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An LCT Examination of Comprehension and Pedagogy in Middle Years English and Science

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An LCT Examination of Comprehension and Pedagogy in Middle Years English and Science

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Doctor of Education

by

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Certification

I, Susan Byers, declare that this thesis submitted in fulfilment of the requirements for the conferral of the degree Doctor of Education, from the University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

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Susan Byers

15th November 2018

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After what seems to be endless years of reading, researching, writing and rewriting, two words are more important than all that are contained in my thesis. *Thank you*.

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Abstract

This study is an investigation of middle years teachers' understandings of comprehension and their practices in the curriculum domains (Freebody et al., 2013) of English and Science in Years 5 to 8. Teacher knowledge and understanding of disciplinary literacy and comprehension in the context of curriculum content are areas of new understanding that have emerged as academic literacy demands increase for students entering the middle years of schooling. "The challenge of teaching reading comprehension is heightened in the current educational era because all students are expected to read more text and more complex texts" (Snow, 2002 p.15) across multiple curriculum domains, and demonstrate their understanding of text and content in discipline-specific ways. To achieve this, multi-faceted comprehension instruction is required, embedded within the content, to bring about deeper understandings of disciplinary knowledge.

Adopting a qualitative collective case study design, the inquiry considers and explores the beliefs and understandings of comprehension and comprehension instruction of a small group of Years 5 to Year 8 English and Science teachers (N=7) in an independent Kindergarten to Year 12 school located in the South-Western outskirts of Sydney. During a twelve-month period, teacher knowledge of what constitutes comprehension instruction in English and Science and understandings of comprehension and comprehension instruction in the official NSW curriculum were investigated.

Legitimation Code Theory (LCT) (Maton, 2010, 2014) provides a theoretical lens to gain insight into perspectives of the school curriculum and the pedagogical decisions made by teachers of English and Science. LCT is an explanatory framework that "enables both the exploration of knowledge-building and the cumulative building of knowledge" (Maton et al., 2016 p.2). Understandings of curriculum knowledge and disciplinary practices of comprehension in the curriculum domains of English and Science have been investigated. Emerging from the data are contrasting perspectives held by teachers

towards curriculum and comprehension knowledge within the context of the teaching and learning environment in English and Science.

The findings of the inquiry reveal a need for the reconceptualisation of comprehension, broadening understandings of existing constructions of comprehension through a disciplinary lens. The inquiry shows that comprehension in the middle years of schooling moves beyond the generic skills and strategies discussed in the literature and taught in the early years of school, to practices which address the disciplinary understandings required to support meaning making in school English and Science. In response to the teachers' knowledge of discipline and the curriculum, disciplinary-specific literacy practices or ways of knowing are enacted within the curriculum domains.

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Chapter 1 Introduction

Introduction

This study will pursue interpretations of comprehension as making meaning of disciplinary content in the context of curriculum and pedagogy in English and Science. An analysis of the NSW and Australian curricula for English and Science reveals that comprehension is referred to but not readily located, defined or explained in the relevant official documents. This creates a conundrum for the teachers in the inquiry. Each curriculum verifies the importance of the purposeful use of language and the inclusion of literacy skills and strategies to develop meaning out of curriculum content and concepts. Terms such as *analyse, evaluate, interpret, synthesise ideas, investigate, analyse data* and *draw conclusions* are used to indicate comprehension and meaning making. When these are interpreted from a disciplinary perspective, comprehension in the curriculum is positioned differently, according to the teachers' literacy understandings and disciplinary knowledge. The inquiry reveals how understandings of the curriculum and of comprehension as a component of the disciplinary practices of teachers is played out in the classroom.

Curriculum organisation in Australian schools

In Australia and NSW, syllabus content is derived from documents developed by education authorities. Schools then create 'scopes and sequences' of content for teachers to implement. At the time of this inquiry, Australian educators were preparing for the implementation of the Australian Curriculum in English, Science, Mathematics and History. In NSW, the Australian Curriculum documents have been recontextualised to become the NSW Syllabus for the Australian Curriculum. Of relevance to this inquiry are the English and Science syllabuses. The timing of the inquiry coincided with the transition to the new syllabus in NSW schools. The curricula taught in Australian schools are divided into years or stages of learning, and include content descriptions of disciplinary knowledge, skills and understandings, and levels of expected student achievement.

It is important to note that, in NSW schools, years of learning are grouped into 'stages' of two years, with curriculum content and outcomes taught across stages rather than individual year groups or grades. Therefore, Years 5 and 6 are known as Stage 3, and Years 7 and 8 as Stage 4. The NSW Syllabus for the Australian Curriculum in English and Science is organised in stages. However, the Australian Curriculum: English organises content by year level. The Australian Curriculum: Science also organises curriculum content by year level, but the content from the Science Inquiry Strand is extended across two years of learning.

The English Curriculum

Content in the NSW English curriculum is organised across four focus areas of Speaking and Listening, Reading and Writing. These are then further delineated into objectives, (encompassing knowledge, understanding and skills, and values and attitudes), outcomes and content. Figures 1.1 and 1.2 show the organisation of the curriculum content in the NSW English K- 6 Syllabus (1998), and the NSW Syllabus for the Australian Curriculum - *English K-10 Syllabus* (2012b). The diagrams represent the core premise of making meaning through language held in each syllabus. The visual representations aim to provide teachers with an understanding of how the skills, strategies and knowledge of the curriculum are interrelated and contribute to the three overarching focus areas of the curriculum. No visual representation of the content is made available to the teachers in the NSW English 7-10 Syllabus (2003).

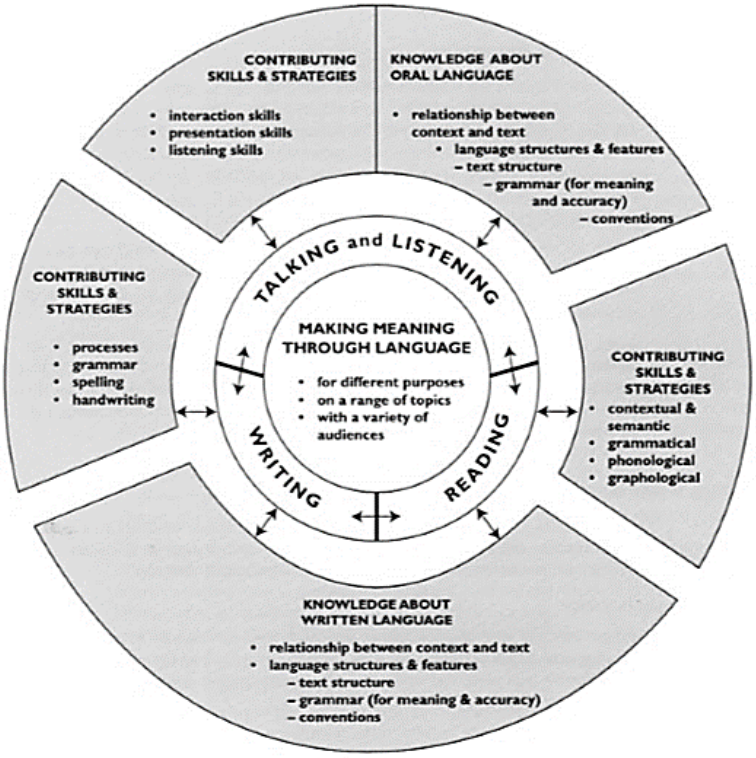


Figure 1.1: Organisation of content in the NSW English K- 6 Syllabus (1998)

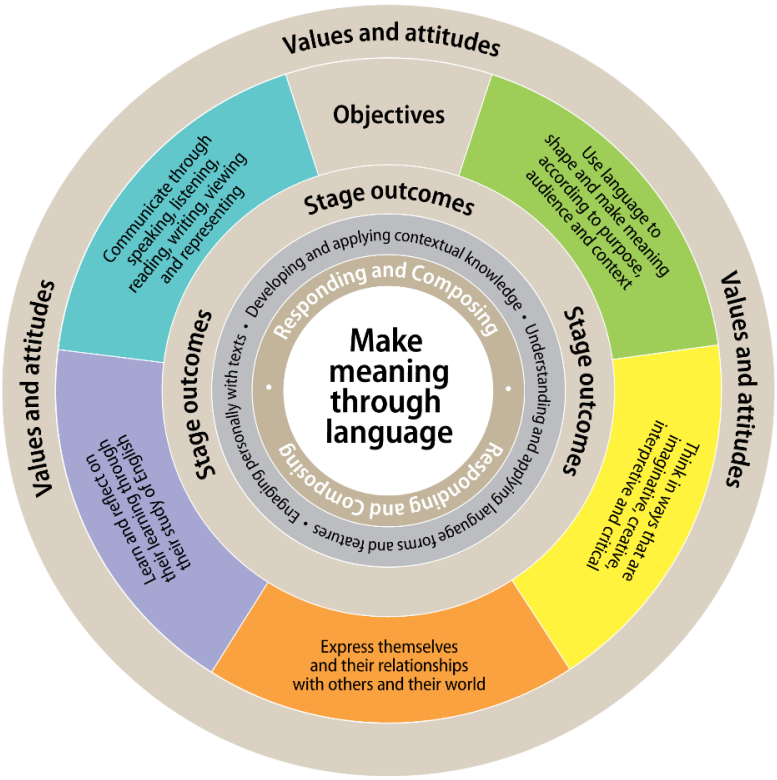


Figure 1.2: Organisation of content in the NSW Syllabus for the Australian Curriculum - *English K-10 Syllabus* (2012b)

The Science Curriculum

In Science, the syllabus is divided into stages, then strands of specific learning for knowledge and understanding, and skill development. The curriculum aims for students to "acquire scientific knowledge and skills and develop understanding about phenomena within and beyond their experience" (Board of Studies NSW, 2003b p.11). To achieve this aim, content in each curriculum encompasses knowledge and understandings, skills, and values and attitudes. The curriculum is organised by strands or elements, which are further delineated into Stage Outcomes, to include content and learning processes. Content within the knowledge and understandings strand in Kindergarten to Year 6, and in Years 7 and 8, encompass different but interrelated aspects of Science as represented in Figure 1.3 (Years 7 – 10, 2003), Figure 1.4 (Kindergarten to Year 6, 2012) and Figure 1.5 (Years 7 – 10, 2012). Similar to the English syllabus, the diagrams represent the relationship between the syllabus content, the context of instruction and the interrelatedness of the science skills, knowledge and understandings. No visual representation of the content organisation is provided in the Science and Technology K-6 (2000) syllabus.

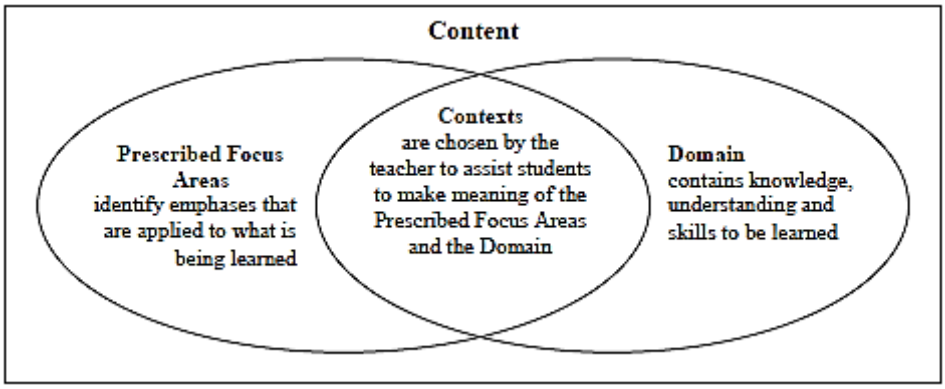


Figure 1.3: Organisation of content for Years 7 – 10 in Science, Years 7-10 Syllabus (Board of Studies NSW, 2003b p.16)

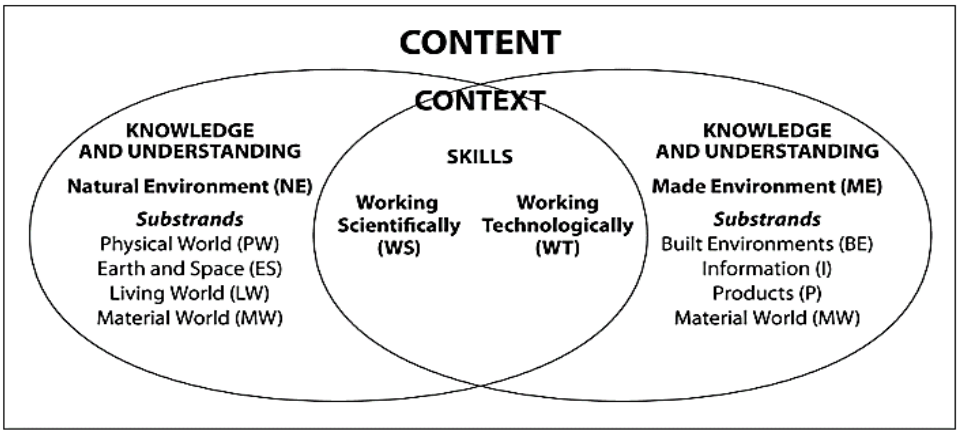


Figure 1.4: Organisation of content for Kindergarten to Year 6 in The NSW Syllabus for the Australian Curriculum: *Science K-10 Syllabus* (BOSTES NSW, 2012c p.30)

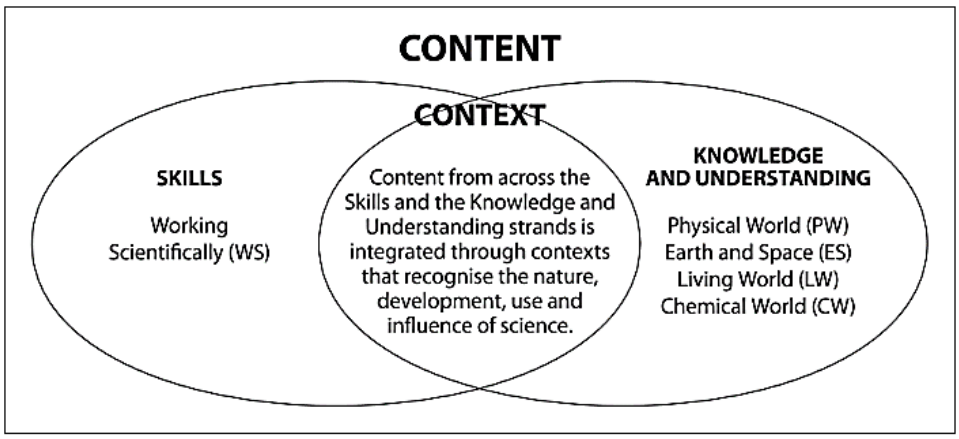


Figure 1.5: Organisation of content for Years 7 - 10 in The NSW Syllabus for the Australian Curriculum: *Science K-10 Syllabus* (BOSTES NSW, 2012c)

This study explores the notion of comprehension as knowledge in the curriculum. In the English curriculum, the central tenet is making meaning through the purposeful and meaningful use of language. Underlying models of practice in secondary school English differ in their orientation to literacy, pedagogical strategies and genre (Jackson, 2016, Macken-Horarik, 2011, 2014). Therefore, the content focus of the class curriculum may draw upon differing and competing aspects of knowledge and demonstrating understanding. Teachers must navigate through the curriculum to identify the content and then select suitable pedagogical strategies to meet the curriculum aims. Comprehension instruction is embedded in each component, but not clearly identified as an area of knowledge or instruction.

