the expert are a result of reasoning. The expert, having swiftly accessed their bank of lesson outcomes, reasons that reorganisation of a sequence might be necessary, for instance, or that levels of challenge need to be managed etc. After this process of reasoning based on accuracy of lesson outcomes, the expert, while processing the planning of the lesson, transits via intuitive utterances to arrive at a decision on how the lesson should unfold.

4.3.2 Interview analysis

The main area of the interview is change. It was important to investigate change because thinking is fluid and it is a human characteristic to change one's mind often. Decision making also involves high levels of change whether this is a mere rethink or a complete reformulating of a concept. Change in lesson planning was investigated through the use of the interview in order to understand the forms of change, reasons for change and effects of change on lesson planning. In analysing the data, both research questions were considered. Therefore, in the first instance, patterns where investigated across stages of expertise development, and then examined in terms of application of cognitive processes. This means, how the novice, competent and expert teachers answered each of the questions; checking for similarities and differences within and across groups. In addition, finding out the prevalence of cognitive processes; cues and explicit expressions.

Pertaining to the first research question, some experts were adamant they would not change their lesson. Gemma says "I'd hope to…deliver it as I planned it really" while for Ivan "change would come after I'd delivered it rather than before". Post lesson delivery change is also captured when Heather says "I would change it after I've delivered it". For Daniel "the whole thing hangs on their, the students' prior knowledge". When commenting on changing a lesson prior to its delivery, Daniel refers to students' prior knowledge whereas the novices make references to prior teaching (Katie) and prior learning (Jennifer). There is a subtle difference; while the expert is confident with identifying knowledge almost as a solid and fixed entity reflective of what students had learned in the past on the topic or curriculum area, the novices express this as learning, almost as on-going processes hinting therefore at

minimal security in evaluating the effectiveness of the students' past exposure to this area of the curriculum. Katie responds "If the lesson before it wasn't complete, I might think about how I could follow it up", indicating an explicit focus on the teaching rather than the learning. This seems to be reflective of the stages of expertise development. Heather will change the lesson by making it more interactive and collaborative, and for Felicity the "changes would link to differentiation rather than anything to do with the actual content". One of the competent teachers will "keep the structure all the way through" and would use "a different type of example" and also move from group work to pair work (Courtney), while the other competent level teacher would change the lesson during delivery. Instead of changing the example, the novice will change the questions which will be used during the lesson. This means while some experts will change the lesson post delivery, the competent level teacher seeks to change the lesson during delivery. Similar to the competent level teacher (Courtney), the novice will change the activity from group to pair, then to individual. This group – pair – individual structure is also highlighted by Alice. Therefore, all the teachers understand the necessity to implement this outline; however the difference is in the reasoning behind this outline. That is, how teachers at different levels of expertise explain why it is important to keep this structure. In sum, experts will generally keep the lesson as planned, competent might change during delivery, and as Katie, a novice, says "I am constantly changing my mind".

Some keywords recurrent across all participants during the interview with reference to thinking about a lesson are: assessment, end product, knowledge of the group, the bigger picture, learning styles. There was a sense of this knowledge of the group being

overwhelming for the novice. Katie refers to the following; the kids in the class, the number of children in the class, the levels, the grades they are at, target questions for specific children. The novice lists that which they should know, while the competent teacher focuses on knowing the group with an assumed understanding of what this is without necessitating listing. In addition to this, the competent teacher indicates an awareness of the emotional element to planning. The emotional element to planning is not mentioned at all by the novice. The novice is therefore coming to terms with the demands of what knowing a group actually means. The competent teacher understands this and is beginning to delve into the emotional elements of thinking about a lesson with the fatalistic conclusion by Courtney; "it's never gonna go quite as you want it". The focus for the competent is for the lesson to go how the teacher wants it. But based on the data from the think aloud, the expert is allowing the lesson to progress based on preferred student trajectory. The factors which will influence how an expert thinks about a lesson tend to be "where it fits into the bigger picture" (Heather). The expert takes a holistic outlook towards planning. Felicity mentions curriculum requirements, syllabus, as aspects which will influence choice of lesson activity. Again, a reference to a bigger picture. Although all the participants make some reference to the group dynamics, Ivan an expert, is absorbed with social relationships; that is the relationship of the students with each other, relationship with himself and the group, and the relationship of each of the students with him, on an individual basis. Whereas the novice sees the group as a data-based entity, the expert uses a combination of perspectives to view a group. This for the expert is in order to seek how to engage potentially disengaged learners, as Felicity says "So I think, I would also have to think about how those who are not so engaged would remain so engaged in what is quite a long, lengthy 50 minutes of talking about complex sentences and applying

it really". Daniel needs to study the characters in the group in order to use their strengths and weaknesses to achieve the learning whereas Katie, a novice, hints at being overwhelmed by saying; "they are so many".

In exploring how teachers choose lesson activities, variety was prominent. However, Eric was worried about himself, specifically getting bored. Similar to the novice, it appears thinking is centred on the teacher as reflected by the competent level teacher Eric. An off-shoot of experience is "becoming aware of what works". There is therefore a hint at the plateau in this case where comfort in what works elicits stagnation. Courtney also states in the think aloud; "If I knew I was doing a writing lesson, I'm dividing my lesson into half, 30 minute mark, and then I know that after it the lesson is going to have a modelling section which will be 5 minutes; it's going to have a writing section – independent writing, which will be 15 minutes and it's gonna have a peer assessment section, which will be 10 minutes. So the second half an hour of my lesson will be exactly the same whenever we are doing writing". Having established what works based on teaching experience, Courtney would be influenced by different elements depending on the year group. For Year 7 for instance, it is enjoyment, Year 10 is content driven and relevance, Year 12 is coursework and assessment. There is a sharp contrast here with Ivan during the think aloud, who is looking to use KS3 techniques to bring back that level of enjoyment which is typical of learning at that Key Stage into KS5 teaching.

Should there be a necessity to discard one lesson idea in favour of a completely new one, the competent level teacher, Eric would be seeking "a kind of clarity about where I want the lesson to go". Courtney continues with reference to the emotional component of a lesson, for instance sensitivity towards an issue which might be similar to what a student in the class was going through; cyberbullying example was provided. This confirms the essential position of having good knowledge of your group, however, this knowledge could also pose some challenges to planning for the competent level teacher. With the expert, total idea change is retrospective; Ivan; "sometimes you er come out of a lesson and you think er there was an opportunity which I missed which arose accidentally during the course of the lesson. Daniel would change the idea depending on "perhaps I haven't pitched it [the lesson] appropriately". For these experts, the reason why they would change a lesson idea is not quite tangible; the pitching of a lesson and a missed opportunity. These are possibly the sorts of things which a non-expert will not see if they were observing these experts. It seems non-tangible moments in teaching have a level of impact, and these are not the easiest to identify. Changes, on the spot, by the other experts would relate to what is going on within the school context; building work and room changes, school trips and absences, formal examinations demands.

An area of thinking which tends to be elusive is non-verbal thinking. In order to capture this, participants were asked "what do you visualise when planning a lesson"? Whereas so far, the competent teacher has shown an awareness of the emotional component to planning, this non-verbal form of thinking was explicitly emotional for the expert (Ivan) as the response to the question was "smiling faces….a smile on your face says you're enjoying the

lesson…that's what schools look out for…that spontaneous enjoyment of learning". Gemma also says "I visualise them being active and enjoying the lesson, and really engaging with the task". Heather; "I visualise what the students are actually carrying out, the activities within the lesson". For Daniel "I visualise a lesson in different stages…I think the starting point is what will the outcome look like er but from the students' point of view". For the novice, the focus again is on the teacher; Jennifer says, "I visualise like em a four part lesson". Both Jennifer and Katie say "I visualise the class", and both make reference to their PowerPoint slides with Katie commenting on visualising the images to go on the PowerPoint slide. There is a big emphasis on what should be going on from the perspective of the teacher. There is a contrast again with the expert seeing the students and their learning and the novice seeing the teacher and their teaching. With the competent level teachers, there is an interesting development. Courtney declares "I'm not a visual person. I think more in terms of words". Eric says "I often use little diagrams to explain things anyway, so I suppose I visualise a piece of paper with some sentences". This captures the theoretical focus of lesson thinking at the competent stage of expertise development which could be counteracted with the more practical application of theories and evidence of their effectiveness; resulting in emotional gratification (smiling faces) at the expert level. Similar to the novice, the competent level teacher also makes a reference to visualising the PowerPoint (Courtney). There therefore appears to be an indication the competent level teacher shares some slight similarities in terms of approach towards planning with the novice; on the contrary, the competent level teacher's approach to planning seems significantly removed from that of the expert. It could be summarised that visualising is prominent in lesson planning as Jennifer states; "I visualise the class sitting there, which sounds odd…I can sort of see the lesson".

There was a general validation of the think aloud topic with all participants finding a suitable place within their scheme of learning to insert the lesson. Although some participants saw this topic as a one-off lesson, the nature of English as a subject was captured in its short, medium and long term perspective. Daniel explains "it's not just a one-off skill to visit…. As an English teacher you have to return to skills throughout all of the key stages". Heather says "that lesson is a sort of one-off stand-alone lesson that could be used at any point in any scheme of learning". Ivan thought "there's absolutely no context to that", indicating a preference to contextualise grammar activities. Jennifer prescribes, the lesson "it's got to have a purpose; that sort of lesson on its own wouldn't be any use". Jennifer then concludes, this type of lesson would be suitable for story writing while Katie decides this will be appropriate for descriptive writing. The competent level teacher Eric acknowledges, this lesson will fit in with their current Scheme of Work while Courtney sees this as a "short term, one lesson…but that lesson would be repeated a number of times throughout a medium term plan". Courtney echoes what Daniel has already highlighted about English as a subject.

Focusing on the second research question, reasoning is paramount from interview questions responses of the participants. Judgement is evident when participants comment on making changes to a lesson based on prior learning, prior knowledge. Memory elements are hinted at in very generic terms as some participants refer to available resources in the department (Eric and Heather). Teacher perception about teaching and what it entails was captured in the interview. For the novice, it is overwhelming, for the competent, they feel they are experienced, and the expert keeps the students at the centre of how they think, what they plan to do and how they do it – at the centre of idea creation, implementation, application and

outcome. Problem solving is captured in the interview with the element of change to a lesson due to what is going on in school; school trips which affect group dynamics and planning, short notice room changes etc., as well as expert lesson set up strategy or activity. The language of intuition is captured when the expert comments on pitching the lesson appropriately and also the reference to a missed opportunity. Decision making is also captured in the interview. Most experts make their decisions during the planning stage; content-based decisions, and would expect to keep these, but also allowing a student-focused structure which can be flexible (see Think Aloud). The competent level teacher's decision is based on the structure of the lesson (Courtney). The structure remains the same and the examples within the content might change. For the competent level teacher, decision making will be during the lesson. Courtney approaches planning with the belief the lesson never goes as planned. Inferring from competent teachers, decision making will be ongoing during the lesson; and these decisions could potentially involve content items. With the novice, decision making is an issue and Katie states she is constantly changing her mind. Because Jennifer is going to make changes to a lesson based on prior learning, it seems decisions will be made during the lesson depending on what they evaluate the prior learning of the students to be. Katie explicitly states she will "decide what best fits the class" when responding to the question on "why would you make changes to a lesson idea". Summarily, the expert is cautious with decision making and carries this out during planning. This probably shows a level of confidence in the decisions taken that they are the most appropriate. Therefore, there is a careful combination of confidence and caution. The competent teacher makes some decisions before the lesson and leaves these open to changes during the lesson. In this case

there is decision making tampered with uncertainty. The novice is extensively plagued by uncertainty and decision making is generally experimental.

4.3.3 Reflective Log analysis

For the Reflective Log, the main focus has been the lesson planning sequence. That is, what the participants' description of the lesson is. In relation to the first research question, the reflective log was used to check whether there are any patterns between the novice, competent and expert with reference to lesson planning thinking. For research question number two, the focus is on problem identification and problem solving. I think the reflective log as it is now used in teaching is a useful method of professional learning. However, as shown in this study, other opportunities to engage with the reflective log are missed out with the singularity of problem solving via problem identification. Through this study on teacher cognition which takes a holistic view of cognitive processes, it is evident the reflective log contains other cognitive processes which if accessed actively should reveal greater insights into teaching at the level of individual professional learning, with the potential of expanding into group professional learning. The way things are at the moment with the use of reflection in teaching and research on teaching, there seems to be a minimalistic use of reflection. Most research on teacher cognition identifies decision making as pivotal to teaching. Growing trends in research propound the benefits of reflection and this is an area which is actively pursued in teacher education, with positive outcomes. This current study highlights that the reflective log has embedded cognitive properties which should also be made explicit and examined. One way to make the cognitive properties of reflection overt is to engage with the seven cognitive processes currently in use in cognition research.

This study, in capturing the core components of the reflective log espouses the reflective log as a retrospective planning opportunity. The participants in the study have tended to state what they would do in a similar situation in the future. This is commendable. However, the question is how far into the future such a situation should arise. It seems, this is what the experts would categorise as a missed opportunity. With the non-expert, identification of reflective-worthy incidents comes after the teaching. Experts aspire towards prompt identification and in situ modification of the lesson. This means the expert 'reads' the lesson accurately and even avoids the problem before it occurs. This is not to say there is no need for reflective practice by the expert. When the expert engages in reflection it is with critical understanding of the occurrence of a missed opportunity almost as if it was embedded in a critical incident report. The similarity between all levels of expertise development is in the effective use of memory to locate the reflective episode. Interpretation of this episode shows a sharp contrast between experts and non-experts. The non-experts will confine the identified problem to be solved in a future lesson; hence prospective planning, while the experts seem set on a reflection embedded in the retrospective planning. The expert allows this missed opportunity to linger slightly longer in their thinking as it should have been within the lesson as it was taught; where and how it should have fitted in. There is less urgency to move on to what would be done in a future lesson. Whereas with non-experts, there is a swift move from problem identification to planning for a future lesson in which problem solving of this issue will occur. Therefore, a subtle difference between the experts and the non-experts with reference to reflective logs. Experts 'see' the reflective log within its original lesson whereas non-experts remove the reflective log from the original lesson into a future 'new' lesson.

Time was a prominent factor in the reflective log. This was usually presented as the reason why a lesson did not go as planned. For the competent teachers, insufficient amount of time was usually cited. Courtney states 'the key issue was time' and Eric also says 'the issue was time…the mistake I made was in timing. I'd over-planned for the lesson'. The situation with the novices was slightly different. Jennifer found herself in a situation where "they [students] all wanted my time". When an expert alluded to time it seems to be a one-off situation when they had more time than they had planned for "it's quite unusual that I'm under with my timing. I'm usually over" (Heather).

There is evidence in the reflective log that when novices and competent level participants think about their lesson, there is inward-facing thinking which expresses what the teacher wants, plans for, or intends to do. The experts tend to reflect via an outward-facing medium, that is, what the students want to do. Ivan allowed the lesson to divert from the plan "there was a kind of positive switch here from teacher as authority to students as authority". For Felicity "I don't think my questions would have delivered the same level of understanding that they'd already got themselves", also reveals an embedded confidence in the ability of the students beyond their (teacher) perception. During planning the perception of Felicity of the potential of the students to rise to a challenge was slightly conservative. When the teacher could reason that their perception could potentially limit the students, the decision was "I just let them get on with it and I think that's something that an experienced teacher may find much easier to do".

Aspirations have also been captured in the reflective log. The expert is resolute in setting the bar high. Although using knowledge of data items about the students indicating some limitations in learning skills of the students, Daniel says “I wanted every child in there to write a sophisticated film review for a particular audience”. With the expert, every child does really matter and Daniel reflects on the outcome by saying “I hadn’t taken the whole class with me”. The decision to challenge the students in this case has been taken irrespective of the data presenting a picture of learners restricted by curricular levels. Unlike aspiration, where the teacher plans to take the learners to a particular point, there were cases of expectations where the teacher knew how far they expected the learners to go and pitched the lesson within reach; that is, challenging still, but contained within expected limits of tolerance. Felicity found that when this was done, the students rose higher than expected “I was underestimating my students, which I clearly did and I think that’s where it didn’t go quite to plan”. Gemma also has a similar experience “Yeh, the change was down to me not really thinking how long it would take”. For Ivan, the students showed knowledge beyond what was planned for the specific lesson “another reason that made me change, they were beginning to refer outwards to the Gothic which should be covered in the near future lessons”.

Whereas the novice (Katie) was restricted to a single lesson and conditions which affect that individual lesson “so the issue that made me change was obviously the [lack of] booklets”, for the experts, the key to lesson planning and staying on or verging away from a plan related to their ability to plan a series of lessons (Felicity), a sequence of lessons (Heather), know what would be covered in the near future lessons (Ivan). At the competent level, what is

evident is a constant battle between where the students are and where they should be, and how to pitch the lesson at the appropriate level. When the competent teacher (Courtney) identified a problem with the lesson, the immediate reaction was to take the lead. “So, em, and also the, what I’d planned was they would annotate the quotes and then they would provide the analysis but because it was the first time we’d done it, they were very uncertain in their analysis on quotes. So, when we were actually doing the feedback, rather than letting them take the lead, I took lead and then I asked, trying to facilitate their group to just jump in with a few points and then we had to chop, chop the end of the lesson, em, so we’re kind of stopping mid scenes. So the reason for change would be their uncertainty because they haven’t done that kind of analysis before”; Courtney, as well identifying that the prior knowledge is not as well embedded as initially perceived, makes this discovery during the lesson and takes the appropriate step of acting on it. However, this poses a new problem for the competent teacher; timing. In a similar scenario, the expert teacher allowed the students to take the lead instead. The competent teacher also highlights the emotional component involved in pitching a lesson at an appropriate level “I didn’t want to make anyone upset” (Courtney). Where the expert is involved in swift decision making, the competent seems to undertake a laborious time-consuming step by step processing, resulting in insufficient time to complete the lesson, as all of the competent teachers in this study have declared.

The expert decision to allow the lesson to go in a different direction has been explained as a result of higher levels of student knowledge and learning skills. When the competent level teacher (Courtney) presents the reflective log, the conclusion is “so the reason for change would be their uncertainty”. In self-evaluation, the competent teacher does not seem, in this

instance, to focus on their own teaching. This is contradictory because in the planning, or think aloud, the main focus of the competent teacher was identified as teacher-centred. The novice (Katie) says "I had planned a really good lesson, but what happened was the booklets that they needed to use were being used by another teacher". There is variation in what constitutes planning. The novice perceives planning in a singular perspective (teaching), almost as if in the here and now, with limited view of what happens after. Therefore, lesson planning for the novice is within the perspective of an isolated event. There is an indication that with the novice planning could rely potentially heavily on lesson items (hence the tick sheet format alluded to in the think aloud) which when removed could destabilise planning. The competent shows an awareness of the dual (teaching and learning) component of lesson planning. Although the competent level teacher shows this awareness, there seems to be an embedded requirement in their cognition for the ability to remain in control. Should there be anything to sway the lesson in an alternative direction, the competent level teacher becomes reluctant to let go or allow the lesson to flow in a new direction. Experts seem to relish the opportunity for the lesson to evolve in new ways. This is generally in ways which go beyond their original plan. It is clear the expert knows various potential trajectories of the lesson and is comfortable with the students choosing one of many ways of engaging with the learning.

After the self-evaluation, the experts seem to look back at the lesson; lesson outcome, with a sense of pride in what the students were able to achieve and also the learning thresholds which the students were able to cross. Ivan says 'in terms of outcome, yes we went in a different direction" and Felicity concludes "I didn't think Year 9 would be able to engage with this". There is a positive reflective focus for most experts and in the situation where the

expert did not feel all students had met the high expectations, there was a sense the expert will not give up and will continue to challenge the students; “they just wanted to gloss over it and move on which means they were never gonna, I suppose, to, repeat or to reflect those skills in their own writing” (Daniel). The competent teachers, rather than spending time understanding the lesson within its unique context move on swiftly to plan for a future lesson. Eric says “subsequently, when I was planning for that group, I was able to take into account how long it was gonna take them to do this kind of work”. Where Daniel seems to stay resolute in moving the students up and beyond data predictions, Eric moves the planning down to accommodate student prescriptions. The non-experts are critical of the student-engineered change to the lesson. Jennifer explains, the lesson did not go to plan because students were “lazy” to read the detailed written feedback which was provided. Courtney says “we had to cut what we were doing in the lesson” in order to deal with the “uncertainty” which students had. It appears the non-expert considers these student-oriented lesson trajectory changes as hindrances to the flow of the lesson. On the other hand, the experts consider these as areas of interest for the students and as Ivan declares “so I decided to strike the iron when it was hot”. Ivan explains “this arose because clearly in feedback and in discussion about the sequencing of the narrative, students were becoming more and more fixated on the narrator. That was their interest rather than the narrative structure….”

4.3.4 Questionnaire analysis

Expert status validation was first of all acknowledged by peer recommendation. An initial meeting was organised with the expert were they validated their expert status verbally. The questionnaire allowed the expert to provide a written validation of their status which included

expert status titles, exemplification of expert duties, for instance Daniel writes; 'AST deployment in over 30 schools'.

Information on qualifications generated by the questionnaire highlighted a key finding; the majority of the PGCE route teachers, except for one, went on to do a further degree; DPhil and Masters. Both of the expert teachers in this study who came into the teaching profession through the GTP route do not have a further degree. This is the case for both the male and female participants. It is important to note, although Daniel does not have a postgraduate degree, their membership of a subject specialist professional group –National Association for the Teaching of English (NATE), puts them in a unique position among the other experts.

For degree subject, all the male participants studied for a degree in English and all the female experts read English Literature at undergraduate level. Three teachers had Drama as their teacher training subsidiary subject (both male and female), one did not take a subsidiary subject, and one studied classical civilisation.

Most experts, in their planning have emphasised the importance of careful choice of exemplar material. Capturing reading as a hobby for most experts highlights their comfort with reference to choice of text, extract or material to be used when planning a lesson. This solid foundation of content knowledge facilitates pedagogical content knowledge application by the experts. This comfort of the experts in text usage could be contrasted with the non-

experts who have tended to make reference only to the text which they were teaching at the moment, with no reference at all to other possible texts they could draw from. Whereas with the experts, they delve into memory and go for non-set texts (as highlighted by Heather, in the interview about choosing from the literary canons to challenge the students), that is, texts the students are not currently using but which could be suitable for the topic of focus.

Non-experts, when they have needed to create examples, have written these themselves, for example Courtney. But not enough detail is provided on what this contains just a reference to the complex sentence which she will create and also a sentence stem. But Ivan provides a detailed explanation of a lesson where a task sheet had been created as stimulus for an activity which included 'made-up' character descriptions and information, as well as misinformation. An explanation of how this was used in class was presented including the outcome of its use. The expert had detailed knowledge of the content of the task sheet which he had created, and he was able to answer questions asked during the lesson; showcasing writing expertise and spoken /verbal expertise of task prompt creation. Within the questionnaire, Ivan highlighted writing as a hobby and indicated a published author status.

Years of experience, focusing on identifying minimal number of years arriving at expert level, the minimum amount of time to become expert was six (6) years (Gemma); Gemma has not recorded any other leadership roles prior to becoming AST. The highest number of years of experience has been accumulated by Ivan: thirty-five (35) years. The total amount of years of experience across all the experts in this study is seventy-six (76). In more specific

terms, two of the experts have spent almost one decade in the profession, two spending approximately two decades, and one just over three decades. Expert composition of this study therefore captures an insight into developing expertise as it has been experienced over three decades.

Linked to years of experience was also career trajectory; that is, interest in the roles the expert have chosen. Another dimension to this was to find out how the experts have moved within and across schools. It was illuminating that the expert with the longest time in teaching has worked in three schools and one university. The expert with the least movement has spent 14 years in one school. All experts have shown a level of stability, with the exception of Heather. The highest level of movement is captured in the trajectory of Heather; eight years as teacher of English in three (3) schools. This could tie in with the understanding that experts need stability in order to thrive.