Reading in science is viewed as a process of inquiry (Koomen et al., 2016). The disciplinary language of science texts poses difficulties for students who may be unable to transfer their word reading skills to understanding the content of the text (Snow, 2010). In the early years of school, students participate in the shared reading of a variety of genres of texts, which include visual features and language that may be part of the everyday discourse. For example, information texts in Science, such as simple descriptive reports and procedures, use familiar language alongside images and labelled diagrams to support understanding. Students progressing to the middle years of school are exposed to increasingly complex expository and explanatory texts with specialised and unfamiliar language (Honig, 2010, Cromley et al., 2010). To comprehend scientific knowledge requires students to negotiate text that may not appear linear or familiar to the reader. Readers must interpret text elements such as abstracts, sub-headings, diagrams, figures and tables to make 'strategic choices', while simultaneously understanding the terminology of the concepts (Faller, 2018, Roman et al., 2016, Snow, 2010, van den Broek, 2010).

Scientific literacy is of paramount importance to the Science teachers in this study. Embedded within the content strands of the curriculum, scientific literacy is an important component of comprehending Science. It requires students to understand science knowledge to *explain, evaluate and interpret* scientific phenomena and data through scientific inquiry. Students need to be critically literate to generate connections between the science concepts and real-world applications. Moreover, there must be a demonstration of an understanding of the vocabulary of science to enable comprehension and engagement with science-related issues (Grant & Lapp, 2011, OECD).

Research purpose

The purpose of this qualitative inquiry is to explore how the understandings of and beliefs about comprehension held by seven teachers are represented in the pedagogy enacted when teaching curriculum content in English and Science. Of pertinence to the

inquiry is the relationship between interpretations of disciplinary literacies and of curriculum in these teachers' practice.

The inquiry is a collective case study and affords opportunities to attend to the uniqueness and complexities of teacher practice through the observation of classroom-based activities. The observations, alongside teacher interviews and document analysis, provide a window to discover and portray differing views of comprehension practice within the participant school setting (Freebody, 2003, Merriam, 1998, Stake, 1995). Data collected over twelve months reveal the disciplinary literacy practices of teachers in both English and Science. The middle years of school have been selected as the foci for the inquiry as it is these years where students are expected to successfully engage with and comprehend increasingly complex text, while navigating the disciplinary literacy demands of the curriculum. Middle school, in the context of the inquiry, is defined as the last two years of primary school, or Years 5 and 6, and the first two years of secondary school, or Years 7 and 8.

Central to the study is determining what comprehension is and how comprehension is represented in curriculum and practice. To scaffold understandings of comprehension in this thesis, interpretations of literacy, comprehension and disciplinary literacy from the research literature, and of the English and Science curriculum, are explored.

Literacy is acknowledged as a language-based activity requiring an understanding of language systems and communication (Wray, 2001). Similarly, Wright (2007) describes literacy as a semiotic domain that communicates meaning. Freebody (2007a) and Myhill (2009) view literacy as a multidimensional concept that is rich and complex, involving social practices and purposes that are embedded in a range of contexts. In addition, Freebody (2007a p.104) states that literacy is the "flexible and sustainable mastery of a repertoire of practices with traditional texts and new communications technologies." Definitions of literacy include aspects of reading, writing, speaking, listening, viewing and critical thinking, while drawing on a range of disciplines including linguistics, and developmental and cognitive psychology. Literacy is not a simplistic phenomenon, but

rich and complex, and involves social practices embedded in a range of contexts (Flynn, 2007, Irvin et al., 2010, O'Shea, 1994, Poulsen & Avramidis, 2003, Wray, 2001, Wyatt-Smith & Cumming, 2003).

Comprehension is viewed as an integral component of literacy. It has been referred to in the literature as the means to simultaneously extract and construct meaning while actively acquiring and using knowledge (Harvey & Goudvis, 2007, Ness, 2011, Snow, 2002). Furthermore, it is a complex, cognitive process requiring both active learning and multiple higher-level processes. It affords the reader opportunities to interact with known and new knowledge in their context and through experiences of the topic and text form (Hannon, 2012, Buehl, 2013, Freebody, 2011).

Research questions

The aim of this inquiry is to seek to understand what teachers believe and understand comprehension to be, how teachers teach comprehension in their classes based upon their beliefs and understandings, what aspects of comprehension are taught, and who makes the decisions surrounding curriculum and instruction.

Three key questions frame this inquiry, as follows.

1. *What do teachers of English and Science in the middle years of schooling understand comprehension to be?*

This question seeks to identify and examine what counts as comprehension to teachers and the practices used by them in English and Science classrooms. Recent theorising of knowledge practices in the school curriculum (Maton, 2010, 2014) will facilitate an exploration of the beliefs and understandings of comprehension and comprehension instruction in the context of teacher practice, and of the curriculum demands of the English and Science curriculum domains.

2. *What are the pedagogical practices of English and Science teachers in the middle years of schooling when teaching comprehension in their subject area?*

This question will identify and examine the teaching practices enacted by teachers when teaching comprehension in English and Science. Of interest are discipline-specific practices within the curriculum domains, as well as common practices across the domains.

3. *What is the relationship between teachers' beliefs and understandings of comprehension and their practices in the teaching of comprehension?*

This question explores the relationship between teacher understandings and beliefs about the teaching of comprehension in the curriculum domains of English and Science and the pedagogies enacted in their practice. Considerations of the knowledge practices of teachers in relation to comprehension and curriculum will be explored.

Significance of the study

Literacy instruction evolves across the phases of schooling and between the disciplines. This thesis has defined middle years schooling as instruction across Years 5 until Year 8. This spans the primary years of Years 5 and 6 and secondary school years of Years 7 and 8 in Australian schools. Students are aged between ten and fourteen years old. The structure of classes in the schools differs across the years, with students in the primary years of Years 5 and 6 having one classroom and teacher for all curriculum subjects, and students in the secondary years of Years 7 and 8 having multiple classrooms and teachers across the curriculum areas.

The perception middle school teachers hold of themselves as teachers of literacy is intriguing to me. While this inquiry explores the pedagogies to support comprehension, it also examines where the teachers' understandings and beliefs about comprehension emanate from and the impact of these upon day to day teaching. Prior studies have revealed a deficit model of literacy practices, identifying what teachers do not do as opposed to the pedagogies enacted when teaching comprehension. Durkin (1978) and

Ness (2009, 2011) identified that minimal specific instruction on comprehension skills and strategies occurs in primary and secondary classrooms, especially in classes that are not English (referred to as Language Arts in North American literature). Further research has indicated that middle school teachers value literacy, but do not believe they have the skills to teach literacy (and comprehension), instead seeing themselves as content area specialists, especially in the context of a content-driven curriculum (Chambers-Cantrell & Callaway, 2008, Durkin, 1978, Hall, 2005, May & Wright, 2007, Misulis, 2009, Ness, 2009, Ness, 2011, Poulsen & Avramidis, 2003). Christie (1998) notes the sense of deskilling and underlying concerns of teachers that they can offer no expert knowledge to students as they learn literacy. Flynn (2007) builds upon this view, adding that literacy instruction across curriculum domains requires a deeper knowledge than the curriculum can provide. In other words, the disciplinary literacies which consider the specialised reading and writing demands needed to interpret information and understand concepts (Jacobs, 2009), are embedded in the discipline knowledge and knowledge of disciplinary pedagogical practices (Clarence & McKenna, 2017).

The present inquiry provides a unique opportunity to explore understandings of comprehension in the middle school (i.e. both primary and secondary classrooms) from the perspective of the classroom teacher. It investigates what comprehension means from the perspective of generalist and specialist subject teachers. Importantly, the inquiry provides a space for the teachers' voice to be heard, giving them the opportunity to validate their practices, based on their knowledge and understandings of both content and the disciplinary literacy practices that support student learning. The inquiry aims to explore the actions teachers are taking to teach comprehension in their classes. It considers the literacy practices in the curriculum domains, questioning whether the strategies employed are generic comprehension strategies, or comprehension is revealed in different ways in each discipline.

As the readers of this thesis come to know the participant teachers, it will be clear that these are good teachers whose pedagogical practices and deep understanding of the curriculum and discipline content is bringing about successful learning outcomes for

their students. The comprehension pedagogies enacted will become apparent, as will the disciplinary literacy practices to enhance student understanding of the content. This inquiry aims to identify these disciplinary practices which support comprehension, and their origin.

A personal journey

As a young child growing up, firstly in country Victoria on an Australian Defence Force base, and then in the outer western suburbs of Sydney in the post-Vietnam War era, my earliest memories are of school. I recall the teachers in primary and secondary school who had a significant impact upon me, who encouraged me to read widely, to question, to think, to wonder, to be creative and to look beyond the circumstances that surrounded me in my personal life. They inspired me to want to be a teacher 'when I grew up' and strengthened my resolve to be like those who had inspired me: to be one who listened and cared, who encouraged a sense of wondering, questioning, social justice and empowerment, one who taught beyond the curriculum and opened minds to the joy of reading and learning.

My teaching career began in the early 1980s. After graduating from university as a primary teacher, like many new teachers at that time, I spent several years as a young graduate working the 'casual' or substitute teacher circuit in government schools in outer western Sydney. This experience allowed me to hone my craft, visiting different schools daily or for extended 'blocks' of work until I attained a permanent teaching position.

My first permanent teaching position was a Year 5 class in a school located in a low socio-economic area of outer western Sydney, which met the criteria for the Australian Government Disadvantaged Schools Program (DSP). I found them to be a difficult class of 30 students, disengaged and lost in family circumstances beyond their control. Academic achievement levels were low, and many students were achieving well below the expected level for the grade. The school had a high staff turnover, with many staff members being new graduates or teachers with limited experience.

The social issues surrounding my students, such as high unemployment, reliance on social welfare, and fractured families, were replicated across the school and its community. Initially, I was overwhelmed by the task that lay ahead of me, but this was my chance to be the teacher I aspired to be. I wanted to empower my students. I taught my students to think deeply, to wonder, to ask questions, to read literature beyond the scheme readers so prevalent in schools at the time. I asked them to search out meanings in texts, in movies and in music. I provided them with the tools to seek out the knowledge and understandings which would enable them to become successful learners and citizens without economic or social boundaries. I carried the same optimism into each of my new classes and schools over the next thirty years.

Throughout my years of teaching, my students have come from low to middle socio-economic backgrounds and included students with disabilities, students with English as an additional language, Indigenous children and refugee children. I have taught in small semi-rural schools, and larger urban schools in the outer western and south-western suburbs of Sydney. I continued my love of learning, completing a Master's degree in Special Education in 2002, sharing my journey with my Year 4/5/6 class at the time. I continued to work in government schools, until 2004, when I began teaching in the independent sector (non-government schools) and remain in this sector today.

Personal orientation and positioning of comprehension in practice

As the Co-ordinator of Literacy Teaching and Learning, I work with and alongside teachers, supporting their literacy practice and their students. In the past decade I have led professional development workshops with my colleagues in literacy, focussing upon literacy across the curriculum, assessment, spelling, writing, oral language and reading comprehension.

In my personal practice, I teach comprehension explicitly, supporting my students to generalise their understandings across curriculum areas. My knowledge in this area was not part of my teacher-training, but has been self-taught over many years, drawn from extensive reading of the research literature and involvement in professional

associations. My interactions with teachers have heightened my awareness that the understandings and beliefs teachers hold of comprehension and its place in the classroom are built upon their own prior experiences as school students and as discipline experts. It is from this interest that the inquiry has emerged.

My colleagues, like I, recall comprehension as a task, not a process or search for meaning and understanding. Comprehension lessons in our school days were disconnected from other subjects, often presented as endless and meaningless passages with low level questions to complete from commercial programmes and basal readers, where the purpose of the task was to try our best to reach 'Gold level' before our peers. Instruction in how to respond, the purpose of comprehension, and its relationship with other curriculum domains, were not made clear by our teachers. Nor did comprehension instruction appear to be a focus in the teacher training courses my colleagues and I completed. However, comprehension is part of the curriculum teachers are required to teach. This has intrigued me. What is comprehension? Is it a set of skills needed to answer questions from a text? Is it a means to develop complex and generalisable concepts? Is comprehension a form of knowledge in itself used to understand the curriculum? Is it a way of knowing?

In different schools across my teaching career, teachers have shared with me their experiences of teaching comprehension, where they perceive that they do not have a repertoire of skills and strategies for comprehension instruction, and nor do their students. They expressed concerns about the difficulties their students experienced in developing understandings of concepts, as instructional time became less flexible due to a crowded and content-driven curriculum.

Emerging from my discussions with teachers is consensus that comprehension is the acquisition of meaning, but that there is confusion about where comprehension sits within the teaching of the curriculum. These concerns emerge especially in disciplines other than English and in the middle and senior years of schooling as comprehension attempts to find its place as part of the curriculum or academic discipline.

Setting the scene for the inquiry

The impetus for the inquiry has emerged from an action research project funded by a teacher research grant awarded to me by the Australian Literacy Educators Association. Working with a university academic as a critical friend, the project explored the understandings of comprehension of teachers and students in Years 5, 7 and 9 (ages 10 to 15 years old) at the inquiry school. Titled, *'What counts as comprehension in teacher practice?'*, insights into teacher and student perceptions of comprehension in different curriculum domains in Years 5, 7 and 9 were investigated (Appendix D). Furthermore, professional learning opportunities were provided to a small group of teachers to support literacy teaching in the disciplines prior to the introduction of the Australian Curriculum.

Teacher understandings and beliefs about comprehension, its instruction, and the impact these understandings and beliefs had upon classroom practice across curriculum domains, were not fully explored, as the project primarily focused upon the immediate professional learning needs of the participants. Further investigation was warranted. I was curious about the pedagogical practices of teachers across the curriculum domains regarding comprehension instruction and the teachers' perceptions of themselves as literacy teachers within their curriculum domain. Furthermore, I was interested in how the beliefs and understandings that these teachers held about the teaching of curriculum specific content and comprehension knowledge 'played out' in their practice. An in-depth exploration of teacher understandings and beliefs about comprehension as knowledge and the pedagogy enacted in a school environment was required.

List of Terms

ACARA	Australian Curriculum, Assessment and Reporting Authority
BOSTES	Board of Studies Teaching and Educational Standards NSW
NESA	New South Wales Education Standards Authority
LCT	Legitimation Code Theory
Middle school	The years of schooling between Year 5 and Year 8. Years 5 and 6 are the later primary school years. Years 7 and 8 are the early secondary school years. Students are aged between 10 to 14 years old.

Thesis overview

Chapter 2

The literature review aims to situate understandings of comprehension within the inquiry. Concepts of disciplinarity and its connection to understandings of curriculum and comprehension as knowledge foreground a discussion of comprehension in the curriculum domains of English and Science.

Chapter 3

The theoretical framework underpinning the inquiry is outlined and explained in this chapter. This inquiry is informed by Legitimation Code Theory, specifically the epistemic-pedagogic device, the specialisation codes and semantic codes.

Chapter 4

The inquiry is a collective case study framed within the qualitative paradigm. This chapter establishes the data collection and analysis procedures used and their suitability to the inquiry. The chapter reveals the contextual background to the inquiry site and the participants.

Chapter 5

A critique of the curriculum implemented in the inquiry is the focus of this chapter. The chapter provides an overview of the implementation of the English and Science

syllabuses in NSW schools, followed by an analysis of comprehension within the curriculum documents.

Chapters 6 and 7

These chapters introduce the participant teachers and their contexts of practice. Here the reader meets the English teachers (Chapter Six) and the Science teachers (Chapter Seven) who generously allowed me to observe their practice over a period of twelve months. The chapters are divided into three sections. Firstly, an overview of each teachers' understandings and beliefs about comprehension and comprehension instruction in context is presented, prior to detailed recounts of teacher practice, as each case is explored. Each case concludes with an interpretive comment on the relationship between belief, understanding and practice in the teaching of curriculum content and comprehension. Explanations of curriculum choice, understandings of curriculum, and comprehension as knowledge and pedagogy enacted, are shared with the reader, using teacher voice to situate the reader in the teaching and learning context.

Chapter 8

The final chapter draws together the findings and interprets them in response to the research questions presented. This chapter discusses the implications of the inquiry and suggests future research.

Chapter 2 Literature Review

Introduction

The literature review situates the thesis within the relevant research fields for the inquiry. The scope of the thesis explores the understandings, beliefs and practices of teachers when teaching comprehension in English and Science. The chapter begins with an overview of the historical perspectives on comprehension research which have informed literacy practices and curricula since the early twentieth century. Interpretations of comprehension emerging from the literature are discussed, prior to an examination of disciplinary literacy and teacher understandings of literacy and comprehension in the curriculum domains. Comprehension instruction in English and Science is explored. The review concludes with a discussion of the differing interpretations of disciplinary literacy and disciplinarity emerging from the literature. An overview of the literature review is shown in Figure 2.1.

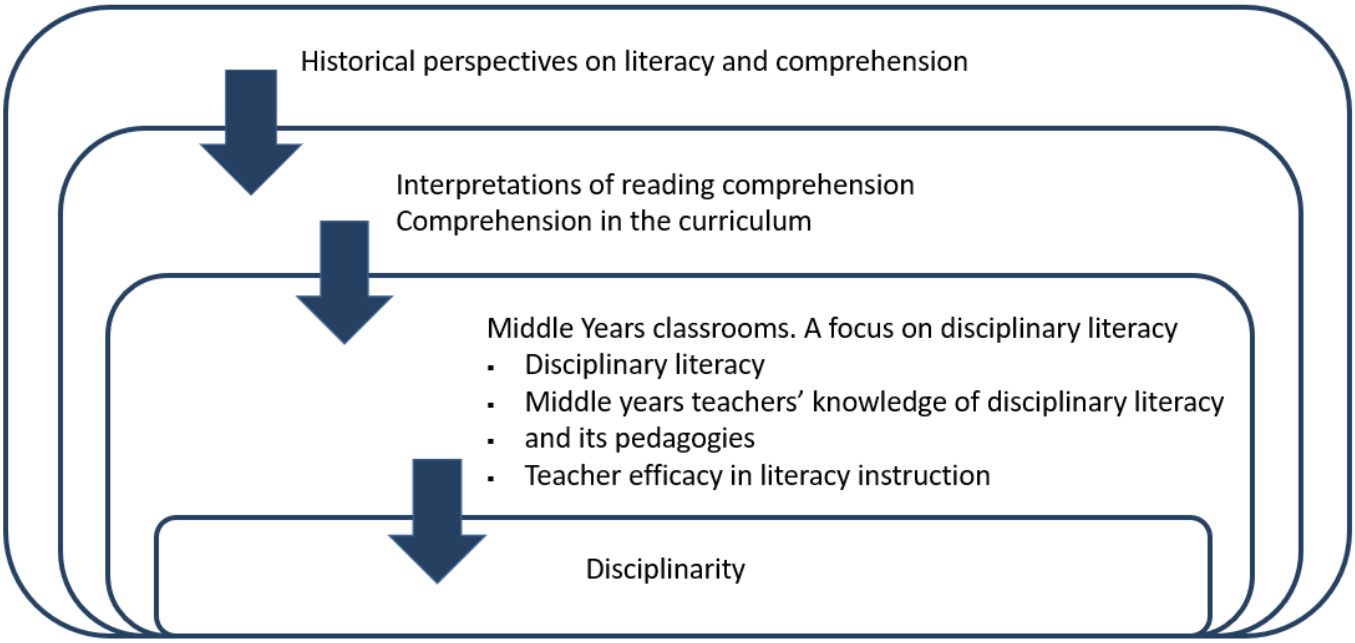


Figure 2.1 Overview of the literature review

Historical perspectives on literacy and comprehension

This thesis explores understandings of comprehension underpinning the pedagogy enacted by middle years' teachers of English and Science. The following section of the literature review provides a historical insight into perspectives from comprehension research that inform understandings of comprehension and comprehension instruction for school educators.

Attention to reading comprehension as part of reading instruction has varied across the decades since the 1900s. Prior to the twentieth century and into its early years, comprehension was not considered as an important factor of reading. Text memorisation, and the oral expression, fluency and accuracy of the reader, were deemed as the criteria for reading success (Clymer, 1968, Pearson, 2010, Venezky, 1984). Comprehension as meaning making in educational research and practice came to the fore in the early twentieth century, due to "large-scale economic and social reformation" (Reid & Green, 2004 p.12) following industrialisation and the introduction of mandatory education during this era. To facilitate learning and teaching, schools required efficient screening devices to objectively ascertain the literacy abilities of the students who were now attending school (Gray, 1984, Venezky, 1984, Pearson, 2010). Testing instruments such as multiple-choice tests, and group-administered and standardised tests, were developed and introduced, coinciding with the increasing influence of psychology upon education. Silent reading and basal readers as low-inference tools became modes of instruction and assessment, replacing high-inference assessment tools such as oral reading with retelling (Venezky, 1984, Pearson, 2010).

Interest in reading skills and comprehension gained momentum, with efforts to 'theorise' comprehension and validate education and psychology as sciences. Early investigations by researchers such as E.B. Huey and E.L. Thorndike to explore the "complex thought processes associated with comprehension" (Pearson, 2010 p.284) emerged. Thorndike (1917 p.332) argued that the reading process is not passive or mechanical, but "demands a more elaborate and inventive organisation and control of mental connections". In a similar vein, Pearson and Gallagher (1983) identify research

on comprehension instruction as a focus for reading researchers during the mid-twentieth century, leading to "everyday classroom instruction being informed by theory and research" (Pearson, 2010 p.279) from the 1980s onwards. The notion of comprehension as an active, strategic and complex process requiring the analysis and organisation of ideas from text was central to these researchers, and led to the emergence of frameworks for understanding comprehension informed by psychology, literary theory and pedagogy in the 1970s and '80s (Block & Duffy, 2008, Pearson, 2010, Pearson & Gallagher, 1983).

As the twentieth century progressed, attention turned to the assessment of 'teachable skills' and the development of linear 'scopes and sequences' to teach reading. Davis (1968) identified nine conceptual skills that he considered necessary for reading comprehension to occur. Leslie and Caldwell (2009) consider these as 'conceptually distinct' categories, and state that Davis' study, together with Thorndike's findings of the importance of the reader's understanding of vocabulary in context together with an understanding of sentence and text structure (1917), have foregrounded knowledge of the comprehension strategies as we know them today.

Similarly, Block and Duffy (2008) identify nine comprehension strategies the effectiveness of which is supported by studies. Table 2.1 summarises the concepts and strategies put forward. Drawn from forty-five strategies found in core reading programs, Block and Duffy ascertain that 'less is more', and that strategy instruction is of greatest benefit when multiple strategies are concurrently taught to students. Similarly, Pearson and Gallagher (1983), in their review of comprehension research in the 1970s, identify comprehension instruction as most effective when strategies are explicitly taught. This affords students opportunities to develop the necessary skills and knowledge to apply relevant comprehension strategies to different learning contexts.

Conceptual skills for comprehension (Davis, 1968 p.504)	Comprehension strategies (Block & Duffy, 2008)
Readers Recall word meanings (vocabulary skills) Draw inferences about the meaning of a word from the content, Follow the structure of a passage Formulate the main thought of a passage Find answers to questions answered explicitly or paraphrase from content Weave together ideas in the content Draw inferences from the content Identify the writer's techniques Use literary devices, tone and mood Recognise the author's purpose, intent and point of view	*Readers* Predict Monitor Question Imagine Re-read Infer Identify main ideas Summarise Evaluate Synthesise

Table 2.1: Conceptual skills and strategies for reading comprehension
(Block & Duffy, 2008, Davis, 1968)

Conceptual skills and strategies for gaining meaning (Table 2.1) emerging from the research have not been readily applied to classroom practice. Durkin's (1978) observational study of comprehension instruction in Social Studies classrooms highlighted the comprehension pedagogies and practices enacted by 36 teachers. Teachers were observed engaging in activities which predominately assessed comprehension, primarily asking literal questions followed by worksheets to be completed by students. The instruction of the comprehension strategies identified in the research, and their application to other literacy contexts, were observed for less than 1% of the time. Such findings reveal that while the research show comprehension instruction is of great benefit to students, teachers are yet to embrace these pedagogies.

Research on comprehension in the past century has brought new perspectives to its instruction and to the literacy practices enacted by teachers across disciplines. Acknowledged as a complex undertaking, comprehension is a strategic yet fluid process, facilitating understandings of increasingly complex text (Afflerbach et al., 2008, Block & Duffy, 2008, Pearson, 2010). Moreover, the conceptualisation of comprehension, as found in strategies emerging from the research, has informed the explicit instruction of

these strategies in classroom practice in recent times. To investigate teachers' understandings of comprehension instruction, the construct of comprehension must first be examined.

Interpretations of reading comprehension

Research on comprehension over the last century has revealed comprehension to be an active and purposeful process to construct meaning over time. Comprehension is considered to be the process of simultaneously extracting and constructing meaning from the text presented (written, digital, visual and listening texts) through the interaction of the participant's context, knowledge and experiences of the topic and text form (Buehl, 2013, Freebody, 2011, Snow, 2002). Such research considers cognitive and linguistic strategies, as well as the range of information from within and beyond the text which the reader brings to and takes from reading (Buehl, 2013, Duke et al., 2011, Gambrell et al., 2002, Kintsch & Rawson, 2008, Pinnell, 2002, Snow & Sweet, 2003, Snow, 2002).

The processes underlying the construction of meaning occur at different levels as the reader engages with the text. The 'simple view of reading' put forward by Gough and Tunmer (1986) narrows reading to two categories – word decoding (graphic-based information) and linguistic comprehension (the interpretation of lexical information, sentences and discourses). Kintsch and Rawson (2008) identify two similar levels of processing, using different terminology. They refer to the linguistic level of reading as the decoding of the text. Higher order processes are engaged at the semantic level, where the text meaning is interpreted and analysed. Snow (2002) also addresses the reader's cognitive and linguistic capacities, and notes that these, combined with motivation to engage with a text, will influence the level of comprehension achieved. Each of these components of reading are necessary, but are not singularly sufficient for successful reading comprehension (Adlof et al., 2011). Comprehension arises from the co-ordinated and systematic operation of complex mental representations based upon different forms of information, according to Kintsch and Rawson (2008). Such

representations acknowledge the context of the reader and their experiences, the characteristics of the text, and the purpose for reading.

The characteristics and features of the text that is to be comprehended have a bearing on comprehension. Reading comprehension lacks the context typical of oral language, making it difficult for the reader to create understandings of written and digital text (Buehl, 2013, Snow, 2002). Therefore, the readers bring their own experiences and prior understandings to the reading experience, thus providing the necessary context for written or digital texts. Prior learning and knowledge in a discipline also plays a central role in the shaping and building of new understandings from those that currently exist, facilitating the construction of knowledge (Duke et al., 2011, Snow & Sweet, 2003). In other words, the background experiences and types of knowledge the reader possesses will influence how successfully meaning will be acquired and constructed. The structure, language and complexity of texts, as well as the curriculum domain, have a bearing upon how the reader constructs and represents knowledge. Furthermore, Kintsch and Rawson (2008) consider the interrelatedness of lexical relationships, text structure and knowledge to develop connections to broader contexts and inferential understandings. Importantly, it is recognised that digital text, moves beyond the conventional linear form of written text. Complexities, such as navigation cues and the ability to mentally reconstruct text to support comprehension, suggest that such texts are understood in a different manner to print (Singer & Alexander, 2017).

Another feature that contributes to comprehension is the activity in which comprehension occurs, defining the cognitive task and purpose for the reader. “Reading does not occur in a vacuum” (Snow, 2002 p.15), and involves one or more purposes, processes and consequences, each of which cannot be considered in isolation (Snow & Sweet, 2003). The purpose for reading, or why the reading is taking place, may be determined externally, as would be observed in a classroom task, or be intrinsically motivated in activities such as reading for pleasure or for increased knowledge. While processing the text, the reader will consider the initial purpose for reading and engage in cognitive activities including decoding, linguistic and semantic processing. The

consequences of reading, that is, what the reader learns or experiences resulting from reading the text, are contingent upon the purpose for reading and the processes engaged. This may be evident in an increase in the reader's knowledge of a subject or area of interest, the application of new knowledge acquired, or engagement with a variety of texts beyond the original purpose.

Each component in the comprehension process is dynamically interrelated within the context where reading takes place (Adlof et al., 2011, Buehl, 2013, Kintsch & Rawson, 2008, Snow & Sweet, 2003). Contextual factors influencing comprehension include the reader's perception of themselves as a reader, the environment where reading takes place, the value placed upon reading by the reader's immediate community, the texts available and the value of those texts within the community, and finally, who determines what will be read and the activities that are engaged in by readers.

Comprehension is a complex, cognitive process, requiring the reader to analyse and engage in 'problem solving' to unconsciously create meaning rather than solely retrieve information from text (Farrall, 2012, Kintsch & Rawson, 2008, Woolley, 2011, Palinscar, 2003). The complexity of the comprehension process is unseen, and remains the essence of reading (Pearson, 2010, Sadler, 2011). Buehl (2013 p.6) elaborates on this point, arguing that "no two people will have exactly the same comprehension of a text because no two people will be reading a text under exactly the same conditions". Comprehension moves beyond retrieving words and occurs in response to the reader's purpose for reading. The reader brings their own experiences and personal interpretations to the reading process, reacting and critiquing text from their point of view.

The background experiences and purposes for reading, together with the reader's ability to acquire, confirm and construct meaning, require the simultaneous extraction and construction of meaning through interactions and involvement with text. "Reading comprehension is the interaction of the reader's knowledge of the topic and textual form at hand and the new information (knowledge, feeling, attitudes) that the text presents" (Freebody, 2011 p.11). Therefore, readers must hold an understanding of both

disciplinary knowledge and its requisite literacies if they are to comprehend texts and build understandings. In an education setting, to facilitate such understandings, teachers use the official school curriculum to plan for learning, together with their own knowledge and literacy understandings of the discipline.

Comprehension in the curriculum

The past decade has brought about significant changes to school curricula nationally and internationally. The Common Core Standards (USA) (2010), National Curriculum in England (English programmes of study: Key stage 3. National curriculum in england, 2013, English programmes of study: Key stages 1 and 2. National curriculum in england, 2013, Science programme of study: Key stage 3. National curriculum in england, 2013, Science programmes of study: Key stages 1 and 2. National curriculum in england, 2013), The Australian Curriculum (Australia) (Australian Curriculum Assessment and Reporting Authority, 2015a, 2015d), and The NSW Syllabus for the Australian Curriculum (NSW) (BOSTES NSW, 2012b, 2012c), have been introduced. The English and Language Arts curriculum documents refer to the implementation of and instruction for comprehension strategies. In the Science curricula, comprehension outcomes and comprehension strategies vary within each jurisdiction, forming part of the scientific inquiry processes. These have been summarised in Appendix P.

Increased emphasis upon disciplinary literacy knowledge in the curriculum domains has emerged in the changed curricula. Literacy content is included as student outcomes; however, literacy instruction in the context of the new curricula introduced has been overlooked. While each of the curricula is an official document to be implemented within the relevant jurisdiction's schools, of interest is the exclusion of a definition of comprehension in each curriculum. The relationship between curriculum and comprehension is not made clear, thus impacting the efficacy of teacher practice in teaching comprehension and student learning.