Experts were asked to provide information of a previous job before joining teaching. All experts had a role outside teaching prior to becoming teachers. These roles included; retail management, pub management, advertising and marketing, contact lens dispenser, shop assistant. Prior experience seems to have been within a highly visible customer facing role which appears to require excellent interpersonal skills. It is also clear some of the experts already had management experience before joining teaching. There is a possibility past leadership experience could have facilitated experts' movement into school leadership as well as their ability to thrive. For Daniel, for instance, there was the pub management role

outside of teaching and then while in teaching the roles were: whole school literacy coordinator, Head of Department, AST, Literacy Consultant, then, Assistant Headteacher. To summarise, two of the experts were Assistant Headteachers, one noted their role as Subject Leader for English, the other as Head of English department, and the other participant specified one role only; the AST role. The participant with the exclusive AST role had the least number of years of teaching experience.

Hobbies and interests showed some uniformity and diversity. All the experts did some form of sport with males doing football among other things and female participants choosing other sports, for example; swimming, tennis, boxercise. A minimum of four hobbies were engaged in by the experts, with ten being the maximum. All the teachers declared reading as a hobby except one (Heather), being in the unique position of citing photography as a hobby. Cross-referencing the questionnaire to the interview by Heather, there is mention of delving into the literary canons when planning a Year 7 lesson in order to add challenge to the lesson. Inference could be made in this instance that for Heather, reading is incorporated in the job role of an English teacher, not necessarily a hobby. Theatre; reflecting already stated popularity of drama as teacher training subsidiary subject, and music also featured prominently as hobbies engaged in by the experts.

4.3.5 Stimulated Recall analysis

The first point is Stimulated Recall (SR) is important as a way of delving deeper into the mind of the expert. The expert has already provided one layer of thinking, then a second

layer of thinking is captured in the SR. This provides a level of clarity and an insight into the mind of the expert. As a researcher on thinking, this is most helpful as I am not in doubt of what the expert actually means. Based on the characteristics of qualitative research and its focus on interpretation, SR is ideal because it permits a first layer of interpretation based on the thinking of the expert, a second layer of interpretation based on answers to embedded questions, finally researcher's own interpretation.

Recurrent vocabulary within SR data constitute: engagement, ownership, responsibility, challenge, extension, example or exemplar material. Daniel and Ivan opened their lesson with a particular emphasis on engagement. Daniel gives the reasoning behind "hooking students in the beginning" pointing out "it gives children ownership, responsibility". A further layer of reasoning about responsibility is evident in the example about creating groups with instruction givers, including the explanation of how this is done, concluding with emphasis that the instruction givers are accountable and they "ensure that their task is not only understandable but also completed". When Gemma introduces responsibility the target is peer assessment "it's always really helpful, I think, to be able to do that little peer assessment at some point in the lesson because they are em sharing the responsibility of learning and also they are beginning to learn from each other". Heather will allow students to make their own decisions on how they intend to go about learning because "students need to take responsibility for their own learning, em, because there is a difference between teaching and them learning". Similar to Heather, Daniel says "the lesson may have a journey or a clear pathway but I do like to negotiate and allow children to choose some elements er that they can jump on and off at different parts". Ivan links these notions of responsibility to

planning “planning [by experienced teachers] has a degree of flexibility especially if it’s involving unknown and unpredictable elements.”

Ownership is another key area of focus for the experts. Felicity explains “I think it gives them a sense of ownership of these frameworks. The concept of owning the learning could be linked to the illusion of control which Ivan introduces, “ there’s a suggestion, even if it may be something of an illusion, a suggestion that they’re in control of the lesson as opposed to me be being in control of the lesson”. And as Heather explains, although within the context of assessment or evaluation; “ I can mark every single thing that they do, but they need to understand what it is I am marking and that they can apply that to their own work, whether it is self-assessment, or somebody else’s which is peer assessment”. The distinguishing element from this example is knowledge application. As concerns the expert, the planning will be thorough, the teaching will be at an expert level but it is vital students contribute to this through ownership of the learning. It seems, only then should the real heights of expertise be attained.

All the experts acknowledge the importance of challenge and planning which incorporates an extension opportunity. Daniel suggests “I don’t think that learning should be difficult, it should be challenging”; Heather states “it is important that they are challenged”. In seeking to incorporate challenge, the difficulties which this encapsulates are revealed. Felicity comments “so in my planning I didn’t necessarily want to limit them with their particular outcomes”, Daniel indicates “I am consistent in having high expectations”. In order to arrive

at targeted outcomes, Felicity chooses "to give them maybe a starting point but equally look at what they're comfortable with and what they are not so comfortable with and that informs my planning for the rest of the lesson". Felicity seeks a "comfort zone" from which the learning could be launched. Accuracy in locating this comfort zone is critical. Gemma will provide exemplar material. However, there is a difference; rather than displaying a ready-made exemplar material, Gemma explains "what I try to do is if I set a task…as they are writing the task, I would also be having a go at the task on the whiteboard using some different texts, em so that they can't copy it but they do understand it".

Apart from the difficulty of pitching the lesson at an appropriate level, Ivan introduces pace as another element which should be considered, "the start or early shots of a good lesson em need to create that momentum and stopping to reflect too much reduces the pace of the lesson". The two key considerations during lesson planning are: pitching the lesson at an appropriate level, and establishing and maintaining an appropriate pace. These are simple components understood by all teachers, however, this study has provided an insight into the cognitive complexities involved in implementing these relatively simple concepts.

Memory, specifically the area of remembering is captured by Heather. In terms of cognitive processes, Heather incorporates the interactive format "because I think that when you are teaching grammar, it can be flat and you want them to be able to remember". Heather therefore reveals the reasoning embedded in the use of an interactive teaching method showing its links to the cognitive processes involved in learning. Ivan hints at an interactive

method or collaborative work with the mention of "group work". According to Ivan "there's a sense of em the children being relaxed because they are working with others there, it removes the fear factor of failure or getting things wrong", which also captures a form of learning which involves interaction with peers.

4.3.6 Expert Commentary analysis

RESOURCE 1 (Ellen)

Based on the lesson by Ellen, there were a number of areas the experts commented on. There was interest in the learning objective and the lesson outcome. For Felicity, requirement of a clear link between the two is vital. For Daniel, there should also be careful thought about the sequence of learning objectives "interesting that she's put - to be able to explain what a complex sentence is - as the third one er (pause) rather than - to be able to explain first - and then apply that". Gemma describes the starter activity as 'nice' and as the lesson idea develops remarks positively on the use of an "imaginative task". Daniel, however thinks the lesson needs "something more imaginative er that would allow them [students] to be creative…but also memorable", as Daniel questions "how is this gonna stick as a piece of learning"? In sum, lesson objectives, lesson outcomes, imaginative task usage, opportunity for students to be creative, linking learning to memory; with regard to retention and retrieval, are important areas to think about when planning a lesson.

When it comes to structure, Felicity says "I think the sort of structure within the lesson would work well", and Daniel comments, "it just seems to be a straightforward literacy lesson".

Ivan comments the lesson has “very clear steps which are logical and er build upon each other”, and this is similar to Heather who also refers to “building blocks”. This step-by-step approach is applauded by the experts as a requirement for lesson thinking and lesson planning. The complexity though is in achieving a balance, a situation Ivan highlights with the comment “it reminded me of a military campaign model of er constructing a lesson”. Daniel captures this issue of balance by declaring, “it [the lesson] seems to just stop short of having true value”. Inference could be made that the structure elements of the lesson are present but the content elements require developing. It could be summarised that the observable components of the lesson are in place but the level of cognitive processing with regard to the planning of this lesson appears to be superficial.

With the structure elements, Daniel indicates that for the starter “I’d want some sort of hook”, Felicity says “we have here quite a mix of learning styles which em is good to see”. As the planning progresses Daniel asks “where’s the scaffolding for them”? There was difference in opinion about the extension activity. For Heather the comment is “I like the extension task which stretches the students to think about the differences” while for Felicity, the extension task comes across as “quite challenging”. When challenge was needed for the more able students there was a general consensus between the experts that this was not carefully planned for. Felicity states “I think that might be a little em limiting for some of the gifted and talented” and Gemma adds “that would be something that every, that all of the students should be doing…and I think that would be a problem with expectations if you were just getting the more able to er do it”. The worry for Daniel is captured in “I wonder how students can monitor their own progress”. With reference to monitoring progress, Gemma identifies

"oh, I see there is a criteria here; level 7s use all complex sentences, Level 6 use four complex sentences. Em, I don't think it's quite this simple in English". Ivan similarly does not approve of the way tasks have been allocated to the students to show differentiation. Although Heather identifies the use of differentiation in Ellen's lesson, there is the admission that "may be there could have been more support for the em lower attaining students". Concerning feedback, Daniel does not see a requirement for whole class feedback. Based on the overall evaluation of the lesson, Ivan wonders "if something interesting happened, is there the flexibility in the lesson to change direction? I doubt it." Felicity's evaluation ties in with the concern raised by Ivan with the identification of a missed opportunity for cross curricular links to MFL. According to Daniel, the lesson, "it's fine in terms of a baseline audit" and "it is quite a safe lesson ….that's not particularly risky". Contrary to all the other experts, Heather evaluates this lesson "as a really good lesson" and explains about an activity which is used; "so not too dissimilar to sort of things that I would have done". This evaluation by Heather, though not conforming to that of the other experts, serves as a link between the data collection methods since Heather appreciates, during the Expert Commentary, in another teacher some components which she has already commented on about her own teaching in the Think Aloud and other data collection methods. This shows a level of stability in thought processes which this study has actively sought.

RESOURCE 2 (Raymond)

For Raymond's lesson, Heather seems to tick off all the structure elements; data check, additional educational needs, starter and previous learning, use of questioning,

differentiation, lesson development, extract (text) used, and concludes despite listing these "gosh, I'm struggling to understand this". Felicity is more specific regarding different parts of the lesson; "starter activity…I think em a little bit vague", goes on to say "the mini plenary…I think needs to be a little bit sharper". For Ivan the starter "is a non-event" because it is abstract. For Gemma, this lesson needs the following: clear organisation of planning, clear use of Teaching Assistant (TA), clear differentiation and also assessment criteria. Focusing on the content of the lesson, Daniel says "I cannot see how this lesson er is is gonna stretch every learner in that class because there's not sufficient thinking from the teacher". Teacher thinking comes into focus again when Gemma confirms "I'm not 100% that this student, or this trainee teacher, this teacher em had really thought in too much detail about how their lesson is going to go". This aspect of teacher thinking could be concluded with Daniel's comment; "I'm not convinced this teacher has planned this lesson meticulously in his head and I'm probably going to suggests it's quite a reactionary lesson rather than a proactive lesson".

In terms of lesson sequence, Ivan concludes "there doesn't seem to be any kind of logical progression". Felicity summarises "so again, I see the starter, the development, the em mini plenary, but again I think we need a stronger sense of what it is the students are trying to achieve". Reference to lesson sequence highlights a greater focus on content elements which Raymond does not seem to incorporate effectively. The issue, however, for the non-expert is the experts refer to the lesson components in abstract terms; for instance "a sense of" and "value". These could be described as abstract features. Although this adheres to research on expert development in view of the characteristics of experts, it is not easy for non-experts to

capture these attributes, not least experiment with their use. The development part of the lesson also presents issues with the choice of the text to be used in relation to the lesson focus, both Gemma and Ivan take issue with the use of the text. For Gemma, the text might be a challenge for the ability of the group, whereas the issue for Ivan concerns grammar structures usage by a specific character which restricts enhancement of students' knowledge and use of complex sentences. While Gemma wonders "how are they going to evaluate their own practice", Daniel concludes, "I think it is a very limited lesson", with Ivan confirming that "the entire thing seems unfocused".

RESOURCE 3 (Sue)

Sue's lesson objective receives approval from Gemma: "Good, that's nice…the students know why they're learning it…so that the students know that there's a purpose to this". Based on the objective Daniel says "so already that's that says to me we've got something that may be pitched quite high". Speed in capturing the interest of the students is the focus for Felicity "I like the idea of them, of the students being aware very quickly about why they are studying complex sentences". The development part of the lesson shows some areas to be worked on despite Daniel's anticipation "let's see how we move through the stages, of em understanding, then application and securing that". Ivan takes issue with one of the activities which requires students to dip into memory as far back as infants or junior school. Felicity approves of how modelling is used and Heather approves of the development activity especially the use of an example. Gemma commends the fact that "they [students] are sort of finding out for themselves" and Heather also agrees with this level of students taking

responsibility for their own learning “I like the fact that it is making the students think about the different types of sentences and for them to recognise the distinction between the two. The onus is on them”. Felicity acknowledges “I think we have essentially a lot going on in the lesson”. There is a positive again when Gemma declares “this is what I mean by the value of showing them rather than telling them”.

When providing an overall evaluation of the lesson, Felicity says “I think there is a lot of potential here for showing students how to er develop as well”. Ivan worries “I’m finding it hard to actually imagine this lesson unfolding cohesively”. Despite the initial positive impression, Daniel decides that the lesson is “just one size fits all” and this makes it “limited”, particularly the use of differentiation. Felicity suggests ways to “develop this [lesson] a little further”, one area is feedback. Gemma comments, “there doesn’t need to be much feedback time or feeding back to the whole class; there’s no reason they cannot feedback in groups”. Enhancing the plenary is another area. Gemma discounts use of whiteboards while Ivan says “mini-whiteboards, if they are going to be used ought to be used throughout the lesson”. Daniel thinks it “would be nice to see what the resources are because this could be a good lesson”, while Heather summarises “so I think that would be a strong lesson as well”.

In sum, experts identify some pertinent areas. First, insight into what directs judgement by experts; similar lesson to theirs, something different which they have not used before, focus on the students, teaching strategies, cognitive elements of the teachers and also the students,

affective elements, for instance boredom of the children, engagement, etc. The next area of interest to the expert is value. While Daniel seeks "true value" in the lesson in general, Gemma identifies one example; "this is what I mean by the value of showing them, rather than telling them". The nature of feedback is pivotal for experts. Gemma says "there doesn't need to be much feedback time, or feeding back to the whole class; there's no reason why they cannot feedback in groups". Daniel also agrees that feedback does not need to be whole class. So far, Heather's evaluations have been slightly different from the other experts. For Ellen, Heather says "I think it's a really good lesson", and for Sue, says "So I think this would be a strong lesson as well". Despite this difference, all the experts are unanimous with appraisal of the lesson thinking by Raymond; incoherent.

It seems there is clear agreement in knowledge of a limited lesson whereas judgement relating to a lesson of value is more contentious. Experts express their thinking about each lesson with language which captures lesson potential, with words such as "strong" and "limited", rather than declarative judgements. Data from the Expert Commentary could be said to highlight individual differences in interpretation of lesson evaluation criteria; an awakening to the complexities inherent in this domain. Also, references to cognitive features of understanding, 'seeing', and feeling or thinking are prominent in the expert commentary data; a validation of the cognitive-based nature of teaching at the point of planning, implementing, reflecting and evaluating.

4.3.7 Critical Incident Report analysis

The Critical Incident Report (CIR) constitutes reflective episodes by the experts. The data shows a similarity between CIR and the reflective log with the retrospective narrative component. The difference however is in the criticality of the reflective episode. As patterns in the experts' utterances indicated, a significant change ensued during the lesson based on their prompt identification of the critical moment. The critical moment, I believe, is that point in the teaching when the teacher has prised all the cognitive processes involved in teaching within the minimal spectrum of seconds to forge a productive way forward with the lesson. This is a critical moment which the experts typically strive not to miss. There is a heightened sense of urgency regarding identification and the speed to act on the situation; and it is only a moment. Criticality adheres to retaining the flow of the lesson. The expert has to recreate a part of a lesson based on a combination of cognitive processes arriving at a decision on how to act and/or proceed. This means the teacher 'reads' the lesson accurately, engages in problem identification, reasoning how and/or why this problem has arisen, dips into memory to locate outcomes for a similar or exact past occurrence, generates a solution based on teacher judgement, implements a decision which ultimately reveals that the intuitive divergence from the original plan has led to a more positive learning experience. Teacher cognition quality and the embedded cognitive processes might not be overt for observation. A change in the lesson plan (if written) can be observed, reasons for this change could be explained but the complexity and expedience of the implementation is potentially difficult to capture. Contributions by experts in this study highlight the complexity and expedience involved in teaching.

From the data, CIRs were based on a range of moments. The joy of a teacher when one student shows evidence of making significant progress or crossing a threshold in their learning journey, as well as what happens with whole group or class learning. Teaching methods were also revealed and cross-examined by the experts themselves for strengths and weaknesses. Planning at expert, and probably, proficient levels were also captured. An example of non-context specific, non-specialist subject teaching was also presented. In the exploration of the above, emotional components of planning as well as cognitive processes involved were delved into.

Heather, despite identifying a whole class learning issue -analytical skills, is able to narrow down on individual students noting and celebrating their progress as evident in "the weakest student in the class came up with a comment about…and it was wonderful, it was a wonderful moment of realisation from her". Another example of whole class problem identification, problem solving and celebration of strengths of individual students is captured in Daniel's example; "Lots of small group sessions then ensued er where instead of having whole class feedback they would feedback er within groups to other groups; er the captains or the assessors would happily go to other groups to assess, peer mark, offer feedback and set targets". Daniel describes a situation involving a group of high achieving students who collectively were reluctant public speakers, a situation made worse by the presence of anyone, except their class teacher. In the example provided by Daniel, this actually created a problem during a lesson observation. This is an interesting case of a well-planned lesson which will just not take off (at the level reflective of the potential of the students) due to the emotional needs of the students. It must be clarified the teacher has good rapport with the

students and students, although reluctant public speakers, have made contributions albeit minimal. This critical incident report shows that the expert has a good knowledge of the students, but unfortunately could not accurately measure the emotional need of the students. This lack of accuracy affected the outcome of the observed lesson.

Teaching methods came into focus with the use of CIR. While Daniel describes how lessons were diversified to engage the different types of learners, Ivan presented a typical example of meticulous planning. Daniel says "we did a lot of shared writing or pair writing so breaking the task down so they didn't have to write extended pieces of writing all of the time er and then using little tricks like using mini whiteboards or allowing them to write on the big boards, perhaps using wireless keyboard, so not always pen based writing on a sheet of paper". From Ivan's perspective engagement of the different types of learners was also key, as is the case with Daniel, although in Ivan's case these were high achievers "Em, the the resource I created was what I call the invention of er dilemma and contradiction. By which I mean that the fictitious biographical information which I supplied to them was deliberately constructed to produce confusion and ambiguity through a mixture of precision, half-truths, ambiguities which require the students to er resolve er er through discussion, logical processes of er the thinking, imaginative reconstruction of er what was in front of them on the er on the paper." This captures the intensity of teacher intervention through planning, and the challenges irrespective of student ability. In planning a lesson, the experts carry with them detailed knowledge of the students coupled with an excellent relationship with the students without which the heights of teaching expertise might not be attained. This is captured when Ivan reflects "So that seemed to me to be the key to the er the key to success,

because the key to success ultimately was the students pretending or accepting the pretence that er this was a real conspiracy. The lesson of course would have fallen completely flat if they just essentially downed to working imaginatively and said to themselves that it really didn't matter at at all".

When Heather had to teach a lesson outside of her subject area, an opportunity for an insight into expertise as context-specific opened up. The lesson was taught in a classroom not used by the teacher, and in a non-specialist subject area. The first issue which the expert cites when providing this CIR is how to handle prior learning and the strategies to put in place to swiftly ascertain prior learning, the result of which would determine how the lesson should then unfold. "The night before I thought; I don't know if they have actually been taught this subject before so I'm going to have a contingency. So on a piece of paper I just wrote down, or typed it up rather, what I would do if it became evident from the starter that they knew the topic better than I had assumed." Expert level performance, it seems, is heavily reliant on a sequence of learning without which flexibility in teaching may not be optimal. One therefore wonders whether one-off master classes showcase expert performance or the potential of expert performance in a specific domain. It is possible the performance by Heather during this lesson reverted to proficient level experimentation rather than expert level flair. This conclusion could be drawn first of all from the limitation in planning due to no knowledge of students' prior learning, limited subject knowledge since this is not the teacher's specialist subject, little knowledge of the non-data related attributes of the students and minimal opportunity to build any relationship with the students. Although Heather's self-evaluation and peer evaluation indicate positive outcomes, Heather seemed focused on the difficulties

encountered in planning for context-free expert teaching. The lesson learned by the expert from this experience is: “it made me realise actually there is no point in continuing with a lesson just because you’ve got it down on paper and you’ve planned it, and actually if things do need to be changed, then that is what has to be done”.

The emotional components inherent in lesson planning were also captured in the CIR. Felicity explains “For example the poem that they had to analyse in that particular exam room related to the idea of being alone, loneliness as a theme, being alone, being away from other human beings. For probably a good 90 per cent of the year group em who sat that mock exam, the idea of being alone is em a weakness to many of them and er it was quite interesting when you presented them with a completely different viewpoint. They they saw it in a completely different light”. Primarily, this exposes the necessity of teaching to allow students to evolve into non-content specific learners; which is what the expert showcases here with the exam question which is on an unseen text. There is a fundamental flaw in learners limiting their analysis to their own personal experience and also potentially cultural limitations of literary concepts. Felicity advises “I think for for planning if you can try to pre-empt moments of misunderstanding or misconception which often occurs in in er teaching, em that’s another way of trying to solve any future issues where pupils leave the classroom without having really fully considered literature or a text that might present a range of interpretations”. Heather’s example highlights the emotional component of planning, with another exposition of how the best laid plans could be limited not by academic ability but by the emotional needs of the students. Possibly, by associating any learning challenges students might face with emotional needs, experts take a different route in planning. Expert planning

therefore takes away, or at least seems to discount any behaviour-related connotations linked to the academic performance of the students, and their central focus goes beyond the behaviour and delves into the root of the problem which is an emotional need; in the case of the example by Heather; poetry phobia "And I know one of the other problems they have is that poetry sends them into a panic. And em for their poetry exam they have to analyse an unseen poem". The expert is able to pre-empt and solve this problem during the planning stage thereby wiping out its potential manifestation in the lesson.

Critical Incident Reports reveal endless processing of lesson planning by experts. Experts continuously re-work their planning, experiment with various strategies, dip into a bank of outcomes and ensure every student is well catered for; enhancing of which continues during the interactive phase. The expert plans meticulously prior to the lesson but leaves enough space to enhance the lesson should an opportunity present itself. Therefore, having planned the lesson thoroughly, the expert remains vigilant for critical moments. This is captured by Ivan "to my mind, the lesson was perhaps based upon what you might er call hidden planning". Concerning experimenting, Daniel says "to er acknowledge that what I was trying to do wasn't the most effective way to stimulate and challenge that group of students". Daniel concludes thus after experimenting with a previously successful teaching method with a parallel group, producing minimal effect with this current group.

Cognitive processes were evident within the CIRs. The statement "I had a critical incident I think a few weeks ago with er my high achieving, very motivated, mature Year 13 Literature

class, er where they were getting tired of the sort of didactic er, teacher-led chalk and talk approach, then analysing literary texts" might contain some elements of intuition. The data and lesson performance description of the group highlights evidence of compliance "high achieving, very motivated". But beyond this description, the teacher is able to sense the feeling of tiredness and begins to self-evaluate; targeting teaching methods. This expert has a system in place which seems to work very well but they are looking for ways to perfect this.

Another area of focus is decision making. Decision making with the experts was interestingly inclusive of the learners. Daniel says "I told the students what my intentions were for them for the ensuing weeks and they were happy to divide the work among themselves and take responsibility for set texts, set authors, er and were more than happy to hit the success criteria, look at the assessment objectives, and to er, formulate the project-based approach to what we needed to cover". Accessing the cognitive processes of decision making, is therefore an expectation for both teachers and learners. This could signal a merging of expert teaching ability with excellent learning skills.

Teacher judgement is captured when Felicity reflects "I'm thinking here about a critical incident that was about a light bulb moment; a moment in which the student had fully appreciated what they had done wrong and hopefully how they could improve". The expert supersedes their own judgement by igniting students' own awareness of the need for judgement. As Heather puts it "it was evident they were well ahead of me, that they knew a

lot more than I thought they had and therefore I was going to change my plans and this is what we're going to do. So long as that is explained, to the students and you do have enough knowledge to be able to adapt as you go, then it is always something to think about if you can see that the original path you were going down isn't the right one and you need to change". These two examples indicate teacher professional judgement and student self-evaluation. In the example provided by Felicity, the teacher had arrived at a judgement which the students did not share and the teacher needed to bring the students to 'see' the issue clearly before progress could be made. In Heather's case, the students' self-evaluation, although not expressed, revealed they were ahead in their learning contrary to where the teacher judged them to be. Teacher judgement and student self-evaluation need to align in order for progress to be made. Until this alignment is in place, the lesson is potentially going in parallel directions.

Reasoning is captured in the utterance by Ivan "most importantly from er from my point of view in the broad context of the work we're doing, you don't go to the students with the world of Shakespeare without them really being er aware of it". There are hints that teacher planning is guided by underlying reasoning cognitive processes. Reasoning, Ivan states, determines how much planning is necessary prior to exploring the core areas of the Scheme of Learning around this Shakespeare text. Another feature is relevance. Ivan recreates the texts, then supports the students to personalise the events by becoming characters and taking roles in decision making, arriving at judgments and engaging in reasoning. The background to the text is personalised as well as the text itself. Evident in these examples is the interplay of cognitive processes.

4.4 Analysis based on levels of expertise

4.4.1 Analysis of Novice teachers

Patterns in novices' data confirmed theoretical knowledge, although there was recurrent listing of lesson elements. Jennifer; "At that point your differentiation would be how difficult, may be they'd sort it on the tables, the higher ability would have a higher ability sentence, the lower ability would have a more simple, but still a complex, but a more basic complex sentence there". As suggested by an expert during expert commentary, there could be an issue with setting high expectations or even excluding rather than including, with the manner in which differentiation is used. Another example by Jennifer; "you got a normal learning objective and you've got a challenge, for differentiation as well. And then they can peer assess, based on em, I'd probably use a pupil picker for that based on em random name generator; so I've got some questioning techniques in there, peer assess; I'd probably get some on the visualiser for pupil picker so I can mark one of them and they can peer assess, so I'm modelling". There is a clear focus on the individual lesson features that must be contained in a lesson plan, with minimal focus on their effect on the lesson. Evidence that there was limited experience and/or limited evidence of a bank of taught lessons or even evidence of a new lesson idea being created. This picture of the novice is captured when Loughran (2006, p.45) predicts "it is not difficult to see then that the 'hunter-gatherer' approach to accumulating teaching procedures may well prevail as a major purpose of and discernible outcome from, learning to teach."

Teaching was often teacher facing. Jennifer says “then I start going in and putting in all my differentiation as well, so building up my work sheets, learning objectives – make sure they are differentiated, and then I’d go through each task and make sure they are building on one another at the same time”. The emphasis is on what the teacher will be doing, what the teacher will have in place ultimately leading to what the teacher wants to happen in class with minimal scope for the students to significantly contribute to this. Katie confirms “I think about the PowerPoint slides I’m gonna make, to be honest, because I work, I work really well with my PowerPoints, I am quite a creative thinker. So I think about what kind of images I could use or what kind of shapes I could use or colours, cause I think if they are quite monotonous, PowerPoints don’t really work. So I definitely think about how I would fit the things I am putting on paper on PowerPoints but also how much I would have to do on the board separately when it comes to things like class feedback”. The excessive use of personal pronouns also highlight this teacher-focused nature of lesson planning thinking exhibited by the novice. In addition, there is limited information on the learning which should be happening. Jennifer says “So, I would make sure the prior learning was secure before we do complex” but does not explain what they would use to “make sure” of this.

Evidence of cognitive processes is captured with the novices. Jennifer says “So, before this lesson I would have done prior learning on main clauses and subordinate clauses and connectives, which they are quite good at and then the starter would be recapping that…”, and this is evidence of teacher judgement. However, the effectiveness of the use of this judgement “they are quite good at” is not well reflected in “the starter would be recapping” that. It is possible that an extension of knowledge opportunity could have been missed in this

instance. Teacher perception is particularly prominent with the novices. Katie says "Also, I just, one thing I've noticed is when it comes to things like grammar and sentences the older you get the more you tend to forget, from what I understand", is an example based on Katie's limited classroom experience.

Novices use set structures and routines. "So, I'd want a group activity first, for the starter, and then I'd want pairs, and then I would want individual" (Jennifer). Katie's "then I might so I think a sort of think-pair-share, think-pair-share; so they can discuss" seems to randomly fit in an activity without explanation to its overall contribution to lesson effectiveness. "Now, usually in my lessons, I have em, I have a system that I've been putting into place for the last three or four weeks and I call it checkpoints, so these checkpoints are basically a technique for AfL, where I can actually think about or get the kids to think about how much they actually know". Jennifer also uses the same method "so you could do I, think-pair-share, and then you could have like a mini plenary there, to see how we are getting on. At that point I'd assess if they are getting it, if the pairs are getting it or not, and then split them"; potentially effective routines suitable for the novice stage of expertise development. The growth element could involve delving into the reasoning underpinning each routine, combined with memory of usage in various situations, as well as precision in teacher judgement and other cognitive processes. An example of reasoning is "So hopefully linking this idea about having a paragraph with no punctuation and they have to punctuate them kind of gets them thinking about how important punctuation is for the complex sentence and how much extra information they are adding". Reasoning portrays links with decision making. Novice thinking reflects evidence of reasoning however, impact on decision making is not

explicit. Novices appear to rely on student assumptions, explaining why sometimes communication is not explicit. Teacher judgement, it seems, at this stage of expertise development is influenced by teacher perception rather than data items or tangible detailed knowledge of the students as evident in "Cause although we're looking at complex sentences, I feel like they need to have knowledge of the other two types of sentences, (going over notes) so identify sentences, I'd probably get them to do that individually, em and then have a sort of pair-share moment" by Katie.

In terms of routines, Jennifer uses this sequence "the learning objectives, active starter, probably have some bell work as you come in, em a basic learning objective, a challenging learning objective, then, I'd always do group-pair-individual, and then I'd always do peer assessment if I can, based on the level descriptors. Em, every activity has to build on it, on learning, there's always got to be an opportunity to backtrack, like an alternative if they don't get that then they can always get an opt out and we could go back and do it again, em and the Ofsted criteria –what makes an outstanding lesson. So making sure you've got your range of questioning, making sure you're differentiating, so having the different tasks". The repetition of 'always' is indicative of routines which the novice applies. Teaching theory is captured in statements alluding to building blocks as a teaching strategy, also key terminology related to teaching is articulated.

Time could be perceived as a constraint in novice planning. For Katie, the priority is fitting the lesson within the timeframe and the other demands on the teacher's time rather than the

content of the lesson being planned; “So from that they will have the class feedback, how long is this taking? Let me just see. I’ve got to keep track of time as well; how long is the starter gonna take? Five minutes. Simple, compound, complex; target questions, think-pair-share, that’d probably take I’d say about twelve minutes, put fifteen minutes. One thing I didn’t mention is they have ten minutes, well the Key stage 3 class has ten minutes reading time. So I’ve got to factor that in at the beginning of every lesson”. In contrast to Katie, Jennifer plans the lesson focusing on the structure elements and some content elements with no mention of time. The complete disregard of time provides an outcome in the reflective log contribution from Jennifer; “Even though I’d done a page of feedback, they all wanted my individual time. So we spent the whole, we ended up spending the whole lesson redrafting their homework, getting them on the visualiser”. At the novice stage where a tick-box attitude to lesson planning is used and accommodated, this example shows the outcome when any item on the tick-sheet is left out. In this case, absence of planning regarding time dedicated to an activity and appropriate use of pedagogical content knowledge, has resulted in a complete change in lesson trajectory which the novice finds emotionally challenging. The emotional challenge is captured when Jennifer says “Pupils wanted to have immediate feedback… and check if they had correct additional information. Don’t spend long doing written feedback, with this group, because you can do it orally instead; or it might work to sit for ten minutes with each of them, (PAUSE) because obviously they want the attention. So, they are too lazy to read the feedback, they just want you to say it instead. So yeah, I had to scrap it all and I had to do peer assessment and get the green pens out and we could then do one on the board, to see how you compare, get the visualiser up at the end, I had to do all

that instead." The polarised situations of central position of timing and total disregard of timing in these two cases expose the delicate balance inherent in lesson planning.

4.4.2 Analysis of Competent teachers

Competent teachers also follow set routines. Unlike the novices who are experimenting with routines, competent teacher at this stage, know the routines which work, and use them. Courtney declares "Well, it wouldn't matter what level of class I was gonna start with. If I knew I was doing a writing lesson, I'm dividing my lesson into half, 30 minute mark, and then I know that after it the lesson is going to have a modelling section which will be 5 minutes; it's going to have a writing section –independent writing, which will be 15 minutes and it's gonna have a peer assessment section, which will be 10 minutes. So the second half an hour of my lesson will be exactly the same whenever we are doing writing". Eric says "If it was KS3 class we're looking at complex sentences there'd be a little bit of review, there'd be some, some starter activity design that'd get them to understand what complex sentences are or to review their knowledge of what complex sentences are and push that on a little bit, possibly with sentences that they're gonna write themselves, possibly with sentences that I'm, I'm gonna be modelling on the board. Em, I would probably be looking in the lesson to look at the kinds of criteria that mention sentences so that they know where they're going with it, that's as a levelled thing". Although Courtney thinks about planning for Writing, and Eric plans for a grammar lesson, structures seem quite fixed and there appear to be set routines for each core learning area.

Literature in expertise development identifies competent level professionals' characteristic to engage in risk-free activities. Eric reveals "So using, using stuff that we've already got resources for, probably" and Courtney says "so we call them sentence 3, so we do synchronised sentences and, all different sentence types have a number. So a topic sentence is numbered 3. I would then may be do two sentences where we have a subordinate clause at the start, so I might do sentence 6 and one where it's in the middle -so sentence 5. So that's subordinate clause at the start and embedded subordinate clause", while referring to a departmental strategy. With set routines and structures and set resources readily available within the department, the competent level teachers in this study showed evidence they have systems in place which work for them. The question is how beneficial these systems are with reference to maximised levels of student progression. Is the safety of familiarity restricting the competent teachers from progressing towards expert level performance? The focus on the lesson structure is further emphasised when Courtney comments "I mean, I am confident enough with the sentences that I can type something new on the fly. So the only thing that I might change is; if I get into the room, I might change; instead of getting them into threes, cos if you get threes that are in, you know, two of them have ended up, got different things, I might end up pairing them instead of, but, or I might end up doing, instead of sentence 6 and 5; do 7 and 5 or something". There is limited scope for exploring suitable options of presenting the content of the lesson and thinking seems to surround the structure elements. Compared to the novice, the competent teacher has a bank of structures which seem to work and there is indication that planning involves generating even more structures which will work. "So you tend to start the year with things that you know are gonna work. You refine your, I might think I'd refine my, er, choice of what we do as I get to know the group better,

as I understand who's in there, so part of part of it is differentiation, partly it's, it's the relationship that I have with different students within the group, you know, knowing what's gonna be useful to them, what's gonna be, what's gonna help to push them" (Eric). Stability at the competence stage could be consolidated by renewed active collection of multiple examples which work. This personalised bank should be worked on thoroughly from the perspective of permutations of learners. Having consolidated this, the outcome stage, reflective of proficiency ensues.

Regarding cognitive processes, problem solving among others, presented a curious perspective on competent level lesson planning. Courtney says "what I'd planned was they would annotate the quotes and then they would provide the analysis but because it was the first time we'd done it, they were very uncertain in their analysis on quotes. So, when we were actually doing the feedback, rather than letting them take the lead, I took lead and then I asked, trying to facilitate their group to just jump in with a few points", signalling that should there be a problem, the teacher is responsible for fixing that problem. This captures the control or grip the competent teacher has on the lesson. The lesson is regimented and goes by the rules of the teacher with minimal input from the students. The students tend to be consumers of the teaching with minimal opportunity to generate new learning based on what has been taught. This problem solving opportunity which contains growth potential for the competent teacher seems confined to a class management strategy.

Modelling, as is evident in extracts from the competent teachers is a central part of their teaching. However, the models seem to be rigid around the format presented by the teacher although the students 'personalise' their output. An analysis of where modelling ceases to be a personalised version of the teacher's example might be required should the competent level teacher be keen to progress their students to levels of flexibility, independence and ultimately new knowledge creation. Another example is from Eric who says "there's a more integral idea behind a lesson, I think. So, planning is one thing but being there and doing it provides little adaptations, provides, em, interaction, I suppose with and within the group that changes things quite naturally anyway. Not that it'd necessarily take it a million miles from where you want it to be. Not, you know, it's not completely random like that but, there's an element to which intervention with the class during the lesson is gonna, is gonna change it; it becomes dynamic in that sense". With Eric, change is suitably incorporated within planning on the condition it is teacher-controlled change. As remarked by Ivan in the expert commentary, there is a situation created where there would be limited flexibility to incorporate or take a new trajectory should the learners contribute their specific area of interest to this lesson.

Emotional components of lesson planning are prominent in the data from the competent teachers. Courtney is aware of the perspective of the students "So, I didn't want to put them on the spot, and create the pressure or make them scared of doing it, by saying stand up and then it; I mean they're very intelligent, so it would be very obvious to them that they were not getting a very high quality feedback, so I didn't want to make anyone upset so make them feel like they hadn't got the, or that best learning experience". Emotions are also captured from the perspective of the teacher "the biggest thing, the biggest emotional thing that I have

while I'm planning lessons is usually, I really enjoy planning a lesson; but you know it's never ever gonna go quite how you want it". Eric also highlights the emotional side to teaching "Also, it's about not getting bored (laughing), as a teacher if you are just doing the same thing all the time, it's about keeping it novel. I know, to be fair, it's very rare that you would be able to do exactly the same with the same group through the year or similar with a group that you've done a year before. Even during the same year, it's it's not really something that works, I don't think. Or it's just not working for me. Em, but teaching is a job where things are kept novel because there there are so many different variables that can impact on the relationship with the group, that can impact on how a group is going to engage with something, even if it is something that has worked twenty times before there will always be a group where it doesn't work. So it's, I suppose, awareness of the particular group, keeping it lively, keeping it interesting 'cos it's a nice feeling; it's a nice feeling when you feel that you've em, achieved something". This shows the competent level teacher has surpassed the point of creating a successful lesson and is now deeply vested in the emotional realm of job satisfaction. This could potentially be the crucial point in relation to teacher attrition rates; no matter what an external observer might have to say about the lesson –positive or negative, what really does matter to the competent teacher is having this 'nice feeling' deep down of having achieved something, and this rests in the mind of the teacher. The difficulty encountered by the competent teacher is depicted in this battle to keep things "novel" and inject creativity, and to maintain stability in using "what works".

4.4.3 Analysis of Expert teachers

With regard to planning, experts are meticulous and dedicate elaborate periods to lesson planning ensuring each lesson item has been used in the best possible way; above all that each lesson is unique. Ivan, in identifying the existing threat to learning which is engagement says, “And as a general technique, one I like to use is er which the children have never seen in school or never seen in action in any of my lessons. So there’s a kind of er shock value there, surprise value which is linked of course with the idea of er of fun. This is something different, this is something new, I’m interested, lets er let’s go with it”, explaining further that “if you’ve got off to a good start, an engaging start, then the lesson would go smoothly and the children will engage a lot more quickly as opposed to the rather perhaps dry steady start in which perhaps the students have disengaged by 30 to 40 seconds into a into the lesson. Given the culture that they come from of er instant gratification and sound bites, you really have to, in my mind, gauge them within the first 10, 20 seconds of the em lesson.” Where the novice would showcase an inventory of lesson items used, and the competent would begin to show some reasoning behind the use of some of these items, the expert is quite exhaustive in the handling of individual lesson items, to guarantee students are engaged with the content from the start of the lesson, are enjoying the learning and remain interested in the topic beyond the classroom experience.

Experts are precise in reading classroom situations, and having read the situation take action swiftly with the lesson trajectory. Experts base their reading of the lesson on a combination of cognitive processes, with the centre of this being intuition. An example from Daniel provides some insight “I read a film review from the BBC which was filled with all the

language, filled with all the techniques I wanted and again as I mentioned before it was a very challenging lesson. Er but I felt that they had the desire, the skills, the relationship that I could really pitch a lesson." Language of intuition is captured in the expression 'I felt that'. "So what I decided to do was em focus on the skill of analysing language. So, I typed up a letter by a, sorry a poem by Seamus Heaney called 'Mid-Term break'. Em, I I typed it up in prose and inserted paragraphs at em moments where I thought a paragraph would have fitted, and I asked them to em analyse it, therefore thinking about the writer's perspective and then the next stage was to be analysing the language. I then gave them the original poem and asked them to consider why I'd given them em the text in a different format. And em I heard one of the students say em I panic when I see a poem. So they actually responded in the way that I wanted. I then asked them to look at the structure, to think about the difference in the way I'd inserted paragraphs and er why the poet had put the em stanza breaks where they had and the insight that came back from those responses was excellent and I think much more perceptive than if I'd just given them a poem to analyse. Em, and then I asked them to reflect on what skills they'd used during the lesson that could be applied to…" (Heather). There is explicit reference to decision making, accuracy with reading of academic and emotional needs of the learners and planning to overcome these, as well as shared reasoning leading to the teaching strategy which was selected. In the following utterance by Daniel there is a combination of decision making, reasoning and judgement: "I think, what will be of real benefit is for pupils to look at prior work, identify, first of all their use of complex sentences and then mmm possibly, if not as important but more importantly, the effect of er, their use of complex sentences, em I suppose, that's me take for granted that use of sentences

will be accurate so you can build in use of punctuation in." These examples show the use of, and interaction within cognitive processes.

Flexibility in lesson trajectory tends to be an off-shoot of contingency planning or sometimes "hidden planning", as Ivan states, backed by a rich bank of lesson outcomes. It is important to note, accuracy in reading of the class situation ensures the aversion of potential problems during the lesson. There is some indication that pre-empting of classroom situations is managed during planning and, if required, implemented during the teaching. In a very unusual situation where Heather had to teach in a subject area not of their specialism, the strategy was "So on a piece of paper I just wrote down, or typed it up rather, what I would do if it became evident from the starter that they knew the topic better than I had assumed." The image of a written lesson plan structure by experts is one which follows a non-linear structure, mirroring what has already been highlighted about expert lesson planning thinking. The expert does not wait to find out during the lesson and make the switch, the expert actively plans for this situation and saves this in a written format ready to be implement after 'reading' the learning situation. Should the lesson trajectory change, this would be in a planned direction. Felicity declares "Within the context of planning, I think one of the key things here is that we have to try to think from pupils' perspectives about issues that an adult may think of very differently", confirming that when the expert engages in teaching, there is more than one planned lesson trajectory. While this example captures lesson trajectory flexibility, it also highlights reasoning which supports expert planning.

Experts' lesson planning is generally student-facing. Inherent emotional components remain positive mainly referring to students enjoying the learning experience therefore empowering the expert to seek engagement techniques. Daniel thinks about the plan in these terms "Again, thinking off the top of my head, I would possibly, er, consider the use of, film footage, so a character's speech, or, or, an exchange in er, film or something that's relevant at the moment, something contemporary that children can engage with; and show them how a complex sentence in, I dunno, a piece of animation, a current Hollywood film, er, can be used, used in a spoken voice**,** and then may be look for it in a popular text like 'Hunger Games' or one of the Carnegie books that we've read; one of the award winners recently; or may be even the class reader from this year or last year, so that they have a novelist that they are familiar with. Er and and all the time just trying to make it real". With a thorough exploration of planning possibilities for the specific lesson, Felicity decides "But I think the thought process that I would put at the lesson at this stage before I deliver it I wouldn't alter". This decision by Felicity comes from the perspective of the teacher concerning how far they are thinking about the lesson, but considering the student perspective, this same teacher Felicity is willing to make some allowances "but as I say just letting them go off in their own direction was the biggest change I allowed and I was very happy with that". An addition by Ivan "while it did have an apparent rigid structure of er problem creation, discussion, feedback and final reflections, er within that apparently rigid structure, there there was always an in-built potential to go in unplanned direction", adds to this adherence to student contributions in the lesson. Gemma returns to engaging the students; "I visualise em the students, I visualise them being active and enjoying the lesson, and really engaging with the task. Em, I try and visualise part of the lesson being noisy. I want to hear noise, discussion, speaking, em, I want

to hear productive discussion though". The student-facing component of expert planning comes with huge responsibility on students as Daniel states "I think the key is to to give them ownership, to give them responsibility". The learning partnership is captured in experts' planning. Expertise can only thrive if the students contribute to raising the learning to the desired or planned pitch. Ivan confirms this; "again this is to do with getting the students to buy in to what they er they were doing".

With reference to time, Felicity provides an insight into how the expert thinks; "why do you talk about time at this stage? Because from the first minute of the lesson you're under time pressure quite simply and you're always aware of time. Any lesson plan requires some sense of timing of parts. But the important em the important thing here I think is that you don't let your lesson be ruled by time. And that's where experience comes in if you're aware that certain things are happening which are starting to explete your er your timeframe and they're well worth the change of direction then, you you go for it. Well, to me the difference between an experienced colleague and an NQT colleague is that the experienced colleague knows when to change direction, how to change direction and is is not afraid to er do that. In other words, their planning has a degree of flexibility, especially if it's involving unknowns and non-predictable elements". This showcases some key areas; first, assumption of the teacher's ability to notice when their lesson is being controlled by timing, next identifying when their time is being depleted, notes the forms of lesson occurrences which compromise available lesson time, pre-empt and plan thoroughly for these, be able to read the lesson trajectory accurately, as well as accommodating the non-predictable elements of a lesson. At the emotional level, "not afraid to er do that" points out the academic and non-academic

constitution of teacher planning. The expert sees clearly that this differentiates the expert from the non-expert; but the expert could be oblivious to the enormity of this expectation for non-experts at various stages of expertise development.

5.0 FINDINGS

The findings of this study have been guided by the two main research questions: the first is 'which patterns are evident in the lesson planning process of novice teachers, competent teachers and expert teachers?' and the second research question is 'what is evident in the cognitive process of lesson planning to differentiate a novice teacher from a competent, and a competent from an expert teacher?' Findings have also been shaped by the rigour of the research ensuring prescriptions of the qualitative tradition are upheld as well as insights arrived at from coding, creating categories and generating themes. The following themes were generated: lesson planning, lesson structure, procedural elements, knowledge items, and thought processes.

In terms of cognition, the finding is, all teachers think about the structure of a lesson; a beginning, middle, and an ending. For the novice, there are set lesson components which must be 'ticked off' almost to show they have been thought about (see teaching as a competence paradigm critique in Turner-Bisset, 2001). For the competent teacher, the verbalising of lesson components is less compared to the novice. Competent teachers show some evidence of the use of these lesson components and some evidence of the effect of their use. Experts make basic use of terms for lesson components and this is less than competent teachers. When experts use these key terms, they show their application and give reasons for their use, with sometimes deep analysis of their effects. These lesson components are: modelling, scaffolding, differentiation, use of ICT, questioning, lesson objectives, lesson

outcome, lesson activities, timing, challenge, extension, plenary, mini-plenary, feedback, assessment; AfL (Assessment for learning), peer assessment, evaluation. Content elements for the topic "complex sentences" captured are: identification of complex sentences, features of complex sentences, types of complex sentences, components of complex sentences, clauses; main and subordinate, use of punctuation as well as embedding the complex sentence within reading, writing or speaking and listening. Whereas the lesson driver for the novice was to ensure all lesson components are visible in the lesson, the expert focuses more on the knowledge elements (content knowledge and pedagogical content knowledge), and carefully organises lesson components to guarantee student engagement. With the expert, there is emphasis on supporting the students to learn independently whereas the novice seeks to pass on their knowledge to the students. The novice appears to dedicate a significant proportion of planning time to content knowledge transfer, rather than a meticulous exploration of pedagogical content knowledge. The competent teachers allow the students to have some level of independence as long as this is on the teacher's terms. Should the students veer off the plan of the teacher, then the preference would be for the competent teacher to retake control of the lesson. Competent level planning therefore contains evidence of pedagogical content knowledge exemplification which the competent teacher believes works and uses repeatedly. Compared to the novice and the competent teacher, the expert demonstrates flexibility with lesson components, and knowledge elements; content knowledge and pedagogical content knowledge, in addition to non-linear lesson structure elements. Regarding lesson structure elements; beginning, middle and ending, the expert shows higher levels of flexibility compared to the non-experts. The competent teachers have arrived at a position where they have certain formats with a few combinations or variations

which work, specifically with the structure elements of a lesson, which are followed regularly or even repeatedly. The novice shows evidence of fixed routines with individual lesson components, for instance fixed points for feedback. Not only do experts use lesson components in ways different to non-experts, some lesson components; for instance scaffolding, are used exclusively by experts. Lesson planning could therefore be understood at these levels; lesson components, knowledge elements which are content knowledge and pedagogical content knowledge, and finally lesson structure elements.