Such changes highlight the challenges and instructional complexities that teachers must address when teaching disciplinary literacy and comprehension in middle school

classrooms. Prior to the curriculum changes of recent years, Snow (2002 p.15) commented on the increasing instructional literacy challenges faced by teachers, noting that "all students are expected to read more text and more complex texts". The complexity of texts has increased across multiple curriculum domains, requiring students to demonstrate understandings of text and content in discipline-specific ways. To facilitate disciplinary learning, multi-faceted comprehension instruction is required by teachers, embedded within the content, to bring about deeper understandings of content. Ness (2009 p.157) argues that instruction in literacy, specifically comprehension, has been considered "as an instructional add-on, rather than a way to promote students' understanding and retention of content". Poulsen and Avramidis (2003 p.547) concur, stating that comprehension instruction is "problematic in relation to subject knowledge as it is neither a school curriculum subject, nor part of a recognised academic discipline". While the curriculum has changed, changes in the literacy teaching practices of teachers across disciplines have not necessarily occurred (Goldman, 2012, Tang, 2016). Further knowledge and understanding of disciplinary literacies and their instruction is required.

A middle years focus on disciplinary literacy

It is acknowledged that academic literacy demands increase as students enter the middle years of schooling. Students are expected to read and comprehend complex texts across disciplines and demonstrate their understanding in discipline-specific ways (Freebody, 2010, Freebody et al., 2013, Moje, 2008, Shanahan & Shanahan, 2008, Unsworth, 2002). As such, research has provided strategies and instructional techniques to support the teaching of comprehension. Comprehension research in the late twentieth century has brought about a greater emphasis upon disciplinary instruction to meet the needs of older students (Moje, 2008, Pearson, 2010). Moje (2008) notes that, while the comprehension strategies and their explicit instruction are of benefit to students, there must be ongoing attention to disciplinary literacies, rather than comprehension being a separate instruction. This is of consequence to older readers who may already possess general comprehension strategies, but who now need to understand the discipline-specific modes of interpreting knowledge to successfully

build and demonstrate their understandings. Comprehension instruction must therefore be provided with the literacy practices of the discipline in mind.

Disciplinary literacy

Disciplinary literacy practices are the shared and specialised modes of communication students must master to access and construct disciplinary knowledge (Moje, 2007, Rainey et al., 2018, Shanahan & Shanahan, 2015, Tang, 2016). To interpret syllabus content across the curriculum domains, students require more than generic reading skills, and must apply different comprehension processes to the discipline-specific literacies (Freebody, 2010, Juel et al., 2010, Goldman, 2012). Within the disciplines, comprehension strategies enacted by teachers enable the construction of disciplinary knowledge. Such strategies include instruction to develop understandings of disciplinary language and text structures, engaging in discussion, and building on existing knowledge (Duke et al., 2011). In different disciplines, this may be revealed as the favouring of specific literacy strategies known by teachers to successfully support the learning of disciplinary content.

While the literature refers to discipline-specific practices, the interpretation of these practices as teachers engage with the content varies. Furthermore, Goldman (2016) states that the literacy and inquiry practices in the disciplines may not be made visible to the students by teachers, hindering understanding of the subject content and concepts. Many teachers remain unaware of the specificity of their practices, viewing literacy practices as generic skills learnt in the early years of schooling and equally applicable regardless of the nature of the curriculum domain (Fang, 2012, Goldman et al., 2016). Assumptions that the literacy of specialised curriculum areas is similar to the literacy learned in the early years of schooling, and therefore sufficient to support literacy learning in the disciplines, further confuses the issue for teachers (Allender & Freebody, 2016, Christie, 1998, Zygouris-Coe, 2012, Freebody, 2010). The literacy required in curriculum domains as students progress through school is the "culmination of the early years, a new kind of literacy" (Freebody, 2010 p.2) and remains an ongoing challenge for schools.

Schleifer (1997) states that the disciplines are a function of the culture in which they develop and create their own networks of meaning. He argues that, to effectively acquire discipline knowledge, literacy practices specific to the discipline must be instilled. Pugalee (2015) agrees, adding that disciplinary literacy practices are influenced by teacher understandings and prior experiences of literacy and comprehension instruction and the school curricula. "Our ideas about what reading means are deeply entrenched in our philosophies that are constructed from years of personal experiences and observations" (p.4). Furthermore, a lack of coherence between curriculum and literacy within and across curriculum domains in a school-wide context results in students and teachers demonstrating little sense of the relationship between curriculum and literacy, leading to students not acquiring deeper understandings and transferability of knowledge (Hall et al., 2010, Zygouris-Coe, 2012, Parris & Block, 2007, Wyatt-Smith & Cumming, 2003). In addition to student experiences, Alvermann (2002) and Tang (2016) argue that literacy instruction in the middle years is shaped by the literacy practices both explicit and implicit in the learning community. These occur over time in the disciplines as part of broader social practices in the education setting.

Understandings of the essential knowledge to learn within the discipline, along with knowing the relevant disciplinary language structures and literacy frameworks, support student learning. Disciplinary 'ways of thinking' (Houseal et al., 2016, Juel et al., 2010, Koomen et al., 2016) enable teachers to support comprehension to meet the disciplinary needs of the curriculum. Such structures and strategies include communication, reasoning, and higher order thinking skills. Alongside vocabulary and comprehension practices, these are considered essential strategies for cross-curriculum literacy (Misulis, 2009, Goldman et al., 2016). These facilitate student engagement with disciplinary knowledge to construct meaning and learn disciplinary practices, where the transfer of knowledge and skills can be more readily achieved (Frey et al., 2017, Juel et al., 2010, Rainey et al., 2018). Disciplinary understandings are more likely to occur through the application and instruction of relevant literacy practices.

Middle years teachers' knowledge of disciplinary literacy and its pedagogies

Differences in the interpretation and understanding of disciplinary literacy by middle years teachers creates tensions in literacy instruction in the curriculum domains. The compartmentalisation of disciplines in schools brings competition between content and pedagogy. Weaven and Clark (2015 p.163) claim that the implementation of the official curriculum, which must be taught and assessed, negates opportunities for teachers to "engage creatively and strategically with the students they teach". Such a position can lead to the promotion of generic comprehension strategies and pedagogies focused upon content at the expense of discipline-specific comprehension instruction (Conley, 2009, Fang, 2014, O'Brien et al., 1995, Wright, 2007).

Teachers require not only a sound understanding of the knowledge base of their subject, but equally, an understanding of the pedagogical strategies that facilitate teaching and learning in that subject (Mitchell & Lambert, 2015, Wilhelm & Lauer, 2015). This would include understanding the literacies that support curriculum knowledge and how "effective literacy instruction for adolescents acknowledges that all uses of written language and reading occur in specific places and as part of broader social practices" (Alvermann, 2002 p.190). Disciplinary understandings of literacy practices held by teachers in their subject area may not necessarily be viewed as being literacy or comprehension. Rather, teachers may consider that they constitute the discipline's broader practices enacted to support student learning.

Prior experiences of reading and comprehension which teachers draw upon have influenced the development of their knowledge and understanding of the nature of reading processes and practices. Teacher knowledge of the curriculum, and interpretations of literacy and the curriculum language, promote how literacy instruction is enacted in the classroom (Cremin, 2014, Ireland et al., 2017, Hall et al., 2010, Concannon-Gibney & McCarthy, 2012). Teachers who understand literacy to be general in nature consider its teaching another layer of content, for which they do not have the requisite skills or knowledge. This perception leads to literacy being viewed as a discrete skill development, rather than a connection between knowledge and

capability. Furthermore, it can be perceived as the responsibility of subject English teachers (Hall et al., 2010, Jacobs, 2009, Misulis, 2009, Wilhelm & Lauer, 2015). The view that English teachers have greater expertise in developing literacy skills in middle school students across the disciplines is not necessarily correct. Effective teachers of literacy across all disciplines engage in open, high order questioning, vary the mode of content delivery, and make the purpose of tasks explicit to students. Furthermore, such teachers possess disciplinary knowledge of their subject beyond that of the syllabus, supporting students to gain the specialised skills of the curriculum domain (Flynn, 2007, Hall & Harding, 2003, Shanahan & Shanahan, 2015, Topping & Ferguson, 2005). These teachers focus literacy instruction on the discipline-specific requirements of the curriculum. This may be represented in classrooms where literacy practices enacted are seamlessly embedded in disciplinary knowledge.

The structure of primary school classes facilitates literacy instruction to be planned for and implemented across the curriculum as students' skills move from learning to read to reading to learn (Christie, 1998, Freebody, 2010, Wray, 2001). In the primary years, the English curriculum typically affords literacy instruction, as it is one of its inherent purposes. Students learn generic skills to decode and comprehend, spell, write, and interpret literature and language of many types. Freebody (2013) states that literacy within the curriculum domains requires more than basic reading and writing skills. Furthermore, literacy instruction must extend beyond traditional pen and paper tasks and embrace digital technology and practices. The emergence of new literacies requires students to manipulate images and text, to comprehend, evaluate and reflect across multiple mediums (Unsworth, 2002, Pugalee, 2015, Unsworth, 2008, Bull & Anstey, 2005, Bull & Anstey, 2010).

Difficulties arise as students enter the secondary schooling phase of their education in Years 7 and 8. Instruction becomes content driven rather than literacy driven, and pedagogy moves from student centred to teacher centred, resulting in stagnating or declining literacy skills (Flynn, 2007, O'Brien et al., 1995). The differing literacy demands of each discipline are not readily recognised. Assumptions made that the literacy skills

are discrete skills, transferable across domains and taught by others, typically in English, further confuse teachers' understandings of literacy instruction in the curriculum domains (Smagorinsky, 2015, Shanahan & Shanahan, 2012). Moreover, such literacies require an understanding of the curriculum language and how texts within the curriculum domains are written and need to be read (Bharuthram & Clarence, 2015, Hall et al., 2010). Curriculum literacies encompass disciplinary practices that build knowledge, in preference to discrete skills.

Teacher efficacy in literacy instruction

Secondary school teachers and specialist teachers in the curriculum domains experience difficulty reconciling the teaching of literacy and syllabus content. There is a misunderstanding of what literacy is in the curriculum domains, primarily due to the perception that literacy and comprehension are the same across all curriculum domains. The specific needs of a domain are often overlooked or considered as part of the content and not literacy at all. Furthermore, curricula across the domains do not identify the specific knowledge and instructional practices required for comprehension instruction (Concannon-Gibney & Murphy, 2012, Smagorinsky, 2015).

In studies of secondary subject specialists, discussion of teacher efficacy concerning literacy teaching indicates that increased professional development is required at the school level and pre-service level, to bring about change (O'Brien et al., 1995). Cantrell and Calloway (2008) identify that teacher openness and willingness to change their practices can bring about effective change in classrooms. A review of research in content area literacy by Hall (2005) reaches a similar conclusion, but emphasises that a change in attitude towards the teaching of literacy is not enough: improved training of teachers is required. Ideally, literacy instruction should form part of pre-service teacher education. Love's (2009) study of pre-service secondary teachers supports this view, identifying the value of teacher literacy pedagogical knowledge to student learning outcomes. Initiatives to address school change and reform, including The New Zealand Secondary Schools' Literacy Initiative (May, 2007), The CIERA School Change Framework (Taylor et al., 2005), and The Language and Literacy project (Fenwick, 2010),

have identified the pedagogical and professional needs of teachers, resulting in significant gains in student outcomes and changes in teacher practice as part of the whole school literacy strategy.

Numerous studies have focused upon literacy in the middle years of schooling. Collaborations between universities and government departments of education at state and national levels have included Literacy and Learning in the Middle Years (Culican et al., 2001), Beyond the Middle (Beyond the middle: A report about literacy and numeracy development of target group students in the middle years of schooling., 2003), and Learning to Read: Reading to Learn (Rose & Acevedo, 2006). These are in a similar vein and provide perspectives on pedagogical practices to maximise student literacy learning across curriculum areas, and draw upon theoretical frameworks of Vygotsky, Bruner and Bernstein. Freebody (2011) notes the omission of international and Australian research studies on comprehension from the National Inquiry into the Teaching of Literacy (2005). Rowe's review of student achievement, "What Matters Most" (2002), extensively discusses the needs of students and teachers in literacy education, focusing upon achievements and gaps in achievements. None of these reports, however, focus upon comprehension instruction.

Durkin's (1978) study of comprehension instruction in Year Three to Year Six Language Arts, Science and Social Studies classrooms revealed that little comprehension strategy instruction occurred. Observed was comprehension assessment through teacher questioning and worksheets, with the study revealing that teachers considered content coverage of prime importance. Ness' (2009) mixed methodology study of comprehension strategies used in secondary classrooms beyond Language Arts found that minimal instructional time was spent explicitly teaching comprehension in secondary classrooms. She concludes that teachers in her study do not consider comprehension instruction as a means for content acquisition, nor see themselves as reading teachers. Similar results are found in an observational study of comprehension instruction in elementary classrooms which indicates that teachers rely on few

strategies of instruction for comprehension, leaving students poorly prepared for the demands of secondary school literacy (Ness, 2011).

Furthermore, a qualitative study conducted in Irish primary classrooms identifies an emphasis by teachers upon decoding practices and reading for pleasure, rather than explicit comprehension instruction (Concannon-Gibney & Murphy, 2012). Similarly, a descriptive study of comprehension instruction practices in lower secondary Language Arts classes (Anmarkrud & Bråten, 2012) identifies the teachers' reliance upon whole class and implicit instruction using a narrow repertoire of strategies. Findings in each study also reveal that the teachers lacked professional knowledge of comprehension and its instruction. To teach literacy in a discipline-specific way requires "conceptual change for teachers to help them adopt new ways of thinking and acting in the classroom" (Pearson et al., 2010 p.462).

Yore (1991) noted that secondary Science teachers identified comprehension, critical reading and vocabulary instruction as requisite skills for success in Science. However, a reliance on science textbooks as a determinant for the content knowledge led to an instructional sequence and mode of delivery which was not conducive to developing scientific literacy. His study revealed that, while science teachers valued reading instruction in science, they did not have background knowledge of the skills and pedagogical strategies to support literacy instruction. Beyond school English, Goldman (2012) claims that few teachers are aware of the need to teach discipline-specific comprehension skills or have not had the opportunity to learn these themselves. This is significant in the context of the present inquiry, as the participant teachers expressed similar views and concerns.

Disciplinarity

The concept of disciplinarity in the curriculum domains broadens the notion of disciplinary literacy. Thorndike (1917 p.332) alluded to such notions, noting, "Perhaps it is in their outside reading of stories and in their study of geography, history, and the like, that many school children learn to read". Beyond learning to read is the ability to

understand what is read, and the process of how to understand the knowledge in the curriculum domain. Disciplinary knowledge is more than the content of the discipline: it encompasses the knowledge to be learned and how the knowledge is organised and valued (Clarence & McKenna, 2017). Furthermore, the disciplinary-specific relationship constructed between the language of curriculum knowledge and ways of thinking and understanding knowledge affords the building and transference of knowledge to other disciplines.(Freebody et al., 2008, Luckett, 2012, Maton, 2011, Christie & Maton, 2011, Freebody & Muspratt, 2007).

Disciplinarity encompasses the capacity to build knowledge within the disciplines over time (Christie & Maton, 2011, Maton, 2011). Moreover, it considers how knowledge is communicated through the 'ways of understanding' the discipline, and the attributes of the knower in the discipline. The modes of communication of knowledge in the disciplines vary and are socially and culturally determined within the context for learning. The metalanguage of the curriculum positions teachers' and students' engagement with literacy practices in the classroom. Teachers and students construct an understanding of the social and cultural structures of the discipline and demonstrates the required disciplinary practice (Luckett, 2009, Hall et al., 2010, Freebody et al., 2008, Maton, 2007, Moje, 2010, Wilson et al., 2014). Distinctive to each discipline is the introduction of concepts and knowledge that cannot be learned elsewhere (Mitchell & Lambert, 2015). In classroom instruction, teachers identify and implement the appropriate literacy practices for their discipline, affording opportunities for the ongoing development of student knowledge of literacy conventions across curriculum disciplines (Freebody, 2010, Gillis, 2014). This occurs in the context of the official curriculum.

The study of English is compulsory across all school years in Australian schools and most English-speaking countries, signifying its importance as a curriculum domain (Christie, 2016). In Australia, the English curriculum comprises components for study, comprising *Writing, Speaking and Listening, and Reading*. As such, it is the core instructional pathway for literacy and comprehension in schools. Macken-Horarik

(2014) states that the curriculum is more than a blueprint for practice, and that subject English is complex and multifaceted in structure: it has been interpreted as an induction to basic literacy, and an opportunity for cultural and critical analysis and to engage with literature (Macken-Horarik, 2011, 2014). For comprehension and its instruction in school English, the curriculum acts as a pathway for teachers for the sequential instruction of the content knowledge they must teach.

The language of school English is inherent in its instruction and aligns with the skills and dispositions of the discipline. The meta-language used by teachers in literacy activities in English increases in abstraction and technicality as the curriculum moves from the early years of primary school to middle and senior school years (Jackson, 2016, Matruglio, 2016). The literature identifies emerging differences between the written curriculum and ways in which it is envisaged to be taught by teachers (the intended curriculum) in response to the learning needs of students (the enacted curriculum). These reflect understandings of what curriculum knowledge is important and the learning process or ways of knowing to meet the curriculum demands (Ireland et al., 2017, Macken-Horarik, 2014). Furthermore, assessment requirements and the perceived impact of a 'crowded curriculum' limit the discretionary space teachers may have when making choices about pedagogical practices and instruction in comprehension (Weaven & Clark, 2015). This may reveal itself in classroom contexts as the prioritising of the instruction of curriculum content in a superficial manner in order to meet assessment requirements, rather than engaging in deeper learning of the concepts.

Science as a school curriculum subject is compulsory in Australian schools from Kindergarten to Year 10. It encompasses *knowledge, understanding and skills* in Natural and Made Environments, Biology, Chemistry, Physics and Environmental Sciences. Similar to the English curriculum in Australian schools, syllabus documents for Science identify the instructional content that Australian teachers must implement. Literacy is identified as one of the general capabilities to support student learning of curriculum knowledge. Specific reference is made to the language of Science and the value of understanding the technical and specific terms for concepts and processes (BOSTES

NSW, 2012c). The language demands of Science as a discipline impact the comprehension of scientific knowledge. To infer both the implicit meanings of the terminology and the connections to scientific concepts, readers must process comprehended information with their background knowledge (Roman et al., 2016, van den Broek, 2010). Disciplinary literacy in Science aims for learners to engage in communicative tasks and use information as scientists (Koomen et al., 2016). The disciplinary language of Science and its application to scientific concepts is key to building understandings of scientific knowledge.

Summary

The literature review reveals the complexity of defining comprehension in the disciplines. Building on the research of psychologists, interpretations of reading and comprehension are broad. Simply put, comprehension is an active process to construct meaning. Research studies have revealed a deficit model of literacy practices, identifying what teachers do not do as opposed to the pedagogies enacted by teachers when teaching comprehension. The literature review suggests that middle school teachers themselves do not believe they have the skills to teach literacy (and comprehension), especially in the context of a content-driven curriculum (Hall, 2005, May & Wright, 2007, Misulis, 2009, Poulsen & Avramidis, 2003). The present inquiry aims to identify the interpretations of the curriculum, discipline knowledge, and comprehension practices made by teachers in the classroom in response to their disciplinary understandings, and how these interpretations are revealed in their practice.

Other studies have examined the instructional contexts of Science and English, the relationship of curriculum knowledge and literacy knowledge within each, and the resulting pedagogic practices that emerge (Freebody et al., 2008, Freebody & Muspratt, 2007, Gwekwerere & Buley, 2011, Morais, 2002). However, the exploration of teacher pedagogy in comprehension instruction across curriculum domains in the middle years of schooling has not received similar attention. The research has identified that teachers in the middle years of schooling hold a generic understanding of literacy and comprehension in their discipline area, where comprehension instruction is likely to be

an assessment of learning, rather than a strategic process to elicit deeper understandings. Further investigation of the relationship between literacy practices and content knowledge in the disciplines, teacher interpretations of comprehension in the curriculum and disciplines, and how such interpretations are conceptualised as comprehension and pedagogised is warranted.

Increasingly, there has been a focus upon the importance of disciplinary literacies to build disciplinary knowledge. Disciplinarity brings to the fore understandings of content knowledge in the context of disciplinary knowledge; that is, what literacy strategy works best to interpret the knowledge being presented as curriculum content. The development of new curricula has created challenges for teachers as they engage in teaching the requisite content knowledge. The central tenet of the curriculum is to build knowledge and understandings; that is, to comprehend the content. Missing from the curricula are clear definitions for comprehension. Implied is a tacit understanding of comprehension and the literacy practices to be enacted. The present inquiry seeks to explore such interpretations and the way in which these are enacted in the discipline-specific context.

The following chapter outlines the theoretical underpinnings of the inquiry, which have been used to facilitate the investigation of the participant teachers' interpretations of comprehension in curriculum and disciplinary knowledge as enacted in their practice.

Chapter 3 Theoretical Framework

Introduction

This chapter identifies the theoretical lens through which the beliefs, understandings and pedagogical practices evident in the teaching of comprehension by middle school teachers in the curriculum domains of English and Science have been investigated. In this thesis, Legitimation Code Theory (LCT) (Maton, 2010, 2014) provides insight into the knowledge bases and practices of teachers in English and Science. In the thesis, teacher understandings of disciplinary literacy and comprehension are conceptualised within the context of curriculum knowledge. Building upon Bernstein's theorisation of the structuring of knowledge (1990, 2000), LCT as a theoretical frame for the thesis brings knowledge into view as an object of study. LCT is an explanatory framework for problem-solving, inviting the generation of explanations of relationships between theory and data (Maton, 2014, Maton et al., 2016), "enabling both the exploration of knowledge-building and the cumulative building of knowledge" (Maton et al., 2016 p.2).

Knowledge, in the context of this inquiry, is viewed from two positions: firstly, as the understandings of comprehension teachers hold; and secondly, as teacher knowledge of curriculum content. In other words, the practices teachers enact when teaching comprehension in their discipline are shaped by their interpretations of the disciplinary literacy expectations in the context of the curriculum. LCT views knowledge as socially produced, where the effects of knowledge practices are explored as a central focus of inquiry (Maton & Chen, 2018 in press, Maton & Moore, 2010). In the present study, teacher understandings of comprehension and comprehension instruction have been explored in relation to the pedagogy they enact as they deliver the prescribed curriculum in their classes. Explanations and understandings of

- what is considered to be legitimate knowledge in the curriculum domains of English and Science,

- comprehension as an enactment of legitimate knowledge in the curriculum domains,
- contrasts in the attributes and attitudes of teachers towards comprehension as knowledge, and
- the context of the teaching and learning environment where knowledge is transformed, transmitted and acquired,

are explored using LCT as a theoretical frame and as an analytical tool to interpret data.

Building upon Bernstein

LCT builds upon Bernstein's theorisation of the structuring of knowledge (1990, 2000). Knowledge in LCT is approached as a social practice where the organising principles of different forms of knowledge are explored and the implications of knowledge-building are explained (Maton, 2014). In this inquiry, knowledge structures and practices bring into view the disciplinary pedagogies enacted by teachers. Furthermore, the capacity to build knowledge over time in a discipline-specific way, that is, the disciplinarity of the curriculum domain (Christie & Maton, 2011, Maton, 2011), is explored in the context of the classroom. Literacy and comprehension skills which support knowledge are driven by the discipline itself. Instruction in scientific literacy is one such example, where teaching scientific terms embedded within the disciplinary knowledge of Science facilitates student understandings of scientific concepts. Such disciplinary knowledge is drawn from the research and informs the official syllabus provided to schools.

The pedagogic device provides a mechanism to "explore the organising principles of dispositions, practices and contexts" (Maton, 2016 p.10) through a system of rules by which specialised knowledge is transformed and pedagogised (Bernstein, 1990, Maton, 2014). It identifies sites of knowledge production within which discourse is recontextualised and reproduced. A relationship between three distinct sites, of production, recontextualisation and reproduction, regulates the distribution of knowledge, the formation of pedagogic discourse, and pedagogic practice (Chen and Derewianka, 2009, Maton and Muller, 2007, Bernstein, 2000), as seen in Figure 3.1. In

the school setting, the relationship between the sites comes into view as "discipline-based knowledge is converted into educational knowledge as consultants and advisers write the syllabus and teachers work to implement its requirements" (Jones, 2007 p.55). Literacy pedagogies, therefore, are deeply implicated in the disciplines and the specific practices of teachers.

Field of practice	*Production*	*Recontextualisation*	*Reproduction*
Form of regulation	Distributive rules	Recontextualising rules	Evaluative rules
Kinds of symbolic structure	Knowledge structure	Curriculum	Pedagogy and evaluation
Principal types	Hierarchical and horizontal knowledge structures	Collection and integrated curricular codes	Visible and invisible pedagogies
Typical sites	Research papers, conferences, laboratories	Curriculum policy, textbooks, learning aids	Classrooms and examinations

Figure 3.1: The arena of the Pedagogic Device (adapted) (Maton & Muller, 2007 p.18)

Legitimation Code Theory as the theoretical lens

Legitimation Code Theory is "a conceptual framework, enabling knowledge practices to be seen, their organising principles to be conceptualised and their effects to be explored" (Maton, 2014 p.3). It sets out to explain the knowledge practices of disciplines. The locus of the study is a school, which as a social field of practice (education), has its own 'rules of the game' or logics (what is legitimate knowledge and how knowledge is acquired and measured), wherein the practices of 'actors' (teachers) within the field lay competing claims to the legitimacy or measurement of achievement (knowledge). Such *languages of legitimation* (Maton, 2000, 2014, 2016), embody practices and beliefs as messages reflecting the nature of achievement or notions of legitimacy. They concern the focus of practices and embrace 'relations to' and 'relations within' the structure and analysis of knowledge practices, through the recognition of the knower and the known within knowledge structures (Maton, 2000, 2014).

Of importance to this inquiry is *what* teachers value as legitimate knowledge. Questions are raised which consider teacher understandings of comprehension and the influence these understandings bring to knowledge building during curriculum content instruction. The resulting effect upon *how* knowledge is communicated by teachers and acquired by their students warrants exploration: in other words, the actions teachers take to enable their students to understand the disciplinary knowledge of the official curriculum. To facilitate this understanding, "the practices and beliefs of actors as they embody competing claims to legitimacy, or messages as to what should be considered the dominant basis of achievement within a social field of practice, are analysed in terms of their underlying structuring principles or *legitimation codes*" (Maton, 2009 p.45).

Legitimation codes

The LCT is a conceptual toolkit which comprises the dimensions of Autonomy, Density, Specialisation, Semantics, and Temporality. Each dimension "offers concepts for analysing a set of organising principles underlying practices as *legitimation codes* that propose differing ways of viewing legitimacy within the field" (Dong et al., 2015 p.40), and includes concepts and modalities for analysing its organisational principles into *legitimation codes*. In this inquiry, the dimensions of Specialisation and Semantics facilitate the exploration of knowledge and knowledge practices of comprehension in the curriculum and the participant teachers' pedagogical practices.

This thesis seeks to identify the legitimate knowledge and (comprehension) practices in English and Science as viewed through the teachers' practice and their interpretations of curricula. This is further enabled through the *epistemic-pedagogic device*, where knowledge of curriculum and comprehension circulates in multiple directions within the arena, as it is intellectualised as syllabuses, curricularised within the school context as scope and sequence documents (the school curriculum), and pedagogised by teachers in their classrooms. The specialisation codes consider "the distinctiveness, authority and status of knowledge–knower structures and asks what makes actors, discourses and practices special or legitimate" (Maton, 2007 p.98). Alongside these, the semantic codes "conceptualise the organising principles of practices through time" (Maton, 2014 p.126).

In this way, how the recontextualisation of curriculum and comprehension knowledge can enable or constrain cumulative knowledge-building across different curriculum domains can be considered.

Maton (2014) considers 'what kind of knowledge' and 'what kind of knower'. In this study, I have explored how the understandings and beliefs teachers hold of curriculum knowledge and comprehension, and the characteristics of the students they teach in English and Science, are enacted in their practices. Martin states, "each subject area has different ways of positioning its knowledge and its knowers" (2016 p.193). Using this premise, it is expected that the data will reveal differences in the communication of curriculum knowledge and comprehension instruction in the two disciplines. English is considered as a horizontal knowledge structure, where specialised understandings are constructed within the discipline (Bernstein, 1999). The criteria for building knowledge in English is context dependent and therefore is not readily transferred to new learning. Instead, knowledge is strongly bounded, building segmentally alongside existing knowledge over time. This can be seen in school English, where specialised knowledge may not serve other areas of learning. For example, learning about the characters and setting of *Holes* in Year 6 does not provide sufficient knowledge to interpret the characters and setting of *Much Ado About Nothing* in Year 8. Bernstein (1999) refers to the tacit acquisition of knowledge in horizontal knowledge structures. This may privilege the learner dispositions of students in school English. Here, understanding the specialised criteria and way of viewing knowledge in the discipline are valued. This may be seen in the classroom, where understanding how to request information and construct an appropriate response to a question becomes a measure of success and is characterised as the articulation of an idea through writing or oral expression.

Conversely, Science is typically viewed as foregrounding a hierarchical knowledge structure, where development of conceptual and theoretical understandings of a discipline are built upon over time. Instruction in Science is systematic and explicit in its knowledge base, with few generalisations (Maton, 2011). Of importance is knowledge and understanding of common disciplinary terms and language across contexts. For

example, knowledge of Physics is built upon across the school years, where learning about *properties of gases* in Year 5 contributes to understandings of *convection and conduction* in Year 8. Understandings of curriculum content are a measure of achievement. Therefore, emphasis will be placed upon the acquisition of content knowledge as a measure of success in the discipline; for example, identifying specific facts about an area of scientific study.

As indicated earlier, the dimensions of Specialisation and Semantics are pertinent to this study. These dimensions, represented as the specialisation codes and the semantic codes, provide a theoretical and analytical structure to the data, allowing 'claims for legitimacy' of knowledge and knowers to emerge. The specialisation codes (Maton, 2010, 2014), facilitate an exploration of the beliefs and understandings of comprehension and comprehension instruction in the context of teacher practice and the disciplinary demands of the English and Science curriculum domains in this inquiry. They provide a lens to view the connections from teacher beliefs and understandings to the pedagogical choices made by teachers, and to explore aspects of disciplinary knowledge and knower dispositions. The semantic codes (Maton, 2013, 2014) provide a contextual understanding of the forms of knowledge generated and facilitate the exploration of the disciplinary practices teachers enact to foster deep understandings of content and concepts in their students.

The epistemic-pedagogic device

The epistemic-pedagogic device (Maton, 2014) is a lens to explore the organising principles that "transform knowledge into pedagogic communication" (Bernstein, 2000 p.25). Maton states that the intent of the epistemic-pedagogic device is to "complement rather than replace Bernstein's pedagogic device… to illuminate educational knowledge and practice more generally" (2004 p.221). Both the pedagogic device and the epistemic-pedagogic device (EPD) examine the different forms of relationship within the knowledge structures using the fields of knowledge *production, recontextualisation and reproduction* as a basis.

The EPD enables me to interpret how knowledge is transmitted and *what* knowledge is taught and by *whom*. This is evidenced in the data through decisions made by teachers in determining

- what aspects of the English and Science curriculum are taught, and the timing, pacing and sequencing of these aspects in response to the mandatory requirements of both the school and statutory authorities,
- the place of comprehension and comprehension instruction in response to curriculum demands,
- and the pedagogy engaged in the classes that facilitates instruction, to enact the curriculum decisions made.