A sequence of lesson planning as exemplified by the experts was captured in this study. First of all, the expert provides exemplar material, secondly the expert engages in modelling, third scaffolding is provided, and then further reinforcement. Only after this solid foundation has been laid would the expert decide to facilitate knowledge application, and finally new knowledge creation. But before all of this, the expert must 'pitch' the lesson appropriately to engage the learners. This means experts do not seek engagement in its conventional usage. Engaging students conforms to their lesson rationale within their learning ignition outlook. This finding reflects the pattern also captured in the pilot for this study. In addition, in instances, for example modelling, where there is shared terminology amongst the professionals, the expert's application of the concept is different to the non-experts. The experts would model to showcase potential of use and extension of scope, whereas the non-experts expect a personalised version of the model which they have presented. In some cases or examples provided by the non-experts, assessment is tied to the model which the non-expert has provided to the students. However, when the students are being assessed by the non-expert, they are expected to produce work which shows they are not 'copying' the model

which the teacher has given them. A closer look reveals without effective support towards independent working, students are expected to take a leap away from the model to becoming independent.

For knowledge elements, experts are fluid in making links across key requirements of the topic whereas non-experts list the topic's key features. In other words, experts approach a lesson topic with rich content knowledge and numerous permutations of pedagogical content knowledge. Non-experts on their part show evidence of good content knowledge but limited examples of pedagogical content knowledge. What is clear with the non-expert is, there are tangible lesson structure elements in place. However, the strong fluid pedagogical content knowledge position of the expert incubates the lesson components effortlessly, implying planning for the expert begins with a solid foundation of learner prior knowledge, excellent knowledge of data-related insight of the groups, deep psychological and emotional insight of each individual in the group, as well as up-to-date knowledge of whole school and national expectations. The expert, therefore, begins planning at an appropriate point in the past, factoring immediacy and empowering learners for independence, and further exploration in the future. The non-expert, depending on their stage of expertise development tends to be limited in their memory span, application of information from memory, as well as reasoning about immediate learner needs, with limited long term learner focus.

For the lesson to unfold after the preactive or planning phase, experts and non-experts alike have to rely on using some procedures. The structure elements of the lesson take prominence

with the non-experts, and these are fixed for curricular content, such as teaching of reading skills, teaching of writing skills, or even for individual parts of the structure elements, for instance set procedures for the starter, what constitutes the middle or development part of the lesson, and the end or plenary. Non-experts, as this study has found for instance, appear to be fixated on the procedural elements of the lesson and seem to be rigidly guided by time. Experts pay more attention to the knowledge elements; both content knowledge and pedagogical content knowledge. Time in the hands of the expert, is a vital tool used flexibly for purposes of continuity. On the contrary, the non-expert allows time to restrict their lesson planning thinking. Considering that this study focused solely on lesson planning thinking with no requirement for the observation of the planned lesson, it was insightful to note that the non-experts worked hard to make sure that the lesson met the time constraints of their school. The experts on the other hand, started by exploring their lesson idea, its suitability to their chosen teaching group, pedagogical content knowledge requirements, with limited allusion to time allocated per lesson. This also meant experts were flexible in their approach to incorporating the lesson idea they had generated. The implication is the expert could start the lesson with any aspect of the topic area, allow the students to develop their own insights, and shape the lesson trajectory with the conviction that in-depth content knowledge provides the flexibility to engage students with the learning of the core descriptors, targets of the lesson focus, ultimately leading to the desired learning outcome. Unlike the non-expert, the sequence of lesson planning of the expert is; first of all knowledge elements (content knowledge and pedagogical content knowledge), next is lesson components (usually engaged with tacitly), and finally structure elements (highly flexible and non-linear).

For cognitive processes, the findings are: non-experts wait and make judgements about the learning during the lesson since there is an embedded belief the lesson will not go according to plan. On the contrary, the expert expects their lesson to unfold as planned and is therefore able to make judgements, usually based on data elements and deep knowledge of the students, at the planning phase. Experts know what the learners already know and are able to do, and when they refer to prior learning it is usually to polish this and refine it, unlike non-experts who appear to be searching for gaps in the learning during the prior learning part of the lesson. Experts make explicit reference to problem solving mostly of the students, and sometimes inferred references to their own problem solving. All teachers use decision making explicitly but experts tend to seamlessly link in reasons for their decisions, implying while the expert is making decisions, there is evidence of other cognitive processes interwoven with this. Intuition is the guiding force for the experts and language of intuition appears to be the prerogative of experts. Only after careful interplay of all of the cognitive processes does intuition kick in and this level of cognitive processing appears to be at the level engaged in by experts.

Experts, novices, and competent teachers engage in reasoning when planning. Difference in the nature and the quality of the reasoning illuminate expertise development. For the experts, reasoning is outwards towards how to facilitate learning while the non-experts are inward-facing, that is how to facilitate the teaching. There are situations captured where non-experts are more concerned with themselves not becoming bored, whereas the experts begin planning by thinking about engagement. When experts plan, they prioritise engagement techniques and stay focused on the students and their learning. The competent teachers express the

understanding that the focus needs to be on the students and their learning. However, competent teachers in their thinking focus on their teaching.

All the teachers showed evidence of perception. Novices often based their thinking about planning on perceptions of how students learn, their areas of difficulty, generalisations about ability levels and how to exemplify lesson components. Competent teachers used perceptions when discussing issues which might begin in their teaching but have links to departmental activities, whole school issues or even wider curriculum components. Competent teachers showed a likelihood of using growth in experience to express perceptions. Minimal use of perceptions was captured with the experts. Perception appeared with the expert when a problem was encountered and the expert had to go back into proficient level performance in order to engage in problem solving.

Memory is evident in how the experts access what they know of the students to be able to make decisions, reason, and judge when they are planning. When the competent level teacher (Eric) accesses memory it is to find something they have used before, for example resources, or how a lesson they have previously taught flowed (that is, the structure elements or lesson procedures used), in order to make minor amendments. The novices have minimal classroom examples as the literature already shows, thus they tended to experiment with creating a new lesson using teaching concepts and theories they have learned, fitting the lesson around these almost in a tick-box manner.

Finally, with reference to cognitive processes, experts expect the students to be using these and identifying when and which cognitive process they have used and why. Some examples are: Heather ‘So if I’m doing grammar I would definitely look at a text, at an extract. So I’d have them annotating, deciding why the writers use certain techniques and then em ask them to write their own examples’ This is decision making by the students. From Heather there is another example of explicit reference to decision making by the students. ‘I can teach them something, I can show them how something is but they have to learn it and understand it. So if they are making decisions about what a sentence is, for example, then they are more likely to retain it, retain that information and learn from it.’ Ivan comments on judgement of the students explicitly: ‘The er the reporting back of course em from the groups also had the additional er feature of possibly undermining or confirming the judgement of the groups as they listened to the thinking of what’s going on around them.’ Embedded in the above examples is the analogy that if the expectation of the expert is students should be applying cognitive processes of learning, it is therefore imperative that effective understanding and utilising of cognitive processes becomes a prerequisite for teachers.

Figure 1 below is a visual representation of the hierarchy of cognitive processes. This hierarchy is based on the findings on cognitive processes from the current study on teacher cognition, added to this, research on cognitive processes, developing of expertise (see Kahneman, 2003 and Kaufman, 2007), and also work by Forester (1991) about experts.

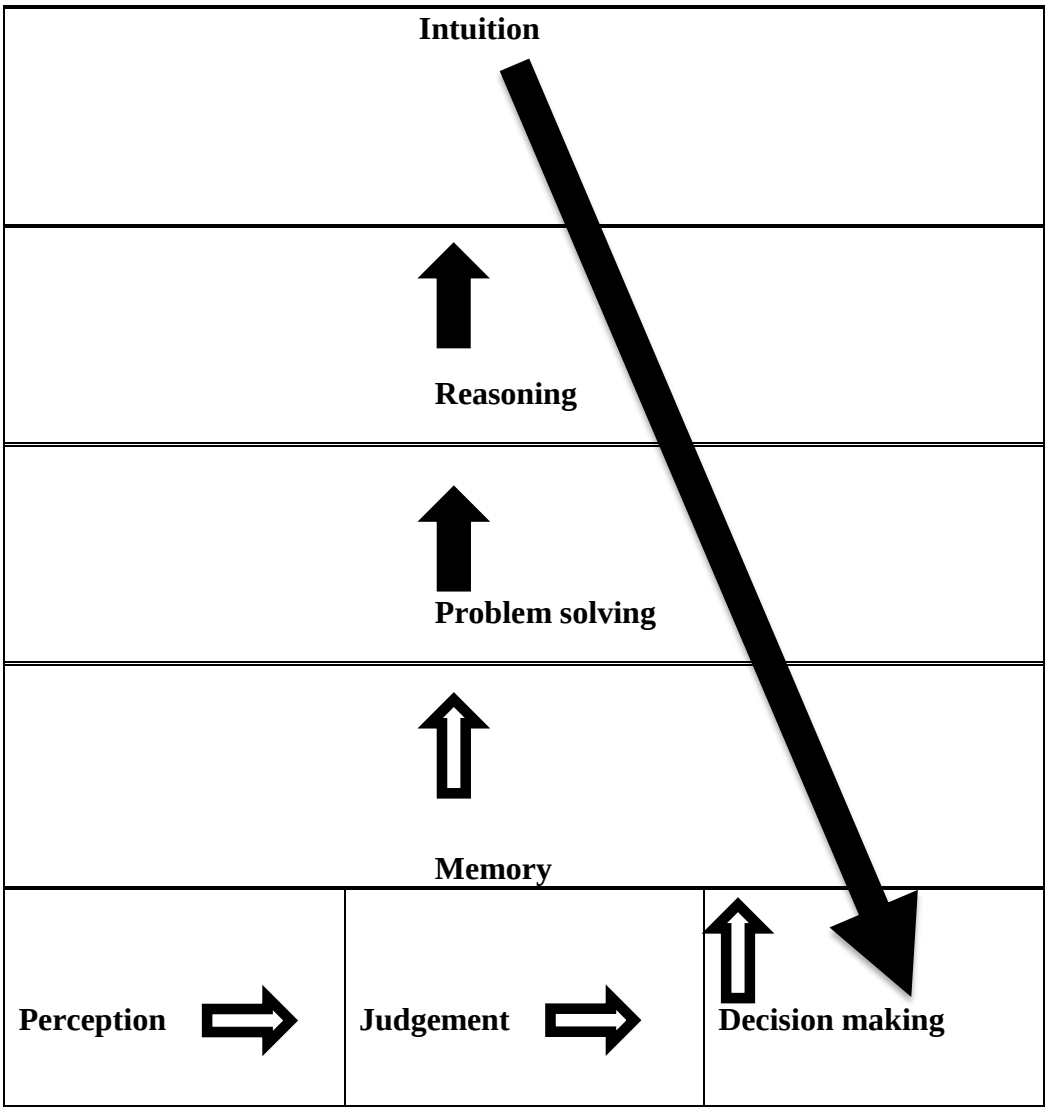


Figure 1: Hierarchy of cognitive processes (Enow, 2015)

The arrows which are filled in in black represent the expert sequence, that is, beginning with problem solving, and the arrows which are not filled in indicate the sequence of non-experts. From the diagram, it can be seen that decision making is central to teacher cognition and this is the case for both experts and non-experts. Differentials begin to emerge in the hierarchy at the point of access to memory stores.

To summarise, decision making is central to lesson planning and this is evident irrespective of level of expertise. Although problem solving seems to be the starting point of lesson planning thinking by the expert, non-experts concentrate on problem identification which is instead consigned to prospective planning usually as a postactive activity. Also, there is a higher inclination for experts to use reasoning naturally without prompting (this study used interview and stimulated recall), than non-experts. There seems to be a requirement in the planning of the experts to justify judgements, decisions and solutions to themselves before implementing them. Reasoning is essential should the expert explore all the possibilities of their ideas especially as they seek to plan activities from the perspective of the students. Evidence captured highlights, in some instances, decision making by non-experts, typically novices, can be influenced by perceptions rather than logical reasoning. With reference to judgements, these are incorporated in the thinking of the expert during the preactive or planning phase whereas non-experts tend to wait until the starter of the lesson, specifically prior learning component to consolidate a judgement. Memory could be presented from the cognitive perspective of long term and short term, with the expert showing outstanding access to both or from the knowledge perspective where the expert showcases extensive content knowledge inclusive of rich stores of permutations of pedagogical content knowledge. Ultimately, for the experts, thorough and swift processing of a combination of cognitive processes generates intuition. To conclude, it should be specified; teachers' ability to draw on tangible and tacit components of teaching form the hallmarks of their expertise.

5.1 Relevance, Implications, Impact

This study centred on teacher cognition, particularly planning, should be relevant to secondary English teaching, planning within teaching in general (that is, across school subjects), the subfield of teacher cognition, developing teacher expertise, and the wider field of developing expertise. This is because all the data for the study was collected from teachers, and in schools. Although the data was collected within a specific region in the UK, the potential for application of the findings is unlimited because the study focused on cognition and cognitive processes. These are functions of the mind; therefore not restricted by space and time.

Relevance to secondary English teachers is of primary importance in this study. This is because all the participants in the study are teachers of English. The main data collection methods have been designed based on tasks appropriate to the teaching of English at secondary school level. Data analysis has also been drawn from planning of the English teachers who took part in the study making this study directly relevant to secondary English teachers. Because the focus is planning, and planning is carried out by all teachers, findings from this study provide relevant insights into the thinking which happens when teachers plan their lessons. It is possible that lesson planning thinking will resonate with all teachers irrespective of subject specialism. Considering the findings of this study, its relevance contributes to the subfield of teacher cognition. Using the Dreyfus model contributes to making overt the complexity of teaching; a vital area in research on teaching. The pioneering empirical utilisation of the Dreyfus model in research on teaching consolidates the relevance of this study to the innovative field of Developing Teacher Expertise. Consequently,

understanding of teacher expertise contributes towards the wider field of expertise development making the current study relevant beyond the field of Teaching and the domain of Education.

Implications of this study on teacher cognition for professional practice are diverse. Primarily, this study provides the opportunity for teachers themselves to take control of their own professional learning (see Eraut, 2004; Harrison and Lee, 2011). The use of the Dreyfus model of expertise development means teachers themselves can locate their level of expertise, review the characteristics which fully describe their practice, and identify their next stage of development, actively deciding and engaging in the effortful process of working towards achieving those descriptors. The next implication is research on cognition in teaching. This study has taken a holistic approach to understanding cognitive processes. An insight from this study for research is the review of a way forward which views cognitive processes holistically. In the case of working with each of the cognitive processes, there is a clear location within the cognitive processes of its place. Holistic view of research on teaching, particularly cognitive processes, could provide a new launch pad for future research. The third implication could be viewed from the perspective of non-teaching arms within education; for instance external evaluative agents both within (non-teaching members of staff) and outside of schools (for instance, Ofsted and HMI). With the current helpful focus on data and data management in schools, performance management requirements, and school policies around lesson planning, it might be necessary to forge a way forward with practices which have served the UK, and other educational systems, immensely for approximately sixty (60) years, for example the linear lesson planning format or the rational

Tyler model (1949), and explore groundwork for more modern and forward-looking ways of thinking about teaching as a profession. Another implication of this study is in the area of teacher education. This study makes overt the tacit components of teaching. Teacher education curriculum and preservice teachers would benefit from this exposure to the hitherto minimally explored non-tangible components of teaching. Not only would this study be enriching to teacher education curriculum, the methods of data collection could also prove effective in accessing levels of thinking during lesson planning beyond the preservice phase. Access to thinking along the expertise continuum in this study widens access to learning about teaching for preservice teachers, empowering trainees to pursue a structured outlook towards professional growth post training with achievable milestones.

To summarise, implications of this study on professional practice include the following areas:

- on teacher professional learning –empowering teachers towards ownership and independence with regard to professional learning
- understanding and effective use of cognitive processes during lesson planning – moving beyond focus on decision making which is central to teacher thinking and planning and incorporating all the cognitive processes which this study has identified
- exploration of non-linear models of planning –with the understanding that expert teachers plan in non-linear ways
- review of teacher evaluation outlook – ensuring that the tangible and tacit elements of teaching are actively sought

- structured trajectory for preservice teachers – providing realistic aspirations for preservice teachers to step onto the Novice stage and be guided towards achieving or aiming towards Expert status within the expertise continuum (Dreyfus model) throughout their career life-cycle
- Further enhancement of quality of teacher education provision by actively researching, exploring, gaining insights into and seeking to incorporate the tacit components of teaching.

This study highlights levels of impact on teacher professional learning. One of the greatest areas of impact is on teacher education. Impact on teacher education is captured in the trajectory of the experts. All the experts have accessed university-based teacher education. Capturing the journey of the experts, how they have evolved over time until arriving at the peak of expertise development is credit to the foundation laid down from teacher education. The performance of the experts is acknowledged first by official expert status, then peer recommendation and ultimately their own cognition and evidence of cognitive processes which have been shown to unite the participants into this group. Another area of impact is on teaching. It is entrenched in research that teaching is complex. Exposing the tangible and cognitive complexities in teaching, as have been captured in this study, validates decades of research on the complexity of teaching, opening up the scope to further investigate, understand and welcome this complexity as wealth to the profession, not as a barrier. One more area of impact is in the domain of expert performance and developing expertise. By researching and understanding teacher cognition, the implicit and explicit levels of teaching have been captured in this this study. Because this study involves participants at various

levels of expertise development, some of the findings of this study should shed some light on the contemporary focus on expert performance in fields inclusive of and beyond education. Planning is a major area of impact since this study identifies the need for change by requesting a review of the dominant use of the linear rational Tyler Model which, as captured by the study, is of minimal benefit to the expert because the expert plans in a non-linear manner.

5.2 Limitations of the study

This study is limited by its subject specificity; teaching of English at secondary level. Although the study seeks to understand teacher cognition, the utterances from the participants have been sourced from one subject area of the secondary curriculum. The study, due to its targeted approach on cognition and cognitive processes enriches research on teaching in an area with minimal research at the moment. The limitation however is, most examples used are from one subject; English (except the situation of one expert citing a non-specialist subject during the CIR). The use of the key lesson planning topic of 'complex sentences' showcases this subject specific limitation. Future research on teacher cognition could explore these patterns and processes from the perspectives of teachers from other secondary school curriculum areas.

Teaching incorporates three key phases; the preactive or planning phase, the interactive phase and the postactive phase. Based on the premise that the two later phases are an outcome of the preactive or planning phase of teaching, it became imperative to introduce this holistic

outlook towards cognitive processes and a new take on cognition in secondary English teaching by focusing on the first phase of teaching. The result is a limitation of this study on the preactive or planning phase, implying data relating to the interactive phase is reported from memory rather than evidenced within the teaching. There is also a limitation, relating to research which shows the interactive phase of teaching is susceptible to diverting from the initial planning for the lesson. Having raised this, it is important to recall that this study has established that experts, due to meticulous planning, approach their teaching with the expectation the lesson will go according to plan, divergence from the plan is a 'planned' result of student contribution welcoming student perspective to the lesson trajectory.

Expertise development is gaining increasing focus in contemporary research. The Dreyfus model has been chosen for this study of teacher cognition. As already indicated, there are various models of expertise development. The current study is therefore limited in its choice of only one, the Dreyfus model despite its strengths, of many models of expertise development. Added to this, within this study, only the milestone stages of novice, competent and expert were targeted. This is a limitation because the transitory stages of expertise development have been minimally worked on in this study.

Regarding methodology, this study is qualitative. Qualitative research was carefully chosen because of its intrinsic link with the nature of teaching. However, teaching incorporates quantitative components which are not fully explored by qualitative research. The choice of multimethod allows for an insight into quantitative elements; an insight facilitated by the use

of QSR NVivo 10 (2014). Although this insight is suitable with reference to this study, a more detailed quantitative focus is not fully captured.

5.3 Proposed areas for further research

Experts in this study make references to 'pitching' a lesson. The pitch of a lesson is generally gauged at the planning phase. Although experts are explicit in stating there is a specific pitch they are aspiring towards or aiming for, this is not readily evident or 'visible' to the non-experts. Further studies could be undertaken seeking to identify when an appropriate pitch has been reached, what the key features are, and how this could be evaluated. If this is established during planning, as is the case with the experts, then the lesson is in effect set up to succeed.

Having finalised the requirement of pitching the lesson perfectly, which appears to be the main stay of the teacher (pedagogical content knowledge) or the exclusivity of teaching, the expert shares some of the burden of teaching and learning with the students. The next target is learning intensity. Experts plan meticulously in order to bring the learning of the students to a point where their expertise could be optimised. Future research could seek to capture learning intensity, measure learning intensity, or even identify learning intensity descriptors. This should permit non-experts to 'see' the level of learning intensity they should be working towards.

Cognitive processes have been explored in this study holistically for the first time in teacher cognition research. Future research on this holistic perspective on cognitive processes would contribute immensely in enhancing teacher quality through a greater understanding of teacher thinking. It should also be useful for detailed studies of individual cognitive processes to be worked on with a resultant contribution towards a holistic picture of cognitive processes as they apply to teaching. Of particular significance could be, the less researched areas of cognitive processes within teaching of memory, reasoning, intuition, across most curriculum areas, including problem solving within English.

Expertise development is a contemporary research area and significant contributions will be made should other studies on teaching be carried out using the Dreyfus model. The milestone stages; novice, competent, expert are relatively static as evident in their descriptors, but the fluidity of the transitory stages; advanced beginner and proficient, should also be helpful in teaching research. In general, there is an urgent need for more research in the innovative field of teacher expertise development. This could include applying other models of expertise development to teaching.

Conceptual clarification and/or theoretical tightening of teacher cognition, 'holding together', enabling it to be more focused when it is studied, specifically with reference to secondary teaching, could also be essential for future research. Existing research has repeatedly referred to the urgency for this to be addressed.

A holistic approach to research on thinking is required. Research on teaching, specifically thinking has been presented as fragmented, and as Mena Marcos and Tillema (2006) highlight the complexity of breaking down in order to study, investigate and understand, only to then rebuild into a whole, as being paradoxical. Research on teaching seems to have been effective in these minute investigations, however, Mena Marcos and Tillema (2006, p.114) appear to suggest it has gone too far in-depth with its 'isolated understanding' and is becoming at risk of losing sight of its wholeness, to the point where 'they can only tell half the story'. Added to this, the issue of non-congruence between thinking and action is also highlighted. In sum, Mena Marcos and Tillema (2006) call for a holistic study of teaching.

6.0 CONCLUSION:

This study set out to capture teacher cognition of secondary English teachers. 'Teacher cognition: a study of Secondary English teachers' set out to understand one area of teacher thinking; lesson planning. Teacher cognition study is subsumed in the wider field of research on developing teacher expertise. Existing research on expertise, in fields other than teaching, have contributed towards situating the research questions for this study. There are two research questions for this study: 'which patterns are evident in the lesson planning process of novice teachers, competent teachers and expert teachers', and 'what is evident in the cognitive process of lesson planning to differentiate a novice teacher from a competent, and a competent from an expert'? One research question aims a wider net at teacher cognitions, and when the cognitions have been collected groups the participants according to levels of expertise using the Dreyfus model. This first research question therefore seeks to identify patterns evident in the generic thinking of novice, competent, and expert level secondary English teachers when they are planning a lesson. The second research question is more specific, unlike the first which is generic, and seeks to understand the underlying cognitive processes imbued in the thinking of secondary English teachers at various levels of expertise development. Since the first research question seeks to identify patterns, it comes across as non-cognitive. This is not the case as the work is based on cognition. This means the first

research question focuses on patterns of cognition involved in lesson planning. The second research question is more explicit in targeting cognitive processes across stages of expertise. Therefore, the first step has been a generic look at teacher cognition, and then a more narrowed down focus on cognitive processes. Evidently, both research questions reveal the mind of the teacher and how the teacher thinks when planning a lesson.