Within and across the three fields, the Production Field, the Recontextualising Field and the Reproduction Field, "knowledge circulates around the arena in multiple directions" (Maton, 2014 p.51), rather than in a linear and equitable fashion across the fields. In this inquiry, knowledge is viewed as understandings of comprehension and of curriculum knowledge. Therefore, tensions or 'struggles' (Maton, 2014, 2016) exist within the arena, as different forms of knowledge compete for control, being intellectualised and pedagogised as each circulates between fields across time and contexts. Tensions between the fields emerge as teachers justify their choices of curriculum content and pedagogy, while bounded by school curriculum, which is further bounded by state curriculum and government regulation. Questions are raised as to what informs and controls curriculum knowledge within the arena and, in the context of the present study, perceptions of comprehension and curriculum as legitimate knowledge. Figure 3.2 shows the arena created by the EPD.

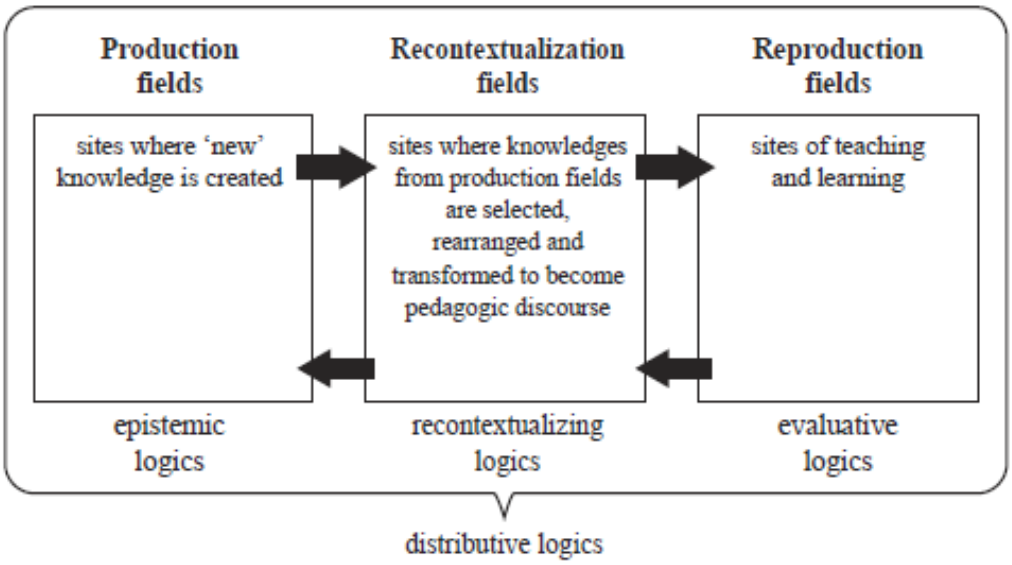


Figure 3.2: The arena created by the epistemic-pedagogic device (Maton, 2014 p.51)

In EPD construction, the *curricularisation* of knowledge occurs from the production to the recontextualisation field, with knowledge being *pedagogised* from the recontextualisation to the reproduction field. Curriculum knowledge created within the recontextualisation field is considered as the syllabuses which schools and teachers must implement. Implicit within these syllabuses is the notion of comprehension as knowledge. A critique of the English and Science curriculum used in Australian schools (please see Chapter 5) indicates that comprehension must be taught. The curriculum outcomes refer to terms such as *analyse, explain, interpret* and so on, supported by a rationale of the curriculum emphasising meaning making and understanding of content. Interestingly, comprehension is not explicitly stated within these official documents, nor is comprehension defined or suggestions given as to how it must be taught in the discipline, thereby alluding to the legitimacy of one aspect of knowledge as the object of study (curriculum content), over another aspect (comprehension knowledge). This adds a level of complexity for schools in the recontextualisation of the official curriculum and for teachers as they make pedagogical decisions regarding comprehension instruction in their classes.

The syllabuses implemented by teachers have been created by BOSTES NSW (now NESA) beyond the context of the inquiry site. These syllabuses must be taught in the participant school as a legislated requirement, for it to fulfil its obligations for registration and accreditation (Registered and Accredited Individual Non-Government Schools NSW 2011). As is the practice in Australia, the participant school and teachers are external to the curriculum design process and decisions surrounding the curriculum content of the syllabuses produced. Although designed beyond the school context, schools are permitted to develop scope and sequence documents from the syllabuses produced, therefore recontextualising the syllabuses into a school curriculum that meets the contextual needs of the school community. As the curriculum enters the reproduction field, the school-developed scope and sequence documents are further pedagogised by teachers, with adjustments made as necessary according to the teachers' personal understandings of the students' learning needs. The resultant programmes of teaching and learning become the curriculum in the context of the class and its students.

Conversely, as knowledge changes, curricular products in the recontextualising field may be *intellectualised* into the production field to create new knowledge. Similarly, educational knowledge enacted in the reproduction field may be *recurricularised* to the recontextualisation field. Evidence of adjustments made to curricula in response to the changing needs of students, teachers and the school context will be seen in the data. In addition, resources such as textbooks and commercial products used by teachers further recontextualise the syllabuses beyond the inquiry site, creating tensions between the fields. The manner in which teachers pedagogise these resources recontextualises their function, highlighting layers of complexity within the recontextualising field, as teachers transform the products to suit their pedagogical choices.

Questions of who has a claim to knowledge, what knowledge is to be learned, and by whom, in the EPD are governed by four 'logics': the epistemic, recontexualising, evaluative, and distributive logics. Table 3.1 provides a brief explanation of the key elements of the four logics, prior to an elaboration of each in the context of the inquiry.

epistemic logics	regulate the delocation, refocusing and relocation of antecedent knowledge to become 'new' knowledge in production fields. For example, stem cell research in Science.
recontextualising logics	regulate the delocation, pedagogising and relocation of knowledge in the recontextualisation fields to become pedagogic discourse. For example, syllabuses, teacher's programs, textbooks.
evaluative logics	regulate the teaching and learning of pedagogic discourse in the pedagogic practice of reproduction fields. For example, assessments.
distributive logics	regulate access to transcendental meanings (non-everyday knowledge, the creating, circulation and change of which is the domain of all three fields) and, *within* this realm, to the 'unthinkable' (or means of creating new knowledge) and the 'thinkable'. For example, subject availability and selection for students.

Table 3.1: The four logics of the epistemic-pedagogic device (Maton, 2014 p.52)

For the purpose of this study, both the curriculum content and understandings of comprehension, explicitly taught and implicitly implied as knowledge, are examined through the EPD as I seek to locate where comprehension knowledge 'sits' within the curriculum of instruction.

Production field - epistemic logics

Bernstein states that the production field is where

> "the distributive rules mark and distribute who may transmit what to whom, and under what conditions, and in so doing attempt to set the outer and inner limits of legitimate discourse" (Bernstein, 1990 p.174),

which "regulate the fundamental relation between power, social group, forms of consciousness and practice, and their reproductions and productions" (Bernstein, 1990 p.180). The production and reproduction of knowledge, and therefore power, is linked intrinsically to the language of the society in which we exist (Bernstein, 2000), and therefore "the distributive rules translate, in sociological terms, into fields of production

of knowledge with their own rules of access" (2000 p.33). In doing so, according to Bernstein, such classes of knowledge and power can be described as 'thinkable', where knowledge can be recontextualised and reproduced, and 'unthinkable', where knowledge is produced beyond the context of instruction.

The influence of the production field upon the arena cannot be ignored, as it is from here that the overarching curriculum taught in the participant school is derived. Within the production field, 'unthinkable' or new knowledge is created and positioned; yet questions remain as to what the 'new' knowledge created may be. The scenarios for the development of curriculum knowledge by regulatory authorities in both English and Science are similar. The content knowledge which informs the Science syllabuses is drawn upon from multiple disciplines in Science. Similarly, the English syllabuses are derived from multiple knowledge sources addressing multiple learning content areas and objectives of English. The basis of the research which informs the English syllabuses has many interpretations, drawing upon reading psychology and literary theory, assessment and pedagogical practices, to inform content. Meanwhile, the theoretical basis of comprehension in the syllabuses is unclear, leading to it being understood in different ways.

Recontextualisation field - recontextualising logics

Relevant to the present inquiry are the fields of recontextualisation and reproduction within the EPD. The epistemic logics work to legitimise new knowledge, but tensions arise between the production field and recontextualising field, where the curriculum is recontextualised into scope and sequence documents according to policy requirements and contextual factors. As Bernstein describes, the recontextualised curriculum becomes 'thinkable' knowledge, relevant to the school context and students' needs (Bernstein, 1990, 2000).

In the broader context of the inquiry, discipline knowledge recontextualised in the form of official syllabuses is determined by the regulatory authority, which in NSW is NESA (previously BOSTES). Consultants and curriculum writers external to the school context

are engaged to produce syllabus documents, which are mandatory to implement in all NSW government and non-government schools to comply with regulatory requirements.

In Bernstein's pedagogic device, the recontextualising rules construct knowledge and pedagogic discourse, "regulating the selection, sequence, pace and relations with other subjects, but also the theory of instruction from which transmission rules are derived" (Bernstein, 1990 p.185). For recontextualisation to occur, consideration must be made of how knowledge is communicated and acquired. "Pedagogic discourse is a recontextualising principle which selectively appropriates, relocates, refocuses and relates other discourses to constitute its own order and orderings" (Bernstein, 2000 p. 33). Instructional discourse is "knowledge that is selected, organised, and defined in evaluative criteria, for the purposes of teaching and learning creates specialised skills and their relationship to each other"; while regulative discourse "generates principles of selection, organisation, pacing and criteria of skills, concepts and information."(Singh, 2001 p.253). In schools, this may be represented by the scopes and sequence documents created as a basis for units of study taught in classrooms.

It is through the embedding of instructional discourse within the regulative discourse to create one discourse that recontextualisation occurs. Bernstein (2000) argues that the regulative discourse is dominant and therefore produces order in instructional discourse. He continues with the notion that the rules for the transmission of knowledge are socially bound within the regulative discourse. Therefore, "the way in which a subject is taught is not one that is intrinsically linked to it but dictated by those who regulate and control its content" (Clark, 2005 p.36); for example, who is in control of the decision-making processes regarding the implementation of the syllabus, and the selection of resources to support teaching and learning in the classroom.

The recontextualising logics of the EPD regulate knowledge to become pedagogic discourse. The recontextualising logics provide access to the two competing forms of knowledge, curriculum and comprehension, within the arena. It is here where the

participant school determines 'what' legitimate knowledge will become the focus of instruction. Both comprehension and curriculum content knowledge compete for dominance in the field, influenced by their relative positioning within the field of production.

Recontextualisation occurs within two fields, the *official recontextualising field* (ORF) and the *pedagogic recontextualising field* (PRF). The ORF concerns itself with curriculum and policy. In Australia, curriculum and policy are created and regulated by government agencies such as ACARA, and in NSW, BOSTES and NESA. These agencies transform knowledge into syllabuses, curricula and assessment requirements to be implemented in the school context (Bernstein, 1990, Bernstein, 2000, Chen & Derewianka, 2009). Conversely, the PRF concerns itself with the selection and dissemination of specialist knowledge at the institutional level (Bernstein, 2000); that is, at the school level.

Building upon this premise, the recontextualising logics of the EPD facilitate the development of school 'scopes and sequences' of each curriculum created in the ORF. In the context of the participant school, decisions determining who will teach the mandatory curriculum, as well as the sequencing and pacing of the delivery of the curriculum through scope and sequence documents (Appendix C), are made by Heads of Faculty and Heads of School. These are informed by contextual understandings of students and the learning environment, and then transformed (or recontextualised) into curriculum programmes in the PRF. Decisions regarding the resources to be utilised, including text books and commercial products such as reading schemes, within the school-based curriculum are made and evaluated collaboratively by executive and teaching staff.

Reproduction field – evaluative logics

The reproduction field is where recontextualised knowledge (curriculum) is transmitted through pedagogic practices. It is here that "learners acquire forms of consciousness, ways of working with knowledge, texts and meanings" (Jones, 2007 p.56). Using

evaluative rules, the relationship of content, time and space determines the criteria for pedagogic practice and the implicit or explicit transmission and acquisition of knowledge. In the context of the classroom, teachers make decisions about the curriculum and discipline knowledge students need to learn and the instructional practices to facilitate learning. These decisions are realised as the disciplinary literacy practices enacted by teachers in English and Science using knowledge about the discipline and its inquiry processes related to reading (Goldman et.al, 2016) to inform how the curriculum knowledge will be taught.

Recontextualised knowledge (curriculum and comprehension) is transmitted or pedagogised (reproduced) through the pedagogic practices of teachers in the classroom. In the participant school in the present inquiry, classes are allocated to teachers and curriculum content determined at the beginning of the academic year. Decisions regarding pedagogy and the timing of instruction and content are made by teachers based upon their understandings of students in their class and the environment in which instruction takes place. Specific to the participant school, lessons occur in varying environments, including classrooms, laboratories and agricultural spaces. The participant teachers modify the curriculum and pedagogy to suit needs arising in the teaching and learning environment, transforming and reproducing knowledge in response to environment and participant (student and teacher) influences. Using evaluative logics, the relationship of content (curriculum and/or comprehension knowledge), time (lesson and unit of study) and space (learning environment) determines the criteria for pedagogic practice, leading to the explicit or implicit transmission and acquisition of knowledge.

Distributive logics

Maton repositions Bernstein's concept of the distributive rules. While Bernstein posits the distributive rules within the production field, Maton argues that the distributive rules concern "all fields of the arena rather than regulating solely the field of production" (Maton, 2014 p.50). The distributive logics "encompass activities across the entire arena" (p.51) and act as the 'gatekeeper' to the arena and fields of practice. They regulate the

conditions surrounding 'who' may access each field, 'what' knowledge is created within the fields, and 'how' it will be dispersed within the social field.

In this study, knowledge is explored as notions of curriculum and comprehension knowledge. The curriculum content implemented (syllabus documents of BOSTES NSW) competes with understandings of comprehension knowledge, as we have seen within each syllabus, but not stated as content knowledge. The legitimacy of each form of knowledge and the struggle for dominance of the arena by regulatory authorities, the participant school and its teachers, are explored within the EPD through the specialisation codes. Figure 3.3 shows the relationship of the EPD to the inquiry.

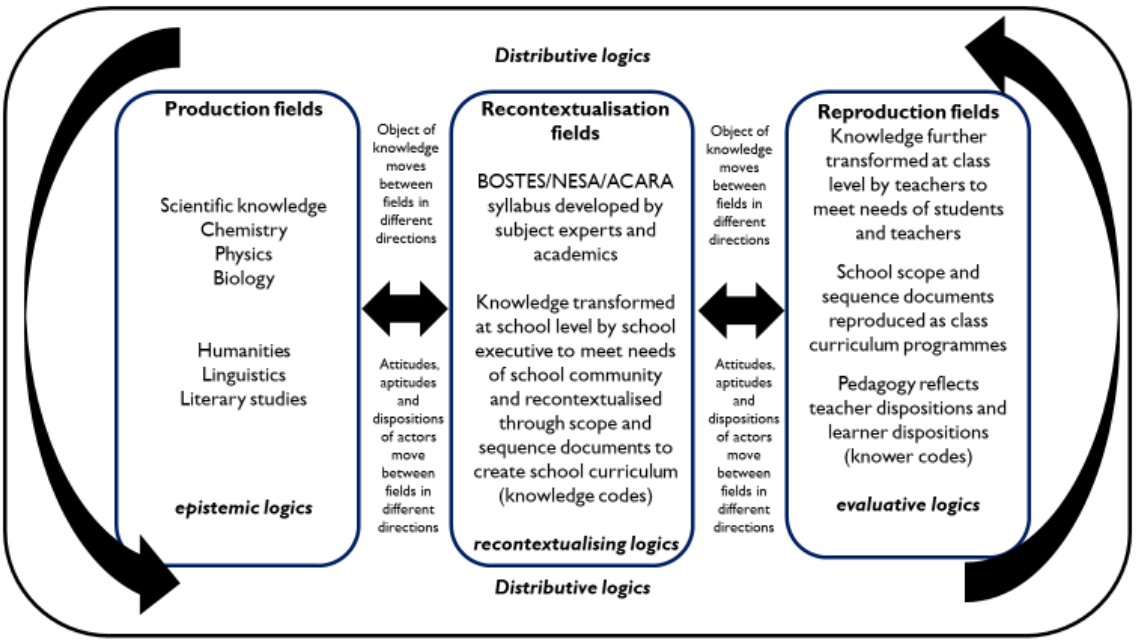


Figure 3.3: The epistemic-pedagogic device in relation to the inquiry (based upon Maton, 2014 p.51)

The specialisation codes of legitimation

The specialisation codes are the organising principles of knowledge-knower structures generated in practices through the relative strengths of epistemic relations (the object of knowledge) and social relations (the dispositions of knowers). They explore and

support the 'workings' of the EPD, which considers fields of practice and how knowledge is constructed and legitimised, through relationships between knowledge and knowers.

The specialisation codes consider "the distinctiveness, authority and status of knowledge–knower structures and ask what makes actors, discourses and practices special or legitimate" (Maton, 2007 p.98). The codes are "underpinned by the notion that educational practices and contexts represent messages as to both what is valid to know and how, and also who is an ideal actor (learner or teacher)" (Chen et al., 2011 p.131).

In the context of the present study, knowledge-knower structures come into view in the teachers' enactment of curriculum and comprehension knowledge in their instruction. The legitimacy of each form of knowledge is reflected in the teachers' practice and in the knower dispositions they seek in their students and identify within themselves.

The specialisation codes legitimise the basis of achievement, and consider what is knowledge (the object of study) and the attributes of knowers (subjects, authors or actors) (Maton, 2014). Further extrapolation of the knowledge-knower structures brings into view specialisations of knowledge practices: the epistemic relations (ER) and social relations (SR). Each have relative strengths which vary independently from stronger to weaker (as indicated by +/-), conceptualising the basis of practices underpinning knowledge claims to legitimacy. The relationship between what is legitimate knowledge and how it should be measured (ER), and who is the right kind of knower (SR), is strengthened (+) or weakened (-) by the positioning of knowledge claims made about something (the object) by the author or actor (the subject). In other words, the varying strengths between the epistemic and social relations form the basis of the four specialisation codes: the knowledge codes, the knower codes, the elite codes and the relativist codes; as shown in Figure 3.4.

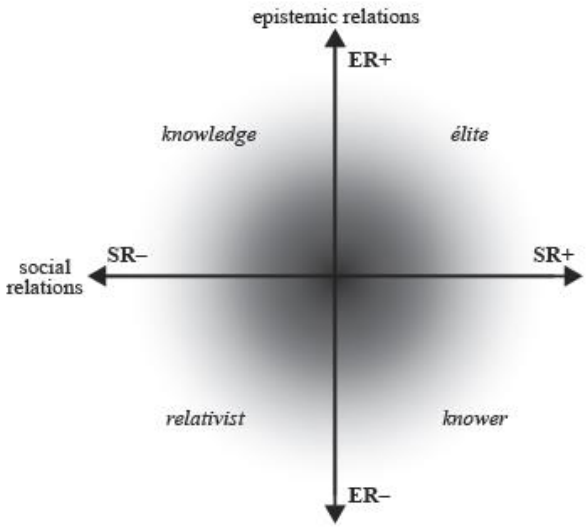


Figure 3.4: The specialisation plane (Maton, 2014 p.30)

Each specialisation code highlights dimensions of the 'rules of the game' embodied within the context of legitimate knowledge (that is, curricula knowledge in school English and Science), and is revealed through the practices and dispositions of the actors within the social field (that is, teachers and students in school classrooms). Maton's claims of the structure of the curriculum fields enable a clearer understanding of how the concept of comprehension operates across the middle years of schooling in English and Science. Relevant to the inquiry are the knowledge codes (ER+/-) and knower codes (SR+/-). The knowledge and knower codes are of importance as their varying strengths bring into view horizontal and hierarchical knowledge structures revealed in the data. Typically, Science reveals a hierarchical knowledge structure and horizontal knower structure (ER+/SR-), while English typically presents as a horizontal knowledge structure and a hierarchical knower structure (ER-/SR+). In other words, what you know matters in Science, but in English, what kind of knower you are is more important. The elite codes (ER+/SR+) and relativist codes (ER-/SR-) are not pursued in this inquiry, as the focus of this thesis is upon the contrasting understandings and beliefs of comprehension and how these beliefs and understandings influence teacher practice and pedagogical decisions in middle years classrooms. Table 3.2 identifies aspects and features of each specialisation code.

Knowledge codes	(ER+/SR-)	specialised knowledge, skills and procedures are the basis for achievement, with the disposition, attitudes and attributes of actors of lesser importance.
Knower codes	(ER-/SR+)	the attitudes, aptitudes and dispositions of actors are the basis of achievement, with specialised knowledge and objects of lesser importance.
Elite codes	(ER+/SR+)	possessing specialist knowledge and being the right kind of knower.
Relativist codes	(ER-/SR-)	achievement is measured by neither specialist knowledge or knower attributes.

Table 3.2: The four specialisation codes (Maton, 2007, 2014)

In the context of the inquiry, the specialisation codes, specifically the knowledge codes and knower codes, frame theoretical perspectives on what teachers understand knowledge of curriculum and comprehension to be, how these understandings are reflected in their practice and, therefore, the relationship between understanding and practice. The specialisation codes of legitimation provide

> "an insight into the possession of explicit principles, skills and procedures (the knowledge codes) and attitudes, aptitudes and dispositions (the knower codes)…to help excavate the underlying principles generating forms of knowledge" (Maton, 2009 p.46).

The specialisation codes provide an instrument to analyse considerations of (legitimate) knowledge voiced and enacted by these teachers in their beliefs, understandings and practices, in terms of the distinction between curriculum content as knowledge and understandings of comprehension and comprehension strategies as knowledge.

Furthermore, questions of how personal understandings of comprehension shape teacher views on the attributes and dispositions of their students as learners, and upon themselves, can be explored through the data analysis. Simply stated, the specialisation

codes facilitate the inquiry's exploration of 'what is known' by teachers in terms of comprehension and curriculum knowledge (epistemic relations) and 'who you are' as a knower (both as teachers and their students). Furthermore, the strengthening and weakening of the relations between knowledge-knower structures over time and context can bring about changes to the 'rules of the game' and the basis for legitimate knowledge.

These *code shifts* may occur as curriculum expectations and expected learner behaviours change across year groups and curriculum domains. This is particularly pertinent to the scope of this study; that is, the middle years of schooling. As students move into the secondary years (Years 7 and 8), the expectations of comprehension knowledge held of students by teachers weaken epistemic relations (knowledge of curriculum content) and strengthen the social relations (learner attributes in the curriculum domain) in comparison to their expectations of students in the upper primary school (Years 5 and 6). The pedagogy observed in upper primary and lower secondary school may also shift in relative explicitness with respect to literacy instruction. This becomes clearer across the disciplines of English and Science. For example, a code shift may occur in English where students enter a higher year level and it is assumed they will have prior knowledge and understanding of a comprehension concept to aid their analysis of a text. In Science, assumptions may be made that students have an understanding of the scientific terms taught in Years 5 and 6, and as such, will be expected to use these terms to interpret curriculum content.

The semantic codes of legitimation

The semantic codes are the organising principles of social fields of practice, generated through the relative strengths of semantic gravity and semantic density. Whereas the specialisation codes enable me to consider who can claim to be the legitimate knower and what can be claimed to be legitimate knowledge (Maton, 2014), the semantic codes are considered with the nature of knowledge itself under construction in comprehension teaching.

The semantic codes consider the degree of abstraction of knowledge in fields of practice in relation to the complexity of knowledge within that context, as simpler concrete and contextual meanings move along a continuum across time to more generalised and abstract understandings. As such, "all practices are characterised by *both* semantic gravity *and* semantic density" (Maton, 2014 p.131). *Semantic gravity* (SG) refers to the degree of contextual dependence of meaning for knowledge to 'make sense'; whereas *semantic density* (SD) refers to condensation of meaning within the social practices, such as terms and concepts.

The organising principles of semantic gravity and semantic density are strengthened (+) or weakened (-) according to the social fields in which the semantic structure occurs, as shown in Figure 3.5. In this study, the social field is the teaching and learning environment of the participant teachers. Semantic gravity is stronger (SG+) when meaning (knowledge) is contextual, becoming weaker (SG-) as meaning becomes contextually less concrete and more abstract, thus bringing about a capacity for knowledge to be generalised beyond the context in which it is acquired. Semantic density strengthens (SD+) when meanings are condensed within symbols and practice, such as terms, phrases and concepts, and weakens (SD-) as meanings are less condensed within these symbols and practice (Maton, 2011, 2014).

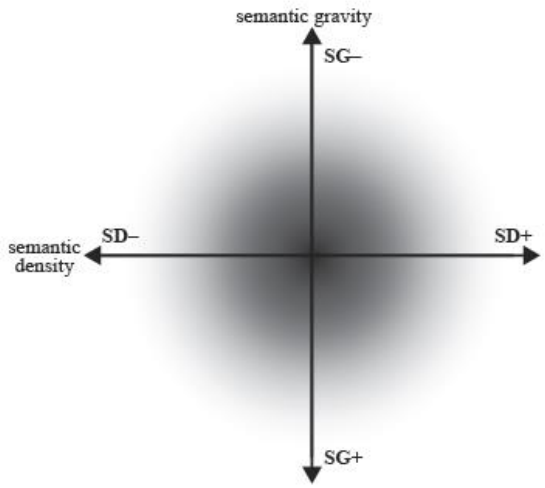


Figure 3.5: The semantic plane (Maton et al., 2016 p.16)

The resultant relationship, or 'shifts', between semantic gravity and semantic density over time, or *semantic profiles*, can be illustrated by movements of curriculum and comprehension knowledge over time. Figure 3.6 shows the *downward shift* where downward semantic shifts of knowledge are repeatedly decontextualized or unpacked (SG-,SD+) towards more simplified understandings (SG+,SD-), but not 'repacked' to allow for generalisations of knowledge across time to occur. For example, a lesson where the language of the Science textbook was simplified by the teacher to explain key concepts in everyday language may be characterised in a similar way to the wave shown in Figure 3.6.

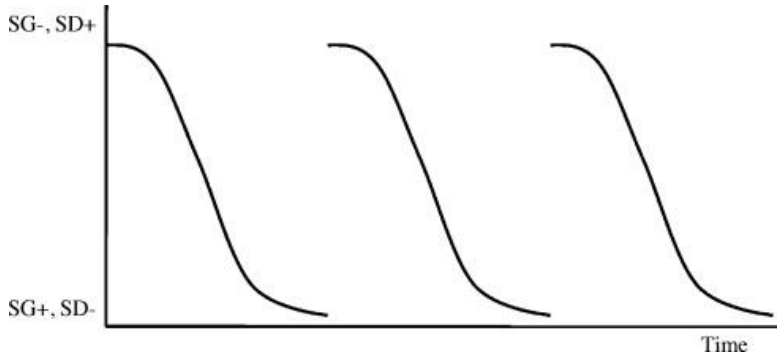


Figure 3.6: Downward shift profile (Maton, 2013 p.14)

The movement of downward semantic shifts coupled with upward semantic shifts over time is the *semantic wave*, as seen in Figure 3.7. Here, knowledge is unpacked and repacked over time, therefore allowing concepts to build and be transferred across contexts and time. For example, a lesson where the teacher introduces a concept using simplified language and provides concrete examples, prior to elaborating using specialised language and abstract understandings, can be characterised as a semantic wave, as seen in Figure 3.7.

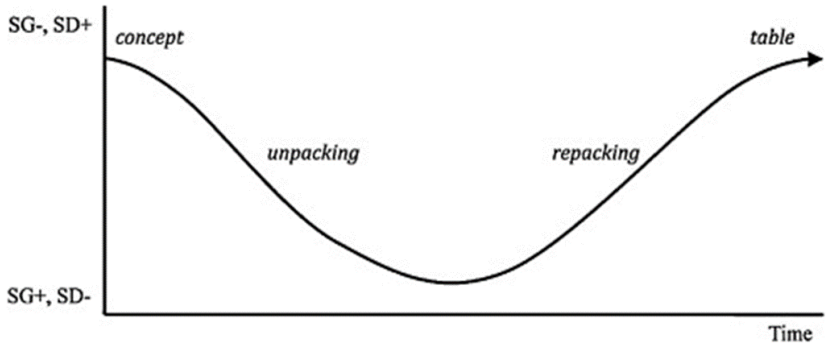


Figure 3.7: Semantic waves (Maton, 2013 p.15)

The semantic codes facilitate the inquiry's exploration of the strengthening and weakening of semantic gravity and semantic density of comprehension and curriculum knowledge within the pedagogy enacted by the participant teachers. This is revealed in the data through classroom discussions and student work samples.

The suitability of Legitimation Code Theory to the inquiry

Legitimation Code Theory (LCT) as a theoretical frame to the inquiry utilises "strong explanatory tools" (Clarence, 2016 p.135) to examine the nature of knowledge and knowers in the disciplines. LCT is utilised in diverse settings and disciplines to conceptualise instructional practices and discourse. These include investigations of: online learner experiences (Chen et al., 2011, Maton & Chen, 2018 in press), disciplinary teaching in universities (Clarence, 2016, Clarence & McKenna, 2017, Vorster & Quinn, 2012), sociology (Luckett, 2009, 2012), music (Martin, 2016), physics (Georgiou, 2016), design (Dong et al., 2015), and secondary school English (Christie, 2016, Jackson, 2016).

In the present inquiry, LCT brings into view the nature of curriculum knowledge and the characteristics of knowers in the curriculum domains of English and Science. As a conceptual toolkit, the understandings of comprehension and the pedagogical practices enacted by middle years teachers are explored through the analysis of interviews, teacher discourse and classroom observations. The relationships between the supporting research questions and the theoretical perspectives underpinning the inquiry are illustrated in Table 3.3.

Supporting research questions	Theoretical perspectives
1) *What do teachers of English and Science in the middle years of schooling understand comprehension to be?* The specialisation codes (Maton, 2010, 2014) will facilitate an exploration of the beliefs and understandings of comprehension and comprehension instruction in the context of teacher practice and the curriculum demands of the English and Science curriculum domains. This will be achieved through the identification of, • what constitutes legitimate knowledge within the curriculum domains, and • teacher understandings of the knower dispositions valued by them.	*Specialisation Codes* • Knowledge codes • Knower codes
2) *What are the pedagogical practices of English and Science teachers in the middle years of schooling when teaching comprehension in their subject area?* The *epistemic-pedagogic device* (Maton, 2010, Maton, 2014) provides a lens to examine pedagogical practices where knowledge is transformed, communicated and acquired in the English and Science classrooms. The specialisation codes provide a frame to explore aspects of disciplinary knowledge and knower dispositions. In addition, the semantic codes (Maton, 2013, 2014) provide a contextual understanding to the forms of knowledge generated and facilitate the exploration of the disciplinary practices teachers enact to foster deep understandings of content and concepts in their students.	*Field of Recontextualisation* • The transformation of knowledge (recontextualising logics) *Field of Reproduction* • The transmission and acquisition of knowledge (evaluative logics) *Semantic Codes* • Semantic gravity • Semantic density *Specialisation Codes* • Knowledge codes • Knower codes
3) *What is the relationship between teachers' beliefs and understandings of comprehension and their practices in the teaching of comprehension?* The specialisation codes provide a lens to view the connections between teacher beliefs and understandings and the pedagogical choices made by teachers.	*Specialisation Codes* • Knowledge codes • Knower codes

Table 3.3: The relationships between the supporting research questions and the theoretical perspectives underpinning the inquiry

Summary

Decision making surrounding the implementation of curricula, and its recontextualisation within the school, are examined via the EPD. Furthermore, understandings of the nature of disciplinary literacy practices which emerge in English and Science when teaching comprehension are examined through the specialisation codes. These provide an 'insiders' view on the impact of beliefs and understandings of disciplinary literacy and curriculum knowledge on the pedagogies enacted in the middle years classroom. The semantic codes afford an analysis of the nature of disciplinary discourse enacted when teaching content and comprehension, in the participant teachers' practice. The methodological approach to the inquiry is outlined in the following chapter. The research design is qualitative and uses collective case study to investigate teacher understandings of comprehension and the literacy practices enacted. The interpretation and analysis of data is facilitated using the principles of LCT.