Planning took on a unique stance in this study, because unlike most studies on planning, there was no requirement to teach the planned lesson. This could be perceived as a limitation to the study, but the target was to capture the thinking, specifically the thinking processes, and this was done with the knowledge that this plan would have been updated, refined, ameliorated etc., before the interactive phase of teaching, and also that the plan might or might not have changed significantly prior to its delivery. Rather than studies which criticise this evolution of the lesson plan, from its conception to its written form and its subsequent 'enacting' which is in a continuous change process, the recommendation is for this evolutionary process to be captured, studied, investigated for reasons for change (similar to the work done in the current study, using the semi-structured interviews), in search for change deferring from best practice, change which incorporates best practice, and the practicalities of moving away from fixations of acting out a lesson plan (which is impossible for some), to teaching a well-planned lesson. A well planned lesson, it is the opinion of this study, is one which records, not a linear, structure but a lesson focus and trajectories of lesson development which are well catered for in the planning phase or preactive phase

guaranteeing by the end of the interactive phase, the lesson focus is highly accomplished. Reference to recording of a lesson plan is not limited to a written lesson plan, audio lesson planning is a possibility, computer generated simulations could be prepared, or gamification software developed to design and structure lesson planning ideas as a way forward, especially with teaching and teacher training welcoming its most computer-literate generation of teachers who have grown to work, play and think with a computer (Goodwyn, 2011). This teacher planning is one which encapsulates rich professional dialogue focusing on the cognate nature of teaching, for the purposes of teacher professional learning (see Eraut, 2004), potentially online interactive game-based, for instance, rather than the current state which is behaviourist, positivist informed evidence-based observation, used for business oriented performance management for the sole purpose of quantifiably measured accountability, which seems currently imbued will one-size-fits-all collective CPD. The seamless transition from the preactive to the interactive and postactive phases is surely what teaching, and teaching of the future is all about.

Findings in the generic study of expertise have guided this study and informed direction regarding specific areas of focus, for example, using intuition as a key attribute of experts. While the process of teaching is dissimilar to other professions in how to recognise or identify expertise, research on expertise has ensured this study progresses swiftly to pertinent issues relating to teacher cognition, planning, teaching, and ultimately learning. Regarding methods and methodology, an open-minded approach is reflected in the use of multimethod.

Multisource data has also ensured that validity is upheld, as well as creating the possibility of rich data generation within minimal time frames, while upholding the foundations of the qualitative tradition. This study raised some questions at the onset. In trying to answer these questions, other questions are generated which should provide future researchers with in-roads into understanding teacher cognition.

For the first time in research on teaching, teacher cognition has been studied holistically. In order to achieve this holistic view of teacher cognition, literature on teacher cognition and/or teacher thinking was carefully studied and probably all papers which have focused on cognitive processes in teaching were examined to source out their outlook on teacher cognition, and specifically which cognitive process or processes were focused on. From this review, it became evident teacher cognition and teacher thinking were used interchangeably by researchers in this field. Most researchers used words such as teacher thinking, teacher cognition, and teacher beliefs, to refer to teacher cognition. Expressions along the lines of 'thinking which influences teacher action' were also seen to be prominent in the literature on teacher cognition. Importance must be given to language as a cognitive process in its own right, but this was taken to be beyond the scope of this study as it delved into concepts which required deeper linguistic understanding typical of TEFL research (e.g. Borg, 2003). Since this current study on teacher thinking was seeking to understand secondary English teachers, as the case is in the UK –majority of students using English as a native language, it was necessary to side-step the demands of language as a cognitive process.

Cognitive processes as used by researchers of teacher cognition are: decision making, problem solving, memory, reasoning, judgement, intuition, and perception. These are the cognitive processes which occurred regularly in literature, mostly in teaching (secondary), teacher education literature, and teaching in general. To achieve this holistic view of teacher cognition, the data was investigated to find each of these cognitive processes, where they were explicitly mentioned by the participants, where participants make references which signal particular cognitive processes. These utterances guided the coding and thematic development, as well as the interpretations the researcher brought to the data through analysis. This explains how the holistic perspective of cognitive processes has come into being in this study, a perspective which is innovative. To have attempted to take a holistic view of teacher cognition, might have been a near impossible task considering the various definitions of teacher cognition and how they seem to cover almost all of what a teacher's work involves, if it is acknowledged that teaching is cognate work. However, looking across work on cognitive processes in teaching as well as in other fields, it became obvious there were a fixed, small number of these processes. The bulk of the literature within these fixed number of cognitive processes tended to work on individual or a small group of cognitive processes as they applied to fields and subfields of various disciplines. Another area of considerable amount of literature on cognitive processes relates to nuances within a single cognitive process, for example; memory as long term and short term, recall, recall procedures, testing memory (e.g. in psychometric tests), lack of memory –health induced, enhancing memory naturally and artificially, memory issues and student behaviour, etc. Worthy of note is also the interspersing of other cognitive processes in these rather intensive

single aspect focused study. This means while discussing recall, for instance, problem solving or intuition will also be mentioned. This signalled to me that although an in-depth study of a single aspect within specific cognitive processes was enlightening, a more holistic view of the interplay of as many of the cognitive processes as possible in any one opportunity of research would be even more revealing. From my own personal experience of teaching, and everyday thinking it became clear there is constant delving into memory, raising perceptions etc. aiding reasoning and decision making. I felt that this was just an everyday experience of the nature of thinking. What began as an initial thought was further consolidated as I grew in my research skills, as a new researcher, and explored literature which showed these interactions. Most papers on teacher cognition had as their opening, a clear declaration of the specific cognitive processes which will be focused on. But as the discussion on that specific one developed further, other cognitive processes were mentioned. It became clear very quickly these cognitive processes were interconnected. This was further consolidated by studies which went on to combine mostly two cognitive processes and their interplay, fewer studies with three cognitive processes and a handful or less which delved into four of the cognitive processes. I decided to scour the literature across all fields, with content on teaching or related to teaching where possible. This led to the current holistic view of cognitive processes in teaching.

Another area which this study has explored in a unique manner is expertise development. Teacher quality (Hattie, 2003) is a contemporary issue and there are recent ground-breaking studies which reveal attributes, knowledge and descriptors relating to teacher quality. A range of studies also emphasise that the largest variable responsible for student performance

is the teacher (Hattie, 2003; The McKinsey report, 2007; Day et al., 2007; DFE, 2012a). The current study explores teacher quality using a development conceptual framework. The developmental approach is based on the Dreyfus model of skill acquisition. Teachers are passionate about their work, its intrinsic rewards, and extended extrinsic social responsibility which teachers themselves find rewarding. Most, if not all teachers who truly believe in teaching as a profession of life long engagement, seek to be the best 'product' of teacher quality. Despite extensive and intensive CPD opportunities, it seems majority of teachers are consigned to the competent level, as shown by the Dreyfus model. How teachers can move beyond this level has not yet been approached with a focused outlook as CPDs seem to have been distributed in a rather collective manner. For teachers who have aspired to the heights quality teaching requires, they have sought further postgraduate education, very often self-funded. This current study has used the Dreyfus model, in a way that has not been used in teaching before, but which has previously been described in great detail and highly recommended by researchers on teaching, for example; Berliner (1988), Eraut (2002), Hallam (2010) and Goodwyn (2011). This study has identified participants at various levels of expertise, as described in literature on expertise development, worked with these participants, and engaged in data collection which captures the cognition of teachers across the expertise continuum. It was necessary to do this because, at times studies on teacher cognition have been generic; talking about teachers as one big group, other times specific to teachers of one subject, still treated as one big group. Preservice teachers have been focused on significantly especially in teacher education literature. In instances where comparisons have been introduced, these were usually or typically a question of novice and experienced, with experienced lumped together again as one big group. The contemporary field of teacher

expertise development, has highlighted exigence for careful consideration of how experienced teachers are handled in research, especially taking into consideration the evidence provided by Ericsson et al. (2006) of the limitations of the notion of 'experienced'. This current study, based on literature on teaching as a journey, used purposive sampling to ascertain teachers reflective of the Dreyfus model were involved in the study. The milestone stages; novice, competent, expert were targeted. As explained already in 3.0, two of these milestone points have designated labels in the UK; NQT, and the former AST or the recent SLE status. Competence was informed by existing literature on teacher expertise with some modifications to existing criteria as suitable within the UK context. In essence, for the first time in teaching research, and teacher cognition research, the Dreyfus model of skills acquisition has been used empirically.

In sum, this study has made an original contribution in the following areas:

- Pioneering empirical use of the Dreyfus model of skill acquisition in the study of teacher expertise; providing an insight into the complex nature of teaching by capturing the more tacit component of teaching which is teacher cognition or teacher thinking evident across stages of expertise development
- Examining cognitive processes in lesson planning from a holistic perspective; identifying the following core cognitive processes: decision making, problem solving, reasoning, judgement, memory, perception, and intuition
- Identifying that the linear, rational, Tyler model of lesson planning predominantly used in schools minimally serves the lesson planning finesse of expert teachers;

stating that expert planning is non-linear, comprising multiple lesson trajectories, which are based on banks of varied permutations of lesson outcomes.

Before closing this study, it is relevant to revisit its context. The onset of the study (the preliminary phase) encountered a transitory period of education in the UK. Data collection for this current phase of the research has been undertaken over approximately two years. The close of the study, has seen some stability in consolidation of changes to the National Curriculum and the varied stages of its implementation depending on subject specialism, new assessment policies at the implementation stages, and legislation for compulsory 11-18 education. This research is therefore topical as it captures not only the complexity of teaching, the workings of the mind of the teacher when planning a lesson, but also the political, economic and social demands on the teacher with the resultant impact on the teacher in general. It must also be recalled the extended compulsory requirement brings with it the condition of success; inclusive of a pass grade in English. As already highlighted in the introduction, this makes the case of the secondary English teacher one pertinent to be explored. The current study on teacher cognition has ultimately revealed the intricacies of the mind of the teacher during planning, its tacit and tangible composition, the political dimension and its influence, social responsibility intrinsically embedded within a global economic environment of instability and fluctuation, as well as consolidating the place of English as a global language. The secondary English teacher, for instance, therefore seems to find themselves in a unique position.

This study set out to explore teacher cognition at the planning stage, specifically focusing on secondary English teachers. The aim was to identify patterns of teacher cognition and evidence of cognitive processes at different levels of expertise. Key findings include commonalities in lesson planning thinking across levels of expertise with inherent variances in teacher cognition within the different levels, captured in the depth of access and use of cognitive processes. The key finding regarding planning is the non-linear composition of expert planning antithetical to the dominant rational Tyler model. More focused professional learning opportunities could thus be carried out, based on these findings, to guarantee teacher growth towards expertise following the Dreyfus model using these innovative empirical insights into the workings of the mind of the teacher during lesson planning. A more contemporary outlook towards planning is pertinent, as this study has shown, should schools be aiming to consolidate their goal to provide students with optimal learning experiences aspiring towards achieving the best outcomes for the learners. The complex nature of teaching, herein captures insights into the tacit components and should facilitate further research on teaching which delves into the mind of the teacher, and cognitive processes from a holistic perspective across the preactive, interactive and postactive phases of teaching.

Having recapped the key findings, it is worth stating, Berliner (2004, p.203) says "adaptive or fluid experts appear to learn throughout their careers, bringing the expertise they possess to bear on new problems, and finding ways to tie the new situations they encounter to the knowledge base they have." In my opinion, in striving for excellence, expert teachers continue to grow. As a researcher in the field of teacher cognition, with an understanding of developing teacher expertise, it could be concluded, expertise is a dynamic process and the

point of expert on the continuum, possibly reveals other layers of further professional development opportunities. However, what this study exposes is an image of what the novice stage encompasses, what the competent stage presents and glimpses of expert level professional thinking, as well as further questions within the domain of developing expertise in teaching relating to teacher cognition during lesson planning. It should be emphasised, teacher cognition and the interplay of cognitive processes during lesson planning encapsulate the complex nature of teaching as a profession. These complexities of teaching thus highlighted could be further explored with an understanding of the stages of development imbued in the journey towards the heights of teacher quality epitomised in the expert teacher. Achieving expert status in teaching is embedded with a level of caution based on the knowledge that expertise is context specific and its nature could be understood from myriad viewpoints as well as within each professional in terms of individual differences. Teacher cognition as this study has explored it generates insights into the tacit element of teaching, its forms in the preactive phase, all gearing towards interactive and postactive phases of teaching. The secondary English teacher in this study is an example of how the mind of the teacher works when a lesson is being planned.

References

Abramson, C. I., 2013. Problems of teaching behaviorist perspective in the cognitive revolution. *Behaviour science*, 3, pp.55-71.

Adair, J., 2013. *Creating Success, Volume 9: Decision Making and Problem Solving* 2nd ed. [e-book] London: Kogan Page Ltd. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10660008> [Accessed 13 September 2015].

Akkerman, S., Van den Bosscheb, P., Admiraal, W., Gijselaers, W., Segers, M., Simonsa, R. and Kirschnerd, P., 2007. Reconsidering group cognition: from conceptual confusion to a boundary area between cognitive and socio-cultural perspectives? *Educational Research Review*, 2(1), pp.39–63.

Alexander, P., 2003. The development of expertise: the journey from acclimation to proficiency. *Educational researcher*, 32(8), pp.10–14.

Andrews, H. A., 2011. Supporting quality teachers with recognition. *Australian Journal of Teacher Education*, 36(12), pp.59-70.

Ansari, D., Coch, D. and De Smedt, B., 2011. Connecting education and cognitive neuroscience: where will the journey take us? *Educational philosophy and theory*, 43(1), pp.37–42.

Armrein-Beardsley, A., 2012. Recruiting expert teachers into high-needs schools: Leadership, money, and colleagues. *Education Policy Analysis Archives*, 20(27), pp.1–26.

Atkinson, T. and Claxton, G., eds., 2003. *The Intuitive practitioner: on the value of not always knowing what one is doing*. Buckingham: Open University Press.

Australian Institute for Teaching and School Leadership AITSL, 2012. [online] Certification of Highly Accomplished and Lead teachers: Principles and processes, April 2012. Available at: <http://www.aitsl.edu.au/search?q=certification> [Accessed 13 September 2015].

Baguley, M., 2013. Epistemologies in Role of Participants in Education Research. [e-book]In: W. Midgley, P. A. Danaher and M. Baguley, eds. 2013. *Role of participants in education research: The Ethics, Epistemologies, and Methods.* Abingdon: Routledge. Available through: Coventry University Library website <http://www.myilibrary.com?ID=425456> [Accessed 24 May 2015].

Baker, A. A. and Lee, J. J., 2011. Mind the gap: unexpected pitfalls in doing classroom research. *The Qualitative Report*, 16(5), pp.1435-1447.

Ball, D. L., Thames, M. H. and Phelps, G., 2008. Content knowledge for teaching: what makes it Special? *Journal of teacher education*, 59(5), pp.389–407.

Bar-Eli, M., Plessner, H. and Raab, M., 2011. *Judgment, Decision-Making and Success in Sport*, [e-book] Hoboken: John Wiley & Sons. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10494600> [Accessed 13 September 2015].

Beaty, R. E., Silvia, P. J., Nusbaum, E. C., Jauk, E. and Benedek, M., 2014. The roles of associative and executive processes in creative cognition. *Memory & Cognition*, 42(7), pp.1186 -1197.

Bédard, J. and Chi, M. T. H., 1992. Expertise. *Current directions in psychological science*, 1(4), pp.135–139.

Gilbert, I. ed., 2012.*The perfect Ofsted lesson: revised and updated 2012 Ofsted criteria*. Carmarthen: Independent thinking press.

Beins, B. C., 2010. Teaching the history of psychology: teaching measurement through historical sources, *History of psychology*, 13(1), pp.89-94.

Bender, A. and Beller, S., 2013. Cognition is…fundamentally cultural. *Behavioural Sciences*, 3(1), pp.42–54.

Benner, P., 2001. *From novice to expert: excellence and power in clinical nursing practice.* London: Prentice hall.

Benner, P., 2004. Using the Dreyfus model of skill acquisition to describe and interpret skill acquisition and clinical judgment in nursing practice and education. *Bulletin of science, technology & society*, 24 (3), pp.188–199.

Berliner, D. C., 1986. In pursuit of the expert pedagogue. *Educational researcher*, 15(7), pp.5-13.

Berliner, D. C., 1987. Ways of thinking about students and classrooms by more and less experienced teachers. In: J. Calderhead, ed. 1987. *Exploring teachers' thinking*. London: Cassell. pp.60-83.

Berliner, D. C., 1988. The development of expertise in pedagogy. *Charles W. Hunt Memorial Lecture, American Association of Colleges for Teacher Education New Orleans, La., February 17, 1988.*

Berliner, D. C., 1994. Remarks...to the Governor's task force on Teacher Education, Meeting at the College of Education, University of Arizona, February 16, 1984. *Paper submitted to the National Commission on Excellence in Teacher Education.*

Berliner, D. C, 2001. Learning about and learning from expert teachers. *International journal of educational research*, 35(5), pp.463–482.

Berliner, D. C., 2000. A personal response to those who bash teacher education. *Journal of teacher education,* 51(5), pp.358–371.

Berliner, D. C., 2004. Describing the behavior and documenting the accomplishment of expert teachers. *Bulletin of science, technology & society*, 24, (3), pp.200–212.

Bonawitz, E., Shafto, P., Gweon, H., Goodman, N. D., Spelke, E. and Schulz, L., 2011. The double-edged sword of pedagogy: instruction limits spontaneous exploration and discovery. *Cognition*, 120(3), pp.322–330.

Borg, S., 2003. Teacher cognition in grammar teaching: a literature review. *Language awareness*, 12, (2), pp.96 – 108.

Borg, S., 2005. Teacher Cognition in language teaching. In: K. Johnson, ed. 2005. *Expertise in second language learning and teaching*. Basingstoke: Palgrave Macmillan. pp.190-209.

Borg, S., 2006. *Teacher cognition and language education: research and practice.* London: Continuum.

Bornedal, P., 2010. *Monographien und Texte zur Nietzsche-forschung: Surface and the Abyss: Nietzsche as Philosopher of mind and knowledge.* [e-book] Berlin:Walter de Gruyter. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10402642> [Accessed 13 September 2015].

Boyle, J., 2010. Measuring cognitive processes in children with language impairment. *Developmental medicine and child neurology*, 52, (6), pp.503-504.

Boudah, D. J., 2011. *Conducting educational research: guide to completing a major project.* London: Sage.

Breere, J., ed., 2012. *The perfect OFSTED lesson*. Carmarthen: Independent thinking press.

Brinkmann, S. and Kvale, S., 2015. *Interviews: learning the craft of qualitative research interviewing*, 3rd ed. London: Sage.

Brook, A. and Akins, K., 2005. *Cognition and the brain: the philosophy and neuroscience movement.* Cambridge: Cambridge University Press. Available through: Coventry University library website <http://ebooks.cambridge.org/ebook.jsf?bid=CBO9780511610608> [Accessed 18 October 2015].

Brown, L. and Coles, A., 2003. Complex decision making in the classroom. In: T. Atkinson and G. Claxton, eds. 2003. *The intuitive Practitioner: on the value of not always knowing what one is doing.* Buckingham: Open University press. pp.165-181.

Bryman, A., 2008. *Social research methods*, 3rd ed. Oxford: Oxford University Press.

Burke, M., 2014. Modelling district nurse expertise. *British Journal of Community Nursing*, 19, (12), pp.608–611.

Burns, A. and Richards, J. eds., 2009. *The Cambridge guide to second language teacher education.* Cambridge: Cambridge University Press.

Butterfield, L. D., Borgen, W. A., Amundson, N. E. and Maglio, A. T., 2005. Fifty years of the critical incident technique: 1954-2004 and beyond. *Qualitative research,* 5(4), pp.475-497.

Byra, M. and Sherman, M. A., 1993. Preactive and interactive decision making decision tendencies of less and more experienced preservice teachers. *Research quarterly for exercise and sport,* 64, (1), pp.46–55.

Cain, B., 1989. With worldmaking, planning models matter. *English education*, 21(1), pp.2-29.

Calderhead, J., 1984. *Teachers' classroom decision-making*. Eastbourne: Holt education.

Calderhead, J., 1987. Developing a framework for elicitation and analysis of teachers' verbal reports. *Oxford review of education,*13(2) pp.183–189.

Carr, D. and Skinner, D., 2009. The cultural roots of professional wisdom: towards a broader view of teacher expertise. *Educational philosophy and theory,* 41(2), pp.141–154.

Charness, N. and Tuffiash, M., 2008. The role of expertise research and human factors in capturing, explaining, and producing superior performance. *Human factors,* 50, (3), pp.427–432.

Chatterjee, A., 2010. Disembodying cognition. *Language and cognition,* 2(1), pp.79–116.

Christians, C. G., 2005. Ethics and politics in qualitative research. In: N.K., Denzin and Y.S., Lincoln, eds. 2005. *The sage handbook of qualitative research,* 3rd ed. London: Sage.pp.139-164.

Clark, C. and Lampert, M., 1986. The study of teacher thinking: implications for teacher education. *Journal of teacher education,* 37(5), pp.27-31.

Clark, C. M., 1988. Asking the right questions about teacher preparation: contributions of research on teacher thinking. *Educational researcher*, 17(2), pp.5–12.

Coates, S., 2011. Second report on independent review of teacher standards: post – threshold, excellent teacher and advanced teacher standards. [online] A report presented to the secretary of state for education, December 2011. Available at: <https://www.google.co.uk/?gfe_rd=cr&ei=tJ31VeLZKczH8gf22JOQAQ#q=sally+coates+december+2011&start=0> [Accessed 13 September 2015].

Cohen, L., Manion L. and Morrison, K., 2011. *Research methods in education*, 7th ed., Oxon: Routledge.

Colarusso, D., 2010. Teaching English in a multicultural society: three models of reform. *Canadian journal of education*, 33(2), pp.432-458.

Collier, D. and Elman, C., 2008. Qualitative and multimethod research: organisations, publication, and reflections on integration. In: J. Box-Steffensmeier, H. Brady and D. Collier, eds. 2008. *The Oxford handbook of political methodology*. Oxford: Oxford University Press. pp.779-795.

Copeland, W. D., Birmingham, C., DeMeulle, L., D'Emidio-Caston, M. and Natal, D., 1994. Making meaning in classrooms: an investigation of cognitive processes in aspiring teachers, experienced teachers, and their peers. *American Educational Research Journal*, 31(1), pp.166-196.

Courey, S. J., Tappe, P., Siker, J. and LePage, P., 2013. Improved lesson planning with universal Design for Learning (UDL). *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children*, 36(1), pp.7–27.

Craft, H. and Bland, P. D. 2013. Ensuring lessons teach the curriculum with a lesson plan resource. *The clearing house,* 78(2), pp.88-93.

Curtis, W., Murphy, M. and Shield, S., 2013. *Foundations of education studies: research and education.* [ebook] Florence: Routledge. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10814745> [Accessed 17 September 2015].

Dall'Alba, G. and Sandberg, J., 2006. Unveiling professional development: a critical review of stage models. *Review of educational research*, 76 (3), pp.383–412.

Darling-Hammond, L., 2005. Teaching as a profession: Lessons in teacher preparation and professional development (Early childhood K-12 education higher education). *Phi Delta Kappan,* 87(3), pp.237-240.

Davies, C., 1992. English teacher ideologies: an empirical Study. *British Educational Research Journal,* 18(2), pp.193-207.

Day, C., Sammons, P., Storbart, G., Kington, A. and Gu, Q., 2007. *Teachers matter: connecting lives, work and effectiveness.* Berkshire: Open University Press.

Daza, M. T., Phillips-Silver, J., Ruiz-Cuadra, M. and Lopez-Lopez, F., 2014. Language skills and nonverbal cognitive processes associated with reading comprehension in deaf children. *Research in developmental disabilities*, 35(12), pp.3526–3533.

Denscombe, M., 2009. *Ground rules for social research: Guidelines for good practice.* 2nd ed. Berkshire: Open University Press. Available through: Reading University library website <http://site.ebrary.com/lib/reading/detail.action?docID=10350213 > [Accessed 17 October 2015].

Denzin, N. K. and Lincoln, Y. S., 2005. The discipline and practice of qualitative research. In: N.K. Denzin and Y.S. Lincoln eds. 2005. *The sage handbook of qualitative research,* 3rd ed. London: Sage. pp.1-32.

Denzin, N. K. and Lincoln, Y.S. eds., 2005. *The sage handbook of qualitative research*, 3rd ed. London: Sage.

Depaepe, F., De Corte, E. and Verschaffel, L., 2010. Teachers' approaches towards word problem solving: elaborating or restricting the problem context. *Teaching and teacher education*, 26(2), pp. 152–160.

Department for Children, Schools and Families, 2008. Delivering 14 -19 reforms: next steps. 2008. DCSF. Available at: <http://webarchive.nationalarchives.gov.uk/20081105174430/http://dcsf.gov.uk/publications/14-19nextsteps/ > [Accessed 25 May 2015].

Department for Education, 2011a. Teaching agency, 2011. Available at: <http://www.education.gov.uk/get-into-teaching/salary/teaching-salary-scales.aspx >Accessed [21 October 2012].

Department for Education, 2011b. Training our next generation of outstanding teachers: implementation plan, DFE. Available at: <https://www.gov.uk/government/publications/training-our-next-generation-of-outstanding-teachers-implementation-plan> [Accessed 25 May 2015].

Department for Education 2012a: Evidence of the STRB (School Teachers' Review Body): the case for change, DFE. Available at: <https://www.gov.uk/government/publications/evidence-to-the-strb-the-case-for-change >[Accessed 25 May 2015].

Department for Education, 2012b. Impact assessment - equalities impact assessment: academies bill [pdf]. Department of Education. Available at: <https://www.gov.uk/government/publications/equalities-impact-assessment-academies-bill > [Accessed 25 May 2015].

Department for Education, 2014a. National Curriculum in England: English programmes of study. Available at: < https://www.gov.uk/government/publications/national-curriculum-in-england-english-programmes-of-study> [Accessed 25 May 2015].

Department for Education, 2014b. Specialist Leaders of Education, DfE. Available at: < https://www.gov.uk/specialist-leaders-of-education-a-guide-for-potential-applicants > [Accessed 25 May 2015].

Dillon, J. and Maguire, M., 2011. Developing as a student teacher. In: J. Dillon and M. Maguire eds. 2011. *Becoming a teacher: Issues in secondary teaching*, 4th ed. [e-book]Maidenhead, GBR: Open University Press. p.3-11. Available from: Reading University library website <http://site.ebrary.com/lib/reading/reader.action?docID=10499006&ppg=6> . [Accesses 17 October 2015].

Doddington, C., 2013. The global search for better teaching: how should teachers think for themselves?. *Education 3-13: International Journal of Primary, Elementary and Early Years Education,* 41(2), pp.218-232.

Doecke, B., Green, B., Kostogris, A., Read, J. and Sawyer, W., 2007. Knowing practice in English teaching? Research challenges in representing the professional practice of English teachers. *English Teaching: Practice and Critique*, 6(3), pp.4-21.

Dreyfus, S. L. and Dreyfus H. L., 1986. *Mind over machine: the power of human intuition and expertise in the era of the computer.* Oxford: Blackwell.

Dreyfus, S. L. and Dreyfus, H. L., 2005. Peripheral vision: expertise in real world contexts. *Organisational behaviour,* 26(5), pp.779-792.

Dudley-Marling, C., Abt-Perkins, D., Sato, K. and Selfe, R., 2006. Teacher quality: the perspective of NCTE members. *English education*, 38(3), pp.167-193.

Dybicz, P., 2012. The ethic of care: recapturing social work's first voice. *Social Work.* 57(3), pp. 271-280.

Education and Skills Act 2008. (c.25). London: HMSO. Available at: <http://www.legislation.gov.uk/ukpga/2008/25/contents> [Accessed 17 October 2015].

Edwards, D., 1997. *Discourse and Cognition.* [e-book] London: SAGE Publications Ltd. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10369726 > [Accessed 13 September 2015].

England, T., 1996. Are professional teachers a good thing? In: I. F. Goodson and A. Hargreaves, eds. 1996. *Teachers' professional lives*. London: Falmer Press. pp.75-87.

Eraut, M., 2002. *Developing Professional knowledge and Competence.* London: Falmer Press.

Eraut, M., 2003. The intuitive practitioner: a critical overview. In: T. Atkinson and G. Claxton, eds. 2003. *The intuitive practitioner: on the value of not always knowing what one is doing*. Buckingham: Open University Press. pp.255-268.

Eraut, M., 2004. Informal learning in the workplace. *Studies in continuing education,* 26(2), pp.247-273.

Ericsson, K. A., 2006. Protocol analysis and expert thought: concurrent verbalizations of thinking and expert performance on representative tasks. In: K. A. Ericsson, P. J. Feltovich, P. J. Hoffman and R. R. Charness, eds. 2006. *The Cambridge handbook of expertise and expert performance.* Cambridge: Cambridge University Press. pp.223-242.

Eriscsson, K. A., Feltovich, P. J., Hoffman, R. R. and Charness, N. eds., 2006. *The Cambridge handbook of expertise and expert performance.* Cambridge: Cambridge University Press.

Ericsson, K. A. and Fox, M. C., 2011. Thinking aloud is not a form of introspection but a qualitatively different methodology: reply to Schooler (2011). *Psychological Bulletin,* 137(2), pp.351–354.

Ethell, R. G. and McMeniman, M. M., 2000. Unlocking the knowledge in action of an expert practitioner. *Journal of teacher education*, 51(2), pp.87-101.

Etscheidt, S., Curran, C. M. and Sawyer, C. M., 2011. Promoting reflection in teacher preparation programs: A multilevel model. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children,* 35(1), pp.7–26.

Exley, B. and Chan, M. Y., 2014. Tensions between policy and practice: reconciliation agendas in the Australian curriculum English. *English teaching: practice and critique,*13(1), pp.55-75.

Fairbanks, C. M., Duffy, G. G., Faircloth, R. S., He, Y. Levin, B., Rohr, J. and Stein, C., 2010. Beyond knowledge: exploring why some teachers are more thoughtfully adaptive than others. *American association of colleges for teacher education,* 61(1- 2), pp.161–171.

Farringdon-Darby, T. and Wilson, J., 2006. The nature of expertise: a review. *Applied egornomics,* 37(1), pp.17-32.

Feldon, D. F., 2007. Cognitive load and classroom teaching: the double-edged sword of automaticity. *Educational psychologist,* 42(3), pp.123-137.

Fenstermacher, G. D., 1994. The knower and the known: the nature of knowledge in research on teaching. *Review of research on education,* 20(1), pp.3–56.

Feryok, A., 2010. Language teacher cognitions: Complex dynamic systems? *System* 38, pp.272-279.

Fleming, M. and Stevens, D., 2015. *English teaching in the secondary school,* 4th ed.[e-book] London: Routledge. Available through: Reading University library catalogue <http://www.tandfebooks.com.idpproxy.reading.ac.uk/doi/view/10.4324/9781315695006 > [Accessed 17 October 2015].

Fogarty, J. L., Wang, M. C. and Creek, R., 1983. A descriptive study of experienced and novice teachers' interactive instructional thoughts and actions. *The Journal of Educational Research,* 77 (1), pp.22-32.

Forester, J., 1991. Anticipating implementation: reflective and normative practices in policy analysis and planning. In: D. A. Schön ed. 1991. *The reflective turn: case studies in and on educational practice.* London: Teachers College press. pp.191-212.

Frederiksen, N., 1984. Implications of cognitive theory for instruction in problem solving. *Review of educational research*, 54(3), pp.363–407.

Frost, N., 2011. *Qualitative research methods in psychology*. Maidenhead: McGraw-Hill.

Furlong, J., 2003. Intuition and the crisis of teacher professionalism. In: T. Atkinson and G. Claxton, eds. 2003. *The intuitive practitioner: on the value of not always knowing what one is doing.* Cambridge: Cambridge University Press. pp.15-31.

Gannon, S., 2012. Changing lives and standardising teachers: the possibilities and limits of professional standards. *English Teaching: Practice and Critique*, 11(3), pp.59-77.

Garrett, D., 2002. *Cognition and commitment in Hume's philosophy*. [e-book] Cary: Oxford University Press. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10278627> [Accessed 13 September 2015].

Garrett, S. K., Caldwell, B. S., Harris, E. C. and Gonzalez, M. C., (2009) Six dimensions of expertise: a more comprehensive definition of cognitive expertise for team coordination, *Theoretical Issues in Ergonomics Science*, 10(2), pp.93-105.

Gere, A. R. and Berebitsky, D., 2009. Standpoints: perspectives on highly qualified English teachers. *Research in the teaching of English*, 43(3), pp.247–262.

Gettinger, M., Stoiber, K. C. and Lange, J., 1999. Collaborative investigation of inclusive early education practices: a blueprint for teacher-researcher partnership. *Journal of Early Intervention*, 22(3), pp.257-265.

Gibbons, S., 2009. Lessons from the past? *English Teaching: Practice and Critique*, 8(1), pp.64-75.

Gibson, W., 2010. Qualitative research analysis in education. In: D. Hartas, ed. 2010. *Educational research and inquiry: qualitative and quantitative approaches.* London: Continuum. pp.295-307.

Goeke, J. L., 2008. A preliminary investigation of prospective teachers' reasoning about case studies with expert commentary. *Teacher education and special education: The journal of the teacher education division of the council for exceptional children*, 31(1), pp.21–35.

Goertz, G. and Mahoney, J., 2012. *Tale of two cultures: qualitative and quantitative research in the Social Sciences.* [e-book]Princeton: Princeton University Press. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10583904> [Accessed 05 September 2015].

Goldbaher, D. and Anthony, E., 2007. Can teacher quality be effectively assessed? National board certification as a signal of effective teaching. *The review of economics and statistics,* 89(1), pp. 134–150.

Goodwyn, A., 2004. Literacy versus English? a professional identity crisis. In: A. Goodwyn and A. W. Stables, eds. 2004. *Learning to read critically in Language and Literacy. Learning to read critically.* [e-book]London: Sage. pp.192-204. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10256873> [Accessed 18 September 2015].

Goodwyn, A., 2011. *The expert teacher of English.* Oxon: Routledge.

Goodwyn, A., 2012. One size fits all: the increasing standardization of English teachers' work in England', *English teaching: practice and critique*, 11(4), pp.36–53.

Goodwyn, A., Protopsaltis, A. and Fuller, C., 2009. *Outstanding teachers and ICT*. In proceedings of the 27th international conference on design of communication ACM SIDOC, Bloomington, pp. 51-58.

Gossman, P., 2008. Teaching development: experience and philosophy (using the three Rs). *Teacher education quarterly*, 35(2), pp.155-169.

Goswami, U., 2004. Neuroscience and education: a review. *British journal of educational psychology,* 74(1), pp.1-14.

Griffin, C. C., Jones, H. A. and Kilgore, K. L., 2006. A collaborative study of student teachers' experience with collaborative problem solving. *Teacher education and special education: the journal of the teacher education division of the council for exceptional children,* 29(1), pp.44 -55.

Griffin, M. L., 2003. Using critical incidents to promote and assess reflective thinking in preservice teachers. *Reflective Practice,* 4(2), pp.207-220.

Griffin, M. L. and Scherr, T. G., 2010. Using critical incident reporting to promote objectivity and self-knowledge in pre-service school psychologists. *School of psychology international*, 31(1), pp. 3–20.

Grossman, P. and McDonald, M., 2008. Back to the future: directions for research in teaching and teacher education. *American educational research journal,* 45(1), pp.184-205.

Grossman, P. and Stodolsky, S. S., 1994. Considerations of content and the circumstances of secondary school teaching. *Review of research in education,* 20(1), pp.179–221.

Hallam, S., 2010. Transitions and the development of expertise. *Psychology teaching review*, 16, (2), pp.3–32.

Halsey, V., 2011. Brilliance by Design: *Creating Learning Experiences That Connect, Inspire, and Engage*.[ebook] Williston: Berrett-Koehler. Available through: Coventry

University Library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10440694> [Accessed 13 September 2015].

Hancock, C. B. and Scherff, L., 2010. Who will stay and who will leave? Predicting secondary English teacher attrition risk. *Journal of teacher education,* 61(4), pp.328–338.

Hargreaves, A., 2000. Four ages of professionalism and professional learning. *Teaching and teacher education: history and practice,* 6(2), pp.151–182.

Harrison, J. K. and Lee, R., 2011. Exploring the use of critical incident analysis and the professional learning conversation in an initial teacher education programme. *Journal of Education for Teaching*, 37(2), pp.199–217.

Harteis, C. and Billett, S., 2013. Intuitive expertise: theories and empirical evidence. *Educational research review,* 9, pp.145–157.

Hartas, D., 2010. *Educational research and inquiry: qualitative and quantitative approaches.* London: Continuum.

Hattie, J., 2003. *Teachers make a difference: What is the research evidence?* In proceedings of the Australian Council for Educational Research Annual Conference, Building Teacher Quality. University of Auckland, pp.1-17.

Haynes, A., 2010. *Complete guide to lesson planning and preparation.* [e-book]. London: Continuum. Available through: Reading University library website <http://www.myilibrary.com?ID=282208> [Accessed 17 October 2015].

Heaton, J., 2004. *Reworking Qualitative Data*. [e-book] London*:* SAGE Publications Inc. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10080920> [Accessed 13 September 2015].

Henessey, J. and McNamara, P. M., 2013. At the altar of educational efficiency: performativity and the role of the teacher. *English teaching: practice and critique,* 12(1), pp.6-22.

Hewitt, D., 2008. *Understanding effective learning: strategies for the classroom*. Maidenhead: McGraw Hill Open University Press.

Higham, R. and Earley, P., 2013. School autonomy and government control: school leaders' views on a changing policy landscape in England. *Educational Management Administration & Leadership,* 41(6), pp.701–717.

Hodgkinson, G., Sadler-Smith, E., Burke, L., Claxton, G. and Sparrow, P., 2009. Intuition in Organizations: Implications for Strategic Management. *Long Range Planning,* 42(3), pp.277-297

House of Commons education committee, 2012. *Great teachers: attracting, training and retaining the best, report on the national enquiry into the expenditure, administration and policy of the Department for Education and its associated public bodies*. [online] House of Commons education committee, London. Available at: <http://www.publications.parliament.uk/pa/cm201012/cmselect/cmeduc/1515/151502.htm > [Accessed 13 September 2015].

Howard-Jones, P., 2006. *Neuroscience and education: Issues and opportunities*. [online]A commentary by the Teaching and Learning Research Programme, funded by the ESRC. Available at: <http://researchcatalogue.esrc.ac.uk/grants/RES-139-25-0178/outputs/read/6c052c65-4809-4dc4-ab9c-d85ffe22a3db > [Accessed 20 September 2015].

Howey, K. R. and Grossman, P. L., 1989. A study in contrast: sources of pedagogical content knowledge for secondary English. *Journal of teacher education,* 40(5), pp.24–31.

Hufford, D., 2009. A hidden outcome: the *who* of the teacher', *Journal of philosophy and the history of education,* 59, pp.7–13.

Hung, W., 2013. Team-based complex problem solving: a collective cognition perspective. *Educational technology research & development,* 61(3), pp.365–384.

Ingvarson, L., 2009. Developing and rewarding excellent teachers: the Scottish chartered scheme. *Professional Development in Education,* 35(3), pp.451-468.

Ingvarson, L., 2010. Recognising accomplished teachers in Australia: Where have we been? Where are we heading? *Australian Journal of Education,* 54(1), pp.46–71.

Ingvarson, L., 2011. Trust the teaching profession with the responsibilities of a profession. *Teachingscience,* 57(3), pp.7–10.

Ireson, J., 2008. *Learners, Learning and educational activity*. London: Routledge.

Isbell, J. S. and Jolivette, C., 2011. Stop, think, proceed: solving problems in the real world. *Intervention in school and clinic,* 47(1), pp.31–38.

Jarvis, P. and Parker, S., eds. 2004. *Human learning: an holistic approach.* [e-book]. London: Routledge. Available through: Coventry University Library website <http://www.myilibrary.com?ID=40026> [Accessed 25 May 2015].

Jewitt, C., Bezemer, J., Jones, K. and Kress, G., 2006. Changing English? The impact of technology and policy on a school subject in the 21st Century. *English teaching: practice and critique,* 8(3), pp.8-20.

John, P., 2003. Awareness and intuition: how student teachers read their own lessons. In: T. Atkinson and G. Claxton, eds. 2003. *The intuitive practitioner: on the value of not always knowing what one is doing,* Buckingham: Open University Press. pp.84-106.

John, P. D., 2006. Lesson planning and the student teacher: re-thinking the dominant model', *Journal of curriculum studies*, 38(4), pp.483-498.

Johnson, K., ed. 2005a. *Expertise in second language learning and teaching*. Basingstoke: Palgrave Macmillan.

Johnson, K., 2005b. The 'general' study of expertise. In: K. Johnson ed. 2005. *Expertise in second language learning and teaching.* Basingstoke: Palgrave Macmillan. pp.11-33.

Jones, K. A., Jones, J. and Vermette, P. J., 2011. Six common lesson planning pitfalls – recommendations for novice educators. *Education,* 131(4), pp.845–864.

Kagan, D. M., 1988. Teaching as clinical problem solving: a critical examination of the analogy and its implications. *Review of educational research,* 58(4), pp.482-505.

Kagan, D. M., 1990. Goldilocks Principle Ways of Evaluating Teacher Cognition: Inferences Concerning the Goldilocks principle. *Review of educational research,* 60(3), pp.419-469.

Kagan, D. M., 1992. Professional growth among preservice and beginning teachers. *Review of educational research,* 62(2), pp.129–169.

Kahneman, D., 2003. A perspective on judgment and choice: mapping bounded rationality. *American psychology*, 58(9), pp.697–720.

Kahneman, D. and Klein, G., 2009. Conditions for intuitive expertise: a failure to disagree. *American psychologist*, 64(6), pp.515–526.

Kennedy, M., 1987. Inexact Sciences: Professional education and the development of expertise. *Review of research in education,* 14(1), pp.133–167.

Kersting, N. B., Gavvin, K. B., Thompson. B. J., Santagana, R. and Stigler, J. W., 2012. Measuring usable knowledge: teachers' analysis of mathematics classroom videos predict teaching quality and teacher learning. *American educational research journal*, 49(3), pp.568–589.

Kinchin, I. M. and Cabot, L. B., 2010. Reconsidering the dimensions of expertise: from linear stages towards dual processing. *London Review of Education,* 8(2), 153-166.

Klassen, R. M. and Tse, V. M. C., 2014. Teachers' self – efficacy, personality, and teaching effectiveness: a meta – analysis. *Educational research review,*12, pp.59 -76.

Kleinknecht, M. and Schneider, J., 2013. What do teachers think and feel when analysing videos of themselves and others. *Teaching and teacher education,* 33, pp.13-23.

Kluwin, T. M., McAngus, A. and Feldman, D. M., 2001. The limits of narratives in understanding teacher thinking. *American annals of the deaf,* 146(5), pp.420–428.

Krull, E., Oras, K. and Sisask, S., 2007. Differences in teachers' comments on classroom events as indicators of their professional development. *Teaching and teacher education,* 23(7), pp.1038 –1050.

Kugel, P., 1986. Thinking may be more than computing. *Cognition,* 22(2), pp.137-198.

Kvale, S. and Brinkmann, S., 2009. *Interviews: learning the craft of qualitative research interviewing,* 2nd ed. Thousand Oaks: Sage.

Lampert, M. and Clark, C., 1990. Expert Knowledge and Expert thinking in teaching: A response to Floden and Klinzing. *Educational researcher,* 19(5), pp.21-23.

Lampert, M., Franke, M. L., Kazemi, E., Ghousseini, H., Turrou, A. C., Beasley, H., Conard, A. and Crowe, K., 2013. Keeping it complex: using rehearsals to support novice teacher learning of ambitious teaching. *Journal of teacher education,* 64(3), pp.226–243.

Laurie, J., 2011. Curriculum planning and preparation for cross-curricular teaching. In: T. Kerry ed. *Cross-curricular planning in the primary school: planning and facilitating imaginative lessons*.[e-book]Abingdon: Routledge.pp.125 -141. Available through: Reading University library website< http://reading.eblib.com/patron/FullRecord.aspx?p=958255> [Accessed 17 October 2015].

Leahey, T. H., 2003 'Herbert A. Simon: Nobel Prize in Economic Sciences, 1978. *American psychologist,* 58(9), pp.753–755.

Lee, P., 1996. *Whorf theory complex: a critical reconstruction.* [e-book] Amsterdam: John Benjamin publishing. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10481820> [Accessed 5 September 2015].

Lee, P., 1997. Language in thinking and learning pedagogy and the new Whorfian framework. *Harvard educational review,* 67(3), pp.430–471.

Le Fevre, D. M., 2014. Barriers to implementing pedagogical change: the role of teachers' perceptions of risk. *Teaching and teacher education,* 38, pp.56–64.

Legislation, 2008. Education and Skills act, c.25 [pdf]. Legislation. Available at: <http://www.legislation.gov.uk/ukpga/2008/25/contents> [Accessed 25 May 2015]

Legislation, 1988. Education reform act [pdf]. Legislation. Available at: <http://www.legislation.gov.uk/ukpga/1988/40/contents > [Accessed 25 May 2015].

Leiberman, A. and Hace, D. P., 2010. Making Practice Public: Teacher Learning in the 21st Century. *Journal of Teacher Education,* 61(1-2), pp.77–88.

Lejeune, M., 2011. Tacit knowledge: revisiting the epistemology of knowledge. *McGill journal of education,* 46(1), pp.91 -105.

Lewin, A. and Silver, C., 2007. *Using software in qualitative research: a step-by-step guide,* London: Sage.

Li,Y. and Kaiser, G. eds., 2010. *Expertise in mathematics instruction: an international perspective,* New York: Springer.

Livingston, C. and Borko, H., 1989. Expert-Novice differences in teaching: a cognitive analysis and implications for teacher education. *Journal of Teacher Education,* 40(36), pp.36-42.

Loughran, J., 2006. *Developing a pedagogy of teacher education: understanding teaching and learning about teaching.* London: Routledge.

Loughran, J., 2010. *What expert teachers do: enhancing professional knowledge of classroom practice.* Abingdon: Routledge.

Loughran, J., 2013. Pedagogy: making sense of the complex relationship between teaching and learning. *Curriculum Inquiry*, 1(43), pp.118–141.

Loughran, J, J., 1996. *Developing reflective practice: learning about teaching and learning through modelling.* London: Falmer Press.

Mahon, R. L., 2007. Bet you would not call a holistic plumber. *Holistic Education*, 81(2), pp.90–92.

Malin, T., 1994. *Cognitive processes: attention, perception, memory, thinking and language,* Basingstoke: Macmillan.

Marschark, M., Siple, P. and Lillo-Martin, D. eds., 1997. *Relations of Language and Thought: The View from Sign Language and Deaf Children.* [e-book] Cary: Oxford University Press. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10279315 > [Accessed 13 September 2015].

Marsh, J. A. and Farrell, C. C., 2014. How leaders can support teachers with data-driven decision making: a framework for understanding capacity building. *Education management administration and leadership,* pp.1-21.

Marshall, C. and Rossman, G. B., 2011. *Designing qualitative research,* 5th ed. London: Sage.

Matthewman, S., 2014. Clearing the ground for a greener New Zealand English. *English teaching: practice and critique,* 13(1), pp.95–111.

Mayer, R., 1983. *Thinking, problem solving, cognition*, 2nd ed. NewYork: Freeman & company.

Mayo, K. E., 2002. Teacher leadership: the master teacher model. *Management in education,* 16(3), pp.29–33.

McArdle, F., 2010. Preparing quality teachers: making learning visible. *Australian Journal of Teacher Education,* 35(8), pp.60–78.

McDonald, M., Kazemi, E. and Kavanagh, S. S., 2013. Core principles and pedagogies of teacher education: a call for a common language and collective activity. *Journal of teacher education,* 64(5), pp.378-386.

McEwan, H., 2011. Narrative reflection in the philosophy of teaching: genealogies and portraits. *Journal of philosophy of Education,* 45(1), pp.125-140.

McNergney, R., Lloyd, J., Mintz, S. and Moore, J., 1988. Training for pedagogical decision making. *Journal of teacher education,* 39(5), pp.37–43.

Mehler, J. and Franck, S. eds., 1995. *Cognition on Cognition.* London: The Mitt press.

Meijer, P. C., Verloop, N. and Beijaard, D., 2002. Multi-method triangulation in a qualitative study on teachers' practical knowledge: an attempt to increase internal validity. *Quality & Quantity*, 36, pp.145-167.

Meijer, P. C., Zanting, A. and Verloop, N., 2002. How can student teachers elicit experienced tearchers' practical knowledge?: Tools, suggestions and significance. *Journal of Teacher Education*, 53(5), pp. 406-419.

Mena Marcos, J. J. and Tillema, H., 2006. Studying studies on teacher reflection and action: An appraisal of research contributions. *Educational Research Review,* 1(2), pp.112–132.

Merriam, S. B., 2009. *Qualitative research: a guide to design and implementation*, 3rd ed. San Francisco: Wiley.

Migo, E. M., Mayes, A. R. and Montaldi, D., 2012. Measuring recollection and familiarity: improving the remember / know procedure. *Consciousness and cognition*, 21(3), pp.1435–1455.

Miller, J. E., Patterson, E. S. and Woods, D. D., 2001. Critiquing as a Cognitive Task Analysis (CTA) methodology. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting,* 45(4), pp.518–522.

Morse, J., Barrett, M., Mayan, M., Olson, K. and Spiers, J., 2002. Verification strategies for establishing reliability and validity in qualitative research. *International journal of qualitative methods*, 1(2), pp.13-22.

Mylopoulos, M. and Wood, N. N., 2009. Having our cake and eating it too: seeking the best of both worlds in expertise research. *Medical education*, 43(5), pp.406–413.

Nathan, M. J. and Petrosino, A., 2003. Expert blind spot among preservice teachers. *American educational research journal*, 40(4), pp.905–925.

National Board for Professional Teaching Standards, NBPTS 2014. [online] *National Board Standards.* Available at: <http://www.nbpts.org/national-board-standards> [Accessed 19 August 2015].

Neely, A. M., 1986. Planning and problem solving in Teacher Education. *Journal of teacher education*, 37(3), pp.29–33.

Nilsson, M., Ejlertsson, G., Andersson, I. and Blomqvist, K., 2015. Caring as a salutogenic aspect in teachers' lives'. *Teaching and teacher education,* 46, pp.51-61.

Nilsson, P., 2009. From lesson plan to new comprehension: exploring student teachers' pedagogical reasoning in learning about teaching. *European Journal of Teacher Education*, 32(3), pp.239–258.

Nissila, S., 2005. Individual and collective reflection: how to meet the needs of development in teaching. *European journal of teacher education,* 28(2), pp.209–219.

Noddings, N., 2007. *Philosophy of education,* 2nd ed. Colorado: Westview Press.

Normand, S. and Tannock, R., 2014. Screening for working memory deficits in the classroom: the psychometric properties of the working memory rating scale in a longitudinal school-based study. *Journal of attention disorders*, 18(4), pp.294–304.

Olson, J., 1992. *Understanding teaching: beyond expertise.* Milton Keynes: Open University Press.

Oppenheim, A., 1992. *Questionnaire design, interviewing and attitude measurement*, new ed. London: Continuum.

Orosco, M. J., Swanson, H. L., O'Connor, R. and Lussier, C., 2013. The effects of dynamic strategic math on English Language learners' work problem solving. *Journal of special education,* 47(2), pp.96-107.

Palmer, D. J., Stough, L. M., Burdenski Jr, T. K. and Gonzales, M., 2005. Identifying teacher expertise: an examination of researchers' decision making. *Educational psychologist,* 40(1), pp. 13–25.

Panasuck, R. M. and Todd, J., 2005. Effectiveness of lesson planning: factor analysis. *Journal of instructional psychology,* 32(3), pp.215–232.

Panasuk, R., Stone, W. and Todd, J. 2002. Lesson planning strategy for effective mathematics teaching. *Education,* 122(4), pp.808–828.

Pardoe, D., 2009. *Towards successful learning.* 2nd ed.[e-book] London: Continuum. Available through: Coventry University library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10427670> [Accessed 17 October 2015].

Parker, M. J. and Winne, P. H., 1995. The place of cognition in explanations of teaching: a dialogue of interpretive and cognitive approaches. *Teaching and teacher education*, 11(1), pp.1-21.

Passmore, J., 1980. *The philosophy of teaching*, London: Duckworth.

Patry, J., 2013. Beyond multiple methods: critical multiplism on all levels. *International journal of multiple research approaches,* 7(1), pp.50-65.

Perrot, E., 1982. *Effective teaching: A practical guide to improving your teaching*, London: Longman.

Petterson, P., Marx, R. and Clark, C., 1978. Teacher planning, teacher behavior and student achievement. *American Educational Research Journal*. 15(3), pp.417-432.

Phye, G. D., ed. 1996, *Educational psychology: Handbook of academic Learning: Construction of Knowledge.* [e-book] Burlington: Academic Press. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10206362 > [Accessed 10 October 2015].

Pickering, S. J. ed., 2006. *Working Memory and Education*. [e-book] Burlington: Academic Press. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10138358> [Accessed 13 September 2015].

Polanyi, M., 1958. *Personal Knowledge: towards a post-critical philosophy.* London: Routledge & Kegan.

Posner, M. I. and Rothbart, M. K., 2014. Attention to learning of school subjects. *Trends in neuroscience and education*, 3(1), pp.14-17.

Powell, D., Plaut, D. and Funnell, E., 2006. Does the PMSP connectionist model of single word reading learn to read in the same way as a child? *Journal of Research in Reading*, 29(2), pp.229–250.

Powell, R., 2000. Case-based teaching in homogeneous teacher education contexts: a study of preservice teachers' situative cognition. *Teacher and teacher education*, 16(3), pp.389–410.

Prytula, L. M., Hellsten, L. M and McIntyre, L. J., 2010. Perceptions of teacher planning time: an epistemological challenge. *Current Issues in Education*, 13(4), pp.1–40.

QSR international, 2011. [computer programme] NVivo 9, qualitative data analysis software: Getting started, Pty Ltd.

QSR international, 2014. [computer programme] NVivo 10 for Windows, qualitative data analysis software: Getting started, Pty Ltd.

Robson, C., 1993. *Real World research*, 2nd ed. Oxford: Blackwell publishing.

Rubin, L., 1989. The Thinking Teacher: Cultivating pedagogical intelligence. *Journal of teacher education*, 40(6), pp.31–34.

Sangster, M. ed., 2013. *Developing teacher expertise: exploring key issues in primary practice.* London: Bloomsbury Academic.

Santamaria, L. and Thousand, J., 2004. Collaboration, co-teaching, and differentiated instruction: a process-oriented approach to whole schooling. *International journal of whole schooling*, 1(1), pp.13–27.

Satterfield, J. M., Spring, B., Brownson, R. C., Mullen, E. J., Newhouse, R. P., Walker, B. B. and Whitlock, E. P., 2009. Toward a transdisciplinary model of evidence-based practice. *The Milbank Quarterly*, 87(2), pp.368–390.

Savin-Baden, M. and Major, C. H., 2013. *Qualitative research: the essential guide to theory and practice.* London: Routledge.

Schempp, P. G. and Johnson, S. W., 2006. Learning to see: developing the perception of an expert teacher. *Journal of physical education, recreation & dance*, 77(6), pp.29–33.

Schepens,A., Aelterman, A. and Van Keer, H., 2007. Studying learning processes of student teachers with stimulated recall interviews through changes in interactive cognitions. *Teaching and Teacher Education*, 23(4), pp.457–472.

Schoenfeld, A. H., 2014. What makes for powerful classrooms and how can we support teachers in creating them? A story of research and practice, productively intertwined, *Educational researcher*, 43(8), pp.404–412.

Schön, D. ed., 1991. *The reflective turn: Case studies in and on educational practice.* New York: Teachers college press.

Schrag, F., 2011. Does neuroscience matter for education?. *Educational theory*, 61(2), pp.221-237.

Scott, C. and Dinham, S., 2008. Born not made: the nativist myth and teachers' thinking. *Teacher development*, 12(2), pp.115–124.

Scott, D. and Morrison, M., 2007. *Key Ideas in Educational Research*. London: Continuum.

Seery, A., 2008. Ethics and professionalism in teaching. *Studies: an Irish quarterly review, Educating ourselves*, 97(386), pp.183-192.

Seidel, T. and Stürmer, K., 2014. Modeling and measuring the structure of professional vision in preservice teachers. *American educational research journal*, 51(4), pp.739–771.

Shavelson, R. J. and Berliner, D. C., 1988. Erosion of the education research infrastructure: a reply to Finn. *Educational researcher*, 17(1), pp.9-12.

Shavelson, R. J. and Stern, P., 1981. Research on teachers' pedagogical thoughts, judgements, decisions and behaviour. *Review of educational research*, 51(4), pp.455–498.

Shen, J., Poppink, S., Cui, Y. and Fan, G., 2007. Lesson planning: a practice of professional responsibility and development. *Educational horizons*, 85(4), pp.248–260.

Shulman, L. S. and Carey N. B., 1984. Psychology and the limitations of individual rationality: implications for the study of reasoning and civility. *Review of educational research,* 54(4), pp.501 -524.

Shulman, L. S. and Shulman, J. H., 2004. How and what teachers learn: a shifting perspective. *Journal of curriculum studies,* 36(2), pp.257–271.

Shulman, L. S., 1986. Those who understand knowledge growth in teaching. *Educational researcher,* 15(2), pp.4-14.

Shulman, L. S., 1999. Knowledge and teaching: foundations of the new reform. In: eds. J. Leach and B. Moon, 1999. *Learners and Pedagogy.* London: Sage. pp.61-77.

Shulman, L. S., 2000. Teacher development: roles of domain expertise and pedagogical knowledge. *Journal of Applied Developmental Psychology* 21(1), pp.129–135.

Shulman, L. S., 2002. Truth and consequences? Inquiry and policy in research on teacher education. *Journal of teacher education,* 53(3), pp.248–253.

Shulman, L. S., 2004. The wisdom of practice: essays on teaching, learning and learning to teach, 8. In: S. M. Wilson, ed. 2004. *Jossey-Bass higher and adult education series.* San Francisco: Jossey Bass.

Shulman, L. S., 2005. Pedagogies of uncertainty. *Liberal education,* 91(2), pp.18-25.

Smith, T. W. and Strahan, D., 2004. Toward a prototype of expertise in teaching: a descriptive case study. *Journal of Teacher Education*, 55(4), pp.357-371.

Sorensen, N.T., 2014. Improvisation and teacher expertise: a comparative case study. PhD thesis. Bath: Bath Spa University. Available through: Bath Spa University library <http://researchspace.bathspa.ac.uk/5128/ > [Accessed 25 October 2015].

Sotto, E., 1994. *When teaching becomes learning: a theory and practice of teaching*. London: Continuum education.

Sperling, D., and DiPardo, A., 2008. English education research and classroom practice: new directions for new times. *Review of education research*, 32(1), pp.62–108.

Squires, G., 1999. *Teaching as a professional discipline: a multi-dimensional education*. [e-book] London: Routledge. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10054792> [Accessed 13 September 2015].

Staller, K. M., 2010. Qualitative research. In: N.J. Salkin, ed. 2010. *The encyclopedia of research design*, 3. Thousand Oak: Sage. pp.1158-1162.

Sternberg, R. J., 1998. Abilities are forms of developing expertise. *Educational researcher,* 27(3), pp.11-20.

Storkerson, P., 2012. Naturalistic cognition: a research paradigm for human-centred design. *Journal of research practice,* 6(2), pp.1–23.

Strauss, S., Calero, C. and Sigman, M., 2014. Teaching naturally. *Trends in neuroscience and education journal,* 3(2), pp.38-43.

Strong, M., Gargani, J. and Hacifazlioglu, O., 2011. Do we know a successful teacher when we see one? Experiments in the identification of effective teachers. *Journal of Teacher Education,* 62(4), pp.367-382.

Stürmer, K., Könings, K. D. and Seidel T., 2013. Declarative knowledge and professional vision in teacher education: Effect of courses in teaching and learning. *British Journal of Educational Psychology,* 83(3), pp.467–483.

Sun, R., Terry, C. and Slusarz, P., 2005. The interaction of the implicit and the explicit in skill learning: a dual-processing approach. *Psychology review,* 112(1), pp.159–192.

Sutherland, R., Rojano, T., Bell, A. and Lins, R. eds., 2000. *Perspectives on School Algebra*. [e-book] Hingham: Kluwer Academic Publishers. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10051656 > [Accessed 13 September 2015].

Szekely, G., 2006. 30 years of planning: an artist-teacher's visual lesson plan books. *Art education,* 59(3), pp.48–53.

Tanni, M., 2012. Teacher trainees' information acquisition in lesson planning. *Information research,* 17(3), pp.1-19.

Tauber, R. T., 1988. Understanding measurement scales: The basis for valid decision making. *NASSP Bulletin,* 72(506), pp.78-83.

The McKinsey report, 2007. *How the world's best performing schools come out on top,* (authors M. Barber and M. Mourshed) McKinsey and Company. Available at: <http://mckinseyonsociety.com/how-the-worlds-best-performing-schools-come-out-on-top/> [Accessed 18 September 2015].

The Office for Standards in Education, Children's Services and Skills (Ofsted), 2003. *Advanced skill teachers: a survey, HMI 1767.* Available at: <http://dera.ioe.ac.uk/4794/ > [Accessed 18 September 2015].

The Office for Standards in Education, Children's Services and Skills (Ofsted), 2012. *Moving English forward: action to raise standards in English,* no. 110118. Available at: <https://www.gov.uk/government/publications/moving-english-forward> [Accessed 19 September 2015].

The Office for Standards in Education, Children's Services and Skills (Ofsted), 2009. *English at the crossroads: an evaluation of English in primary and secondary schools, 2005/08.* Available at:<http://webarchive.nationalarchives.gov.uk/20141124154759/http://www.ofsted.gov.uk/resources/english-crossroads-evaluation-of-english-primary-and-secondary-schools-200508> [Accessed 25 May 2015].

The Office for Standards in Education, Children's Services and Skills (Ofsted), 2010. *Generic grade descriptors and supplementary subject-specific guidance for inspectors on making judgements during subject survey visits to schools*, no.20100015, Ofsted. Available at: <http://dera.ioe.ac.uk/16034/ > [Accessed 18 September 2015].

The Office for Standards in Education, Children's Services and Skills (Ofsted), 2011. *Excellence in English: what we can learn from 12 outstanding schools,* Ofsted. Available at: <https://www.gov.uk/government/publications/excellence-in-english> [Accessed 25 May 2015].

The school Curriculum, 2007. *English programme of study for Key stage 3 and attainment targets.* Qualifications and Curriculum Authority (QCA). Available at: <http://teachfind.com/qcda/national-curriculum-statutory-requirements-key-stages-3-and-4-september-2008-pdf > [Accessed 18 September 2007].

Thompson, E., Lutz, A. and Cosmelli, D., 2005. Neurophenomenology: an introduction for neurophilosophers. [ebook] In: A. Brook and K. Akins, eds. 2010. *Cognition and the brain: the philosophy of neuroscience movement.* Cambridge: Cambridge University Press, pp.40–97. Available through: Coventry University Library website <http://ebooks.cambridge.org/chapter.jsf?bid=CBO9780511610608&cid=CBO9780511610608A010&tabName=Chapter> [Accessed 13 September 2015].

Toom, A. 2012. Considering the epistemology and artistry of tacit knowledge and knowing. *Educational theory,* 62(6), pp.621–640.

Torff, B. and Sessions, D., 2009. Principals' perceptions of the causes of teacher ineffectiveness in different secondary subjects. *Teacher education quarterly,* 36(3), pp.127-148.

Traianou, A., 2007. *Understanding teacher expertise in primary science: a sociocultural approach.* Rotherdam: Sense publishers.

Tripp, D., 1993. *Critical incidents in teaching: developing professional judgement.* London: Routledge.

Trout, Muffet. 2012., *Making the Moment Matter: Care Theory for Teacher Learning.* [e-book]. Rotterdam: Sense Publishers. Available through: Reading University library website <http://www.myilibrary.com?ID=501496> [Accessed 17 October 2015].

Tsui, A., 2002. *Understanding expertise in teaching: case studies of language teacher development,* Cambridge: Cambridge University Press.

Tsui, A., 2005. Expertise in teaching: perspectives and issues. In: K. Johnson, ed. 2005. *Expertise in Second language learning and teaching.* Basingstoke: Palgrave Macmillan. pp.167-189.

Turner, D. A., 2011. Which part of 'two way street' did you not understand? Redressing the balance of neuroscience and education. *Educational research review,* 6(3), pp.223–231.

Turner-Bisset, R., 1999. The knowledge bases of the expert teacher. *British education research journal,* 25(1), pp.39-55.

Turner-Bisset, R., 2001. *Expert teaching: knowledge and pedagogy to lead the profession.* London: Fulton Publishers.

Tyler, R.W., 1949. *Basic principles of curriculum and instruction,* London: The University of Chicago press.

van Someren, M.W., Barnard, Y.F. and Sandberg J. A.C., 1994. The think aloud: a practical guide to modelling cognitive processes, Department of Social Science Informatics University of Amsterdam. Published by Academic Press, London, 1994 ISBN 0-12-714270-3 Copyright M.W. van Someren, Y.F. Barnard and J.A.C. Barnard. Available at: <http://www.researchgate.net/publication/215439100_The_think_aloud_method_A_practical_guide_to_modelling_cognitive_processes > [Accessed 25 May 2015].

Vermette, P. J., Jones, K. A., Jones, J. L., Werner, T., Kline, C. and D'Angelo, J., 2010. A model for Planning Learning Experiences to promote achievement in diverse secondary classrooms. *SRATE journal,* 19(2), pp.70–83.

Vermunt, J, G. and Verloop, N., 1999. Congruence and friction between learning and teaching, *Learning and instruction,* 9(3), pp.257–280.

von Krogh, G., Ichijo, K. and Nonako, I., 2000. *Enabling knowledge creation: how to unlock the mystery of tacit knowledge.* Oxford: Oxford University Press.

Wagner, A., 1987. Knots in teachers' thinking. In: J. Calderhead, ed. 1987. *Exploring teachers' thinking.* London: Cassell. pp.161-178.

Wallace, B., Bernardelli, A., Molyneux, C. and Farrell, C., 2012. TASC: Thinking actively in a social context. A universal problem-solving process: a powerful tool to promote differentiated learning experiences. *Gifted education international,* 28(1), pp.58-83.

Ward, L., Grudnoff, L., Brooker, B. and Simpson, M., 2013. Teacher preparation to proficiency and beyond: exploring the landscape. *Asia Pacific Journal of Education,* 33(1), pp.68–80.

Webster, C. A. and Schempp, P. G., 2008. Self-monitoring: demystifying the wonder of expert teaching. *Journal of physical education, recreation & dance,* 79(1), pp.23–29.

Weisberg, R.W. and Reeves, L. M., 2013, *Cognition*: *From Memory to Creativity.* [e-book] Somerset, NJ: John Wiley & Sons. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/reader.action?docID=10657781> [Accessed 13 September 2015].

Welker, R., 1991. Expertise and the teacher as expert – rethinking a questionable metaphor. *American educational research journal*, 28(1), pp.19-35.

Westerman, D., 1991. Expert and novice teacher decision making. *Journal of Teacher Education*, 42(4), pp.292-305.

Wigfield, A., Guthrie, J., and Taboada, A., 2011. Alignment of Cognitive processes in reading with motivations for reading. [e-book] In: D. Lapp , D. Fisher, D. Lapp, D. Fisher, D. Lapp and D. Fisher, eds. 2011. *Handbook of research on teaching the English language arts*. London: Routledge. Ch.18. Available through: Reading University Library website <http://search.credoreference.com.idpproxy.reading.ac.uk/content/entry/routengart/alignment_of_cognitive_processes_in_reading_with_motivations_for_reading/0 > [Accessed 25 May 2015].

Wilkerson, T. and Scheffler, A., 1992. Examining an assumption of linkage between lesson planning and implementation. *Education*, 113(1), pp.74-79.

Willig, C., 2013. *Introducing qualitative research in psychology*, 3rd ed. Maidenhead: McGraw-Hill.

Winch, C., 1998. The philosophy of human learning.[e-book] London: Routledge. Available through: Coventry University library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10070520&force=1> [Accessed 17 October 2015].

Winch, C., 2010. *Dimensions of expertise: a conceptual exploration of vocational knowledge.* London: Continuum.

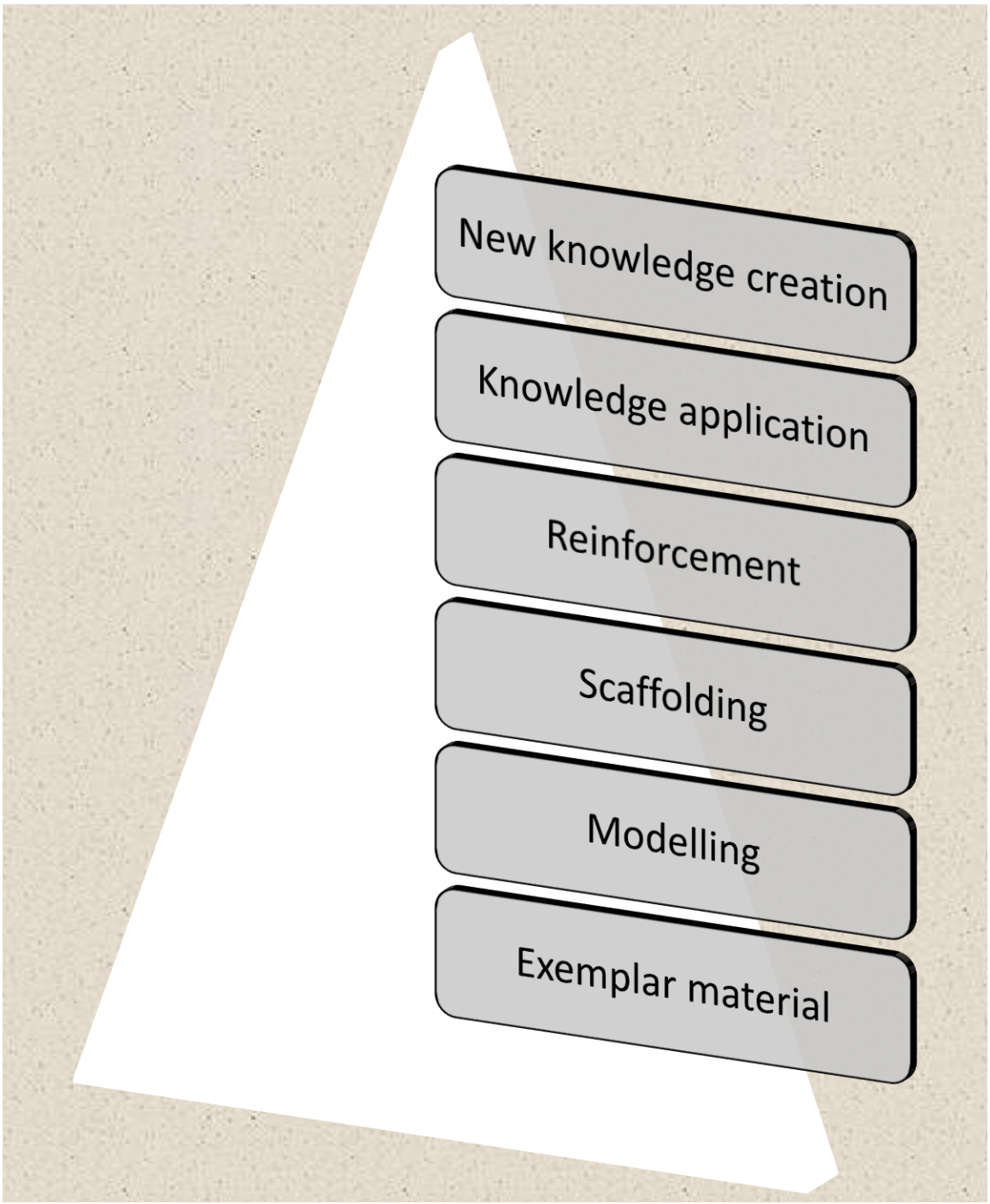
Woods, D., 1996. *Teacher cognition in language teaching: beliefs, decision-making and classroom practice.* Cambridge: Cambridge University Press.

Yinger, R., 1979. Routines in teacher planning. *Theory into practice*, 18(3), pp.163-169.

Young, M. H. and Balli, S. J., 2014. Gifted and talented education (GATE): student and parent perspectives. *Gifted child today*, 37(4), pp.236–246.

Zlatev, J., Andrén, M., Johansson Falck, M. and Lundmark, C., 2009. [e-book] Bringing language and cognition back together again. In: J. Zlatev, M. Andrén, M. Johansson Falck and C. Lundmark, eds. 2009. *Studies in language and cognition*. Available through: Coventry University Library website <http://site.ebrary.com/lib/coventry/detail.action?docID=10677136> [Accessed 5 September 2015].

Appendix A: Expert pyramid – planning and construction of learning during teaching.



Appendix B: Explanation of expert pyramid.

New knowledge creation	With the new knowledge creation the learner is usually on their own and apply concepts/ skills/ or even thinking in new ways/ new contexts/ new environments. Some of this may in the short term filter into the English subject area, medium term into cross curricular and co-curricular areas and long term in life! Covering all the bases of English as a school subject. This is impact that has been grown in the classroom and allowed to thrive beyond the classroom.	Creativity At this stage **all** cognitive processes are at play. For the teacher to **activate** cognitive processing in the students they have to walk the path of the students by going through the cognitive processes themselves and this is a conscious process!
Knowledge application	Independence from the learner is shown at this level. The key question is: is the learner able to recognise the concept / skill that has been learned without further prompting? Is the learner able to apply this knowledge independently Both questions could be based on a set class activity; group, pair or individual	Independent learning Learners must use **memory here! + reasoning + decision making + problem solving** Memory= remember the learning Reasoning =how best to apply it Decision making=choosing what to work on Problem solving=finding strategies to solve any problems: peers/ research/ or teacher When giving feedback about their work, students must be able to identify these cognitive processes and explain their knowledge application based on these.
Reinforcing	After providing support, one is still not sure. So there is the need to reinforce the scaffolding. This is not repeating what has been done but based on the 'grey areas' of the scaffolding a final deliberate effort to bring ALL on board.	**Judgement** Teacher based judgement Have the students achieved the height I planned for them to reach during this lesson? THIS HAPPENS IN THE MIDDLE of the lesson. **The learning peaks in the**

	However, the needs of learners at the scaffolding level need to be 'read' accurately! The level of expected accuracy depends on the level of expertise.	**middle NOT the end**. The lesson slows down towards the end to allow ss to think and be independent and creative and phase into their next lesson.
Scaffolding	Provide SUPPORT based on how well students have modelled the technique. Perception + evidence =intuition at a higher level will control this.	**Problem solving** Teacher-led facilitation: i.e. from what we are able to do which areas are 'missing' NOT cannot do, just what is missing ***at the moment***.
Modelling	Not afraid to get hands dirty – write the same paragraph you have asked students to write, for example, but using a different topic to the one you have given student. Same requirements but different topic so students copy your technique NOT your idea	Technical skill Shared learning experience i.e. the teacher is fully involved in the learner's journey. Teacher **reasoning** MUST be made explicit to the students at this stage.
Exemplar material	e.g. from a contemporary author / the classics Exemplar material can be created showcasing expert creativity and writing skills.	Text –based and multimodal (teacher **decision making** during planning + teacher **perceptions** are handled here as well) Student led or student-centred

Appendix C: The composition of an expert mind – based on the pilot and initial data analysis

	Lesson set up	**Learning ignition**	**On-going learning**
Rationale (Why?)	Prepare the stage for learning to be **ignited**	Finding out/ experimenting	**Relevance:** the learner might need to 'see' the new knowledge *(no need to tell them what it is)*
Tools (What?)	**Concrete**	**-Link to abstract** -Prompts -Questions (learners asking questions) -Challenge: stretch the learners	Application: **new knowledge application** (*possibly on the learner's terms and context)* which confirms that learning has happened
Thinking points (How?)	-Group learning (ALL) -Group interest -Area(s) of difficulty -Challenge to be introduced **-Level of learning intensity**	Learners are **thinking** *(Put learners in situations which allow them to think)*	Positive and negative outcomes which continue to generate learner interest **over time**
Implication (So what?)	Opportunity for **outcomes which are not pre-empted**	**Embracing of 'new' ways of thinking** from the learner's perspective	**Continued interest** in **learning ignition** opportunities

Presented at the 2014 BERA conference September 23rd – 25th, Institute of Education, London.

Appendix D: Data collection methods and summary of focus

TOOL	RATIONALE	IMPACT
1. Think aloud	Thought processes – to explore how teachers of different levels of expertise approach **the same lesson** when planning -Novices will be investigated -Competent teachers examined -Experts –individual differences	1. Look for tacit knowledge from the data 2. Look for intuitive decision-making making from the data. *Query the data to find patterns
2. Interview	Generating an understanding of what affects the decision-making process of lesson planning.	Map out **what influences the** experts – for all questions. Map out what influences the competent. Map out what influences the novice. Any similarities/ any differences?
3. Reflective log	Examining the reflective process of teachers with different levels of expertise. Any similarities / any differences?	How does each group reflect? Positively? Negatively? What is the **step-by-step** thinking process of reflection? Does the thinking process of reflection differ from the thinking process of planning? The focus here is on the **sequence** of events rather than the actual content. For example how do the participants begin reflection? How do they end? What is the implied effect on lesson planning?
4. Questionnaire	Establishing the **background** of expert teachers and teacher self-evaluation of our expert status criteria.	Longevity of service and development of expertise. Family background and development of expertise. Degree subject and development of expertise
5. Stimulated recall	Stimulated recall allows for a **deeper level of analysis** as	Capturing the **non-overt** aspects of decision-making

	questioning is used to elicit the thinking behind **decision-making** during lesson planning.	and teacher thinking. The stimulated recall questions allow the expert to **explain or make explicit** the thought processes involved in the decisions they make during lesson planning. These are the sorts of things the novice will not be able to 'see' in the first place when observing a lesson. This is because the transition of the expert is usually so smooth it is almost unnoticeable. The argument here is that the stimulated recall should have formed part of an observed lesson which could have been video recorded; which tends to be the norm with most stimulated recall activities. However, video recording is usually of delivery, whereas this study is seeking to capture thinking process prior to delivery.
6. Expert commentary	Allows us **to capture** what experts are able to 'see' in the planning process of competent and novice teachers. Are these **intuitive instances?**	**Captures an alternative perspective** to the one being presented by the competent/novice. What is the difference? What is the expert able to 'see' that the non-experts can't 'see'? -Also **Variability**; how close or how far apart experts are with their commentaries.
7. Critical incident	Flow of ideas - More natural reflective log allowing for **free flow of thought processes** during reflection. Experts choose what they want to talk about and have had the time to think about what they want to talk about. (This can be compared to the reflective log above) –Any patterns in the thinking process?	-look at choice of year / group. -look at sequence of reflection -look at what is considered a critical incident -

CRITICAL INCIDENT prompt

What is a critical incident? 'A *description* of an incident that 'amused or annoyed' (Tripp, 1993, p.20), was 'typical or atypical' (Tripp, 1993, p.36), was an 'aha or ouch' (Posner, 2000) or a 'felt difficulty' (Dewey, in LaBoskey, 1993, p.25.); and, the *meaning* of the incident written [recorded] as a detailed reflection and analysis of the incident' (Griffin, 2003,p.210).

Think about ***a critical incident*** in your teaching. How does this critical incident impact on your lesson planning?

Sample Interview questions

1. How do you think you might **change** this lesson you have just planned prior to (before) its delivery?

2. When planning a lesson, what are the key **factors influencing** how you think (about the lesson)?

3. During the planning stage, which factors would determine your **choice of lesson activities?**

4. Why would you make **changes** to a lesson idea?

5. What do you **visualise** when planning a lesson?

6. How would you situate the lesson you have just planned within **medium and long term lesson planning** thinking?

REFLECTIVE LOG:

Use the reflective log to provide reflection on a lesson you have already taught ***which you think did not go as planned.***

Lesson topic / idea:
What was the issue that made you change?
Which change(s) did you make during lesson delivery:
Reason for the change(s) during delivery:
Additional information?

Appendix E: Sample of transcripts

Sample of Stimulated Recall prompts embedded within the Think Aloud transcript.

Daniel - THINK ALOUD

RESEARCHER: So as I said it's a very general topic. It's think aloud and write a lesson plan aiming to extend students' knowledge of complex sentences.

Daniel: ok

RESEARCHER: You can use a Key Stage 3, Key stage 4 or Key stage 5 class.

Daniel: ok

RESEARCHER: And, as I say, you just try and externalise your thinking. So talk (laughing). If you want to write, you can…

Daniel: Yep

RESEARCHER: …and, if not just talking through is absolutely fine.

Daniel: I taught a lesson on sentences this morning with a Key Stage 3 intervention class; that was quite nice. Em, think aloud, write a lesson plan. Ok. Em, so, so, we know what the learning needs to be*;* Em, either I need to think about, er, the ability range of the students, dynamics of the group, er, how they learn best,er, and then put in, I suppose, the hook at the beginning ***[Why do you need to hook them at the beginning]***, some, some way of grabbing attention, er , so that, er,I've got them, er, I suppose, be on side in some ways, but I got them engaged, er, I'd like to have something that's, pretty fun, something, ah, I can't believe that's been recorded ; pretty fun(laughing). Eh, and then I, I, I think the key is to to give them ownership, to give them responsibility, ***[How do you ensure that this responsibility is not too much for them?]*** give them rules within the learning. Er, whether that's through differentiated tasks, through rules within their groups that they have to teach each other, different elements, different parts of the rules, perhaps a definition, work with examples. Em, may be the extension task ***[Why are you thinking about the extension task at this stage?]*** for this, em, piece of learning could be to come up with a comparison, er, of complex sentences Vs simple sentences and then compound sentences, er and then , I think, what will be of real benefit is for pupils to look at prior work, identify, first of all their use of complex sentences and then mmm possibly, if not as important but more importantly, the effect of er, their use of complex sentences, em I suppose, that's me take for granted that use of sentences will be accurate so you can build in use of

punctuation in er (pause) go, going back to student rules, I would probably; and, and then this is me; I haven't been thinking about this a lot, but this is me envisaging what the lesson looks like and I would give students rules, probably number them or give them titles and perhaps bring out the instruction givers and say to them (click of a finger) here's a definition, for example or if you need a definition, here's one of the subordinate clause. Your job is to ensure that the whole of your group of 3 or 4; first of all to understand a subordinate clause. And then can think of an example of a subordinate clause and can apply that learning in their own example of their own***. [What do you expect the instruction givers to be doing?]*** Em, what I haven't mention is looking for great examples of complex sentences, so I would look for a text, for example rich in complex sentences. Again, thinking off the top of my head, I would possibly, er, consider the use of, film footage, so a character's speech, or, or, an exchange in er, film or something that's relevant at the moment, something contemporary that children can engage with; and show them how a complex sentence in, I dunno, a piece of animation, a current Hollywood film, er, can be used, used in a spoken voice***, [Why an example of a complex sentence in a spoken voice?]***and then may be look for it in a popular text like 'Hunger Games' or one of the Carnegie books that we've read; one of the award winners recently; or may be even the class reader from this year or last year, so that they have a novelist that they are familiar with. Er and and all the time just trying to make it real. Get them to learn from the professionals and then showing them the effects within their own writing. Eh, so, that's that's the thinking behind it.

How I would then write the lesson plan, er, I would start with er, the data elements at the top; so it would be the, I said I would identify the the ability range, er, I'd be aware of any special needs, er, I will put the groupings together, I'd be aware of the different groups, within the class; those on free school meals, er, pupil premium provision, perhaps those with er, specific learning needs, er, pop… I would be looking for those who are more able and are identified as being above average or level 5 and above. Er, and then I'd try and put into the context of what we are doing at the moment in terms of the theme or the Scheme of learning we are looking at er, I've mentioned then, that I'd look at a starter, something engaging, something fun, something visual, possibly something active because I don't want them to come in sit down and work in silence. It needs to be something that prompts thoughts, stimulates discussion, gets them bouncing ideas, er, something very open-ended. That enables them to be creative. Em, (pause) and then I'd probably look to bring in learning outcomes. Something that they can measure progress against, and not necessarily, just on a slide on the board er, where they have to read it. I, I, I'd happily give them something that they have to interpret, rearrange, mix and match; pick out the key skills that, that show them the progression through the levels. And again very much student-led with me as teacher in a supporting role not teacher led with them, er, just, I suppose being empty vessels waiting to be filled up; I don't want that ***[Why would you want the plenary to be student-led?].*** Em, because I do think with this kind of task there is a lot of prior learning that needs to be brought forward and possibly just refined and polished. Em (pause), so we've got to that point, yes the rules, the definitions, the

examples, text mark, and then that application would be where **the sort of main part of the lesson** ***[Why are these aspects within the main part of the lesson?]*** would be; putting in something brilliant, reflect on what you've done before, er and then I think reviewing , in this one just something very simple as a plenary where they share their best ideas with others and others assess them, er, so, you know, celebration of great ideas. Em, and then going forward, but it's it's got to fit in a; what part does this play in a great piece of writing; a really captivating piece of writing. And something as simple as I would take for granted ***[What makes you think that the students would know this?]*** most students I work with would know that at level 5 they've got to have a variety of sentence types. So they would know that a complex sentence would work effectively with a single word sentence following it. Or er, possibly, er, a rhetorical question before; with the complex sentence working as this list of ideas, perhaps, so it needs to fit into the bigger picture or er, that idea of whole text, writer's craft and complex sentences is one part of that. Em, that's a bit of a messy plan of ideas. But in my head it would make sense. Er, and then what it would look like**, it would probably be very different.** ***[Any comment about this last phrase –in bold?]***

RESEARCHER: OK

Sample of transcript showing Stimulated Recall responses

Daniel - STIMULATED RECALL

RESEARCHER: Yep, em, so, as I say this section is…is it ok if I just start recording?

Daniel: Yeh, carry on

RESEARCHER: Alright so this is the stimulated recall part of the session; so you just read through and as you encounter the questions, if you em yeh, see if you can give an answer to them…

Daniel: Yep

RESEARCHER: That's fine.

Daniel: So… the topic think aloud write a lesson plan to extend students' knowledge of complex sentences, use KS3, 4 or 5…talk, if you want to write you can, ok taught a lesson on sentences this morning on KS3…(reading) why do you need to hook them in the beginning. Ok why do we need to hook them? Er, I tend to find that the key to a strong start is to engage students, to get rid of distractions, to change may be mind sets sometimes, to grab attention, er and to er I suppose have that distinct from outside and inside the classroom er, may be to give the the lesson a sense of identity er and I also find that by giving them something to think about it engages them in group discussion, gets them thinking, er may be outside the box, generates ideas encourages them to listen to viewpoints of other people er so yeh I've said that some way of grabbing attention so I've got them on side, yep, so it can be a behaviour distractor, I've got them engaged so I would like to have something that's pretty fun, yep, so again a positive start, strong start, er I suppose prompt encourages enthusiasm, I've also said moving on that it gives children ownership, responsibility, I think that's important because it enables them to buy-in to the lesson and er it allows me to shift the learning on their shoulders in some ways and make them, I suppose, an explicit part of the lesson, the learning is for them, they are not doing it for me. So how do I ensure that this responsibility is not too much for them? Em, bah listen to them, I gauge their response, I watch what's happening, er because I will deliberately try to have something that is challenging; I do want to stretch thought, er give them something that's tricky or, doesn't have one clear answer, is open to interpretation, er, how do I ensure it's not too much for them? I suppose that's where team work, working in pairs can come in er and the idea that they can share the burden, they can share ideas, they can ask each other for help, er I tend to promote the idea that copying other people's ideas is not cheating, if an idea is good it's worth sharing, it's worth nicking or stealing er, ok just moving on on a little bit whether that's to differentiate the task.er again how do you ensure that responsibility is not too much for them is through differentiation. They can buy into different levels, er everybody

doesn't have to start at the same point em, so yes the the lesson may have a journey or a clear pathway but but I do like to negotiate and allow children to choose some elements er that they can jump on and off at different parts, they can decide to accelerate what they're doing if they're happy with an element of the learning then I don't mind er as long as they can prove that we can assess the fact that they are able to hit the, at least what we consider to be the target level…. (reading) ok why are you think the extension task at this stage? I suppose I've just alluded to that with the idea of er, the the episode of learning or over a series of 2 or 3 lessons er children are able to negotiate where and what they do to some extent. So so I think it's important that we, that I particularly as the leader of the learning er enable children to see that extension doesn't mean extra work it means doing something that's more appropriate for a child's ability level and it is appropriate for them to be motivated to stretch themselves. So, ok, I 'm I'm I think I did mention probably it comes a bit later on that I don't think that learning should be difficult, it should be challenging, er and I don't know if it's just me or that's embedded in some form of pedagogical thinking but but I find it easier to simplify something that's complicated rather than to stretch somebody from a basic level. So it's easier to I don't want to use the term dumb-down but it's easier to scaffold in extra support when necessary. Em, I think as well by thinking about extension as this stage that that shows er how high my expectations are and I think one of my strengths is I am consistent in having high expectations and again not just about behaviour but in expectations for how hard children work, how children perceive achievement er and just the acknowledgement of that yes they can be working hard and put the effort in but it is also about their thinking and the thought processes that they go through. Moving on…this piece of learning could be…comparison yep, higher order skill, complex sentences Vs simple sentences, er then compound sentences, er one of the things I didn't mention last week, was that if we're looking for something that's challenging or extending on top of the comparison is looking what's missing, er drawing other contexts, see how you can apply this to other parts of school, other subjects, other er activities in their lives. I'm just gonna move down (reading) ok I'm just reading through …your job is to try and…hold in a group of 3 or 4…first of all understand the subordinate clause and then think of an example of a subordinate clause…can apply that learning in their own example of their own, oops, poorly phrases, em, what do you expect the instruction givers to be doing? Ok, er so talking about giving children defined roles within a group activity, so allowing them to have ownership giving them a great sense of independence, creating a sense of responsibility er in works in, on two layers or two levels I suppose, in that instruction givers need to understand what the instructions they are giving mean, so they have to become experts within that so there's that first layer in their learning er and then they have to think about how and it really is the how er they're gonna share these instructions to make them meaningful er so that all of their group members would understand them. They may be have to think about how they'll phrase the instructions in another way so that they are user friendly, they may have to think about how many times they are gonna give the instructions er and of course they have to think about their audience so the members of their group er as well as using not necessarily peer pressure but peer influence, er to give the task a great sense of importance, urgency, em, so so it's it's coming at the same task from a different angle. Er, I I also like the fact that the instruction givers can be accountable; so it's their responsibility to ensure that their task is not only understandable but also completed that everybody's involved, er, and it's that sense of reward and er satisfaction for them that that they've

carried out their job whilst also learning. So there again it's that idea of extension from an early stage they can be multi-tasking almost or they're they're working in two different levels. Then moving on the script, the transcript, what I haven't mentioned is looking for great examples of complex sentences…so look for a text, for example rich in complex sentences, again thinking off the top of my head, …possibly consider the use of a film footage …a speech or an exchange in the film or something that's relevant to the moment, something that's contemporary, something they can engage with I don't know a piece of animation, a current Hollywood film. Why an example of a complex sentence in a spoken voice? Em, (pause) because I think it's important to show children and not just children, all learners that er complex sentences or use of language doesn't only apply to er a piece of text er some children may find that difficult they may not get their heads round it er fully, whereas by changing the modes if you like I can show them how versatile how flexible the language is and I and I suppose with many technical aspects of any subject it's all very well giving children the definition but sometimes it's the example that hits er home and gets them to comprehend what's going on. Er so spoken voice just because it's it's another form of English it's one that certainly er children who have literacy difficulties or struggle to grasps some of the the concepts of written accuracy ere r they tend to find it easy to verbalise their thoughts er to respond er through oral work. Er so for for me it's about securing that understanding er in in a way that that suits as many particular types of learners as I can so it's not just the only way but it just seems to be a good example that may help some.

Appendix F: Description of participants

1. Who is an expert teacher?

Expert teachers in this study are Advanced Skills Teachers (AST) and Excellent Teachers (ET) (Ofsted, 2003; DFE, 2011a), following the specification for England. Although these teachers are typically identified to perform more fluidly than other teachers and make wider contributions within the school and externally (as appropriate), for this study there was the flexibility in targeting former LA consultants but current practicing English teachers. The reason for this flexibility is the understanding that LA consultants were recruited within school to share their expertise across local authorities. It is worthwhile reiterating the transitory phase under which this study unfolded (see Higham and Ealey, 2013). The condition, however, was that there was peer recommendation, added to this they had to be practising secondary English teachers. This was a transitory period with changes which meant the AST title was being phased out. However, most headteachers were quite protective of their ASTs and those recommended were still retaining their AST title even if the out-reach element to their work, which was Local Authority based, had ceased. Some of the participants were recommended as in-school ASTs, others were LA specialist subject consultants who had returned to work in schools (generally with an SLT or departmental role), due to the fact that the on-going changes had also affected their role at the LA level. Level of education, doctorate qualification or Masters level; most often coupled with SLT or department level (typically HoD), was characteristic of the participants at the expert level. The questionnaire facilitated access to years of experience, particularly since research on expertise has suggested an approximation of a minimum time scale for arriving at the expert stage.

2. Who is a competent teacher?

Acknowledging the critique of length of experience not equating to expertise (Berliner, 1987; Berliner, 2004), I settled for length of experience equating to some level of competence. Competent teachers will have a combination of the following descriptors: worked for at least six (6) or more years, and also have a leadership responsibility within the department, for example, TLR –Teaching and Learning Responsibility, HoD, Director of Faculty, Leader of Learning, Second/third in the department, Literacy co-ordinator, intervention leader, raising achievement co-ordinator etc., or SLT member. Having any kind of responsibility within the department is evidence of peer recognition which could be used to validate competence. What is the rationale of six years teaching experience? Following the teacher pay scale (DFE/Teacher agency, 2012), MPS - main pay scale follows an incremental yearly progression from M1 to M6. Progression to the Upper Pay scale UP1–UP3, tends to be portfolio evidence based across a set of standards. From my experience, evaluation systems are in place for this post threshold award to be ratified, usually by the headteacher. Therefore, situating competence beyond six years of teaching increases the probability of my target participants having peer validation of, at least, competent performance.

3. Who is a novice teacher?

The novice teacher for this study was taken to be teachers in their first or second year of teaching; counting one or two years after successfully completing their teacher training irrespective of the route used, for example university-based training or work-based training.

To work with the novices, it was essential that as well as LA recommendation regarding schools where NQTs were well supported and thriving, there was HoD acknowledgement that it was appropriate for the NQTs to be involved in the study. At LA level, there was a clear sense the NQTs were 'protected' as the negotiations for working with NQTs had a significantly longer duration than those for working with the other participants. Although this added more time to the targeted time for data collection for this study, it confirmed the NQTs who eventually participated in the study were confident enough to be involved.