Chapter 4 Methodology

Introduction

This chapter identifies the research design and methods used to investigate middle years teachers' understandings of comprehension and their practices with respect to comprehension in the curriculum domains (Freebody et al., 2013) of English and Science. The chapter is divided into three parts and provides an explanation of:

1. The nature of qualitative inquiry, and its suitability to this inquiry;
2. Research design;
3. Data analysis methods.

This inquiry is framed within a qualitative inquiry paradigm. Qualitative inquiry can be considered as "finding good moments to reveal the unique complexity of the case" (Stake, 1995 p.63), which "begins with assumptions, a worldview, the possible use of a theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem" (Creswell, 2007 p.37). Using these viewpoints as a broad lens on qualitative inquiry, this study explores the understandings of comprehension teachers hold when teaching curriculum content in English and Science. The identification and investigation of how these understandings guide the teachers' interpretations of the curriculum and its expectations in the selection and enacting of pedagogical practices in the classroom is of importance to the inquiry. A collective case study inquiry best suits this purpose, as it affords opportunities to attend to the uniqueness and complexities of teacher practice through the observation of classroom-based activities, and via multiple data collection methods, to discover and portray differing views of comprehension practice within the participant school setting (Freebody, 2003, Merriam, 1998, Stake, 1995). Three research questions guide the inquiry. The relationship between the research questions, their aims, data collection and analysis, are shown in Table 4.1.

Supporting research questions	Aim	Data analysis
1) *What do teachers of English and Science in the middle years of schooling understand comprehension to be?* This question has been explored through interviews with the teachers. Semi-structured interviews prior to and following the lesson observations provide insights into the understandings these teachers have of comprehension in their discipline.	To identify what comprehension means to teachers of English and Science in the middle years of schooling (Year 5 to Year 8).	• Analysis of interview transcriptions to identify strengthening and weakening epistemic (ER) and social relations (SR).
2) *What are the pedagogical practices of English and Science teachers in the middle years of schooling when teaching comprehension in their subject area?* Classroom observation of teacher practice, together with post-observation semi-structured interviews has provided data to investigate this question.	To investigate the discipline-specific practices of comprehension instruction within the curriculum domains of English and Science, as well as common practices across the domains.	• Analysis of pedagogies observed using a translation device to identify strengthening and weakening epistemic relations (ER) and social relations (SR), and strengthening and weakening semantic gravity (SG) and semantic density (SD). • Transcription of lessons to identify semantic movement. • Identification of comprehension instruction and pedagogies for in depth analysis.
3) *What is the relationship between teachers' beliefs and understandings of comprehension and their practices in the teaching of comprehension?* Classroom observation, interview and artefacts, such as students work samples and curriculum documents have been used to investigate this question.	To identify teacher understandings and beliefs of what constitutes legitimate knowledge (comprehension knowledge and/or curriculum knowledge); To investigate teacher understandings of learner dispositions within and between the curriculum domains.	• Analysis of interview transcriptions to identify strengthening and weakening epistemic relations (ER) and social relations (SR). • Analysis of comprehension outcomes and expectations in the English and Science syllabus using the specialisation codes of LCT.

Table 4.1: The relationship between the supporting research questions and data collection aims and analysis

Qualitative inquiry as an overarching paradigm

Denzin and Lincoln (2011 p.3) describe qualitative inquiry as "a situated activity that locates the observer in the world and consists of a set of interpretive, material practices that make the world visible". As an inquiry method, it possesses specific characteristics which are widely discussed within the literature (Bogdan & Biklen, 1998, Creswell, 2007, Denzin & Lincoln, 2011, Fraenkel & Wallen, 2006, Merriam, 1998, Patton, 2002). Patton (2002 p.40) has categorised these characteristics into themes of design strategies, data collection and fieldwork strategies, and analysis strategies. Using Patton's themes as a frame, these characteristics are evident within this inquiry. These include:

- *Naturalistic* – in qualitative inquiry, context is paramount, with data being collected over a sustained period of time (Bogdan & Biklen, 1998, Creswell, 2007, Fraenkel & Wallen, 2006, Merriam, 1998, Patton, 2002). In this inquiry, each teacher's classroom, be it an English classroom, Science laboratory or agricultural building, provided the teaching and learning context for lessons observed. Data collection extended across a period of twelve months, providing the opportunity for data to reflect the natural teaching and learning context of the participants. Findings have been situated within the context of time and place of the study.
- *Emergent Design* - the research design has been flexible and responsive to changing conditions within the field, with adaptations to the inquiry made as data have been collected and understandings deepened (Creswell, 2007, Fraenkel & Wallen, 2006, Merriam, 1998, Patton, 2002). In this inquiry, data collection opportunities have been in response to the contextual needs of the participants and, as such, have occurred at differing times across the twelve-month data collection period. In addition, questions asked in the semi-structured interviews reflected emerging understandings from the data collected.
- *Purposeful sampling* - the participant sample for this study is small (N=7) and their selection purposeful, as this provides a means to develop an in-depth understanding of the study. The participants (teachers of English or Science Year 5 to Year 8) are the cases for the inquiry and have been selected as they are

"information rich and illuminative.....and provide insight about the phenomenon" (Patton, 2002 p.41).

- *Multiple sources of data* - data have been collected from within the classroom and include interview transcripts, observations, photos and video recordings and documentation (Bogdan & Biklen, 1998, Creswell, 2007, Fraenkel & Wallen, 2006, Merriam, 1998). A critique of the official curriculum used by the participant teachers, and descriptions of comprehension in their practice, provide additional insights into understandings and knowledge of comprehension in the school.
- *Researcher as a key instrument* - I have gathered data in situ in the school. As a teacher-researcher immersed daily in the research site, I have been "able to actively enter the worlds of interacting individuals" (Patton, 2002 p.49), which affords me opportunities to describe and understand "both externally observable behaviours and internal states (worldview, opinions, values, attitudes and symbolic constructs)" (ibid) within a Transition (pre-Kindergarten) to Year 12 school context. My knowledge of the site and its particular environment and circumstances brings additional insights to the data that may not be obvious to an external observer. In this way, the broader context can be considered, with anomalies explored and clarified as they arise (Creswell, 2007, Fraenkel & Wallen, 2006, Merriam, 1998, Patton, 2002, Freebody, 2003).
- *Descriptive data and rich descriptions* - data gathered in this inquiry describe events as they occurred, with each aspect and detail of data collected bringing further insight into the situation observed (Bogdan & Biklen, 1998, Denzin & Lincoln, 2011, Fraenkel & Wallen, 2006, Patton, 2002). Descriptions of conversations, the teaching and learning environment, and of individuals, recreate the setting with as much detail as possible, so that the reader may gain an understanding of what occurred.
- *Perspectives* - this inquiry captures the emic (teacher participant) viewpoint through understanding how each teacher interprets their pedagogy and understandings of comprehension from within their own frame of reference. The etic (myself as researcher) viewpoint uses my personal experience and insights

to understand what is observed (Bogdan & Biklen, 1998, Creswell, 2007, Denzin & Lincoln, 2011, Fraenkel & Wallen, 2006, Merriam, 1998, Patton, 2002).

- *Concern with process* - through descriptive accounts of classroom observations and participant perspectives, the inquiry considers how and why behaviour occurs rather than explore particular outcomes (Bogdan & Biklen, 1998, Fraenkel & Wallen, 2006, Merriam, 1998, Patton, 2002). A series of interviews with teacher participants provides insights into teachers' reasoning behind the practices and pedagogical choices made. In addition, observations of each teacher engaging with the curriculum content and comprehension pedagogy provide data that will impart what has been learned and support the inquiry findings.

Collective case study inquiry

This inquiry uses collective case study as a research design to investigate seven teachers and eight classes (cases) within one school. Yin (2009 p.18) puts forward a twofold definition of case study articulating its scope and features, stating that case study is an empirical inquiry that:

- investigates a contemporary phenomenon (the case) in depth and within its real-world context, where the boundaries between phenomenon and context may not be clearly evident;
- may have more variables of interest than data points;
- relies on multiple sources of evidence;
- benefits from the prior development of theoretical propositions to guide data collection and analysis.

Through case study as a method of inquiry, the "conditions that significantly shape and temper teaching and learning practices… which are not background variables, but rather lived dimensions that are indigenous to each teacher-learning event" (Freebody, 2003 p.81) are explored. Case study provides a framework to observe and interpret the intricacies of teacher practice concerning comprehension instruction within the context of day-to-day teaching in teacher's classrooms.

Stake (2000) describes a collective case study as one where "a researcher may jointly study a number of cases in order to investigate a phenomenon, population or general condition" (p.437). The selection of multiple cases to investigate the research questions of this inquiry is a purposeful decision. The questions in the study seek to identify not only what teachers of English and Science understand about comprehension, but importantly, why they have formed these understandings and how their understandings are reflected in the pedagogical practices observed within the classrooms. Using a collective case study design, data gathered from multiple sources have been used to compare and contrast understandings of comprehension and comprehension pedagogical practices between English and Science teachers, therefore "retaining the holistic and meaningful characteristics of real-life events" (Yin, 2009 p.4), such as those observed in the participant teacher's classes.

In the inquiry, the collective case study design (Merriam, 1998, Stake, 1995, Yin, 2009) considers:

- the exploration of recontextualised knowledge (the curriculum) and disciplinary comprehension pedagogies in the context of the teacher's classroom;
- multiple sources of data to establish the cause and impact of disciplinary practices viewed through the lens of the specialisation and semantic codes;
- the behaviours and practices observed to reflect the experiences of the teachers in a contemporary setting in which there is reduced control of participant behaviours.

The data gathered across each of the cases will provide insights to each of the research questions. Triangulation of data, "the process of using multiple perceptions to clarify meaning by identifying the different ways a phenomena is seen" (Stake, 2000 p.445), provides the means to validate and corroborate the reliability of the evidence collected to ensure the validity of research findings. The collective case study design enables findings to be considered more compelling with increased generalisability, than for a single case study design (Creswell, 2007, Merriam, 1998, Fraenkel & Wallen, 2006, Yin, 2003, Stake, 2000). The research design is represented in Figure 4.1, and provides an

overview of the methods used, including participant selection, document analysis, observations and semi-structured interviews.

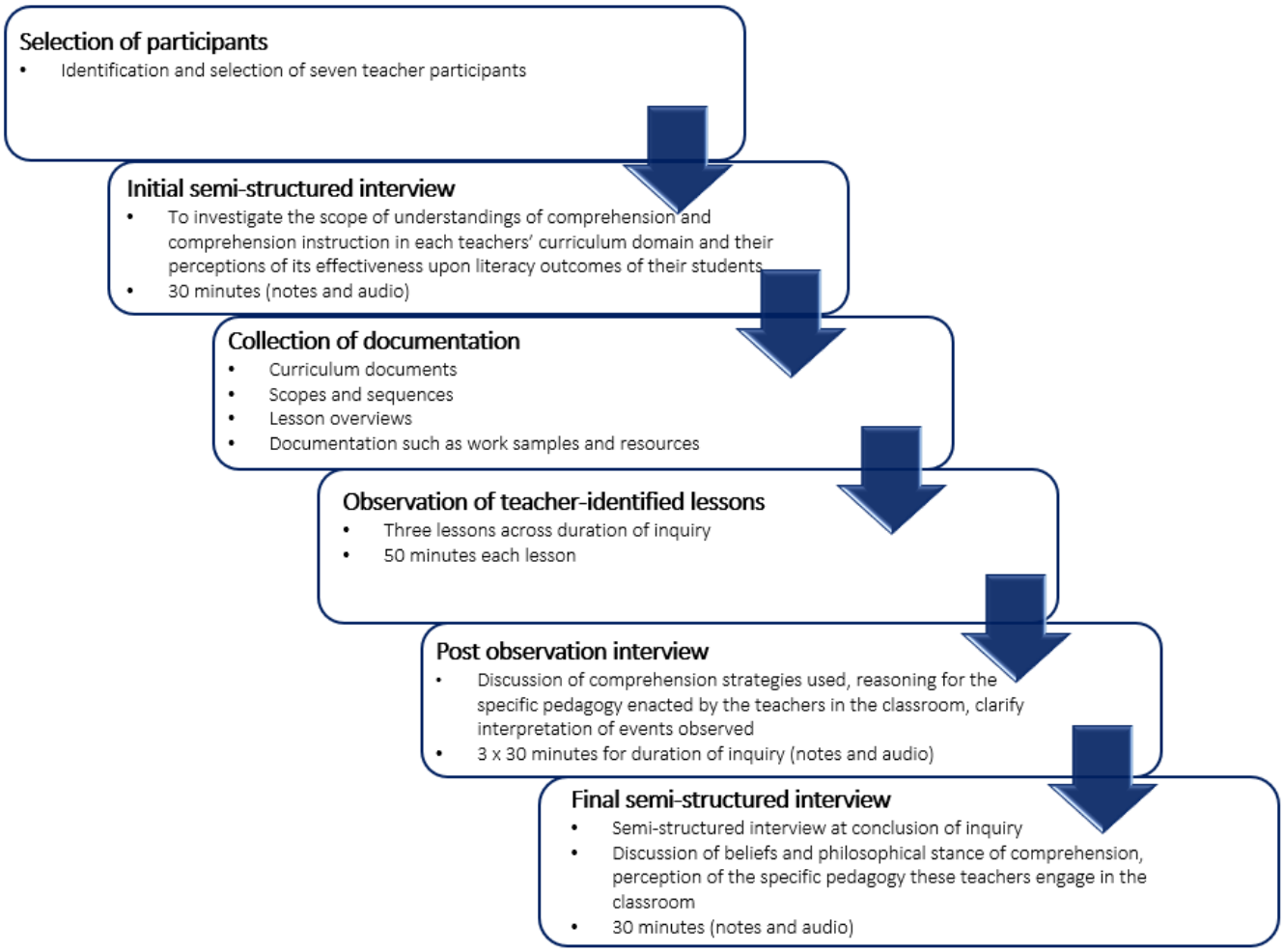


Figure 4.1: Research design

The inquiry is not an intervention, but rather an observation of teacher practice, where, as the observer, I had no control of the participant's behaviour, nor was this intended. This is an important aspect of the inquiry, as the natural behaviours, conversations and actions of the teachers and students in the classroom settings allowed me to capture the essence of each teachers' understanding of comprehension in the context of their practice. Each case (the teacher and their class) "is a specific, complex, functioning thing" (Stake, 1995 p.2), which can be considered as a bounded or integrated system, drawing attention to the case as a finite object, rather than an infinite process (Flyvbjerg, 2011, Stake, 1995, Merriam, 1998). The cases were studied concurrently over a period of

twelve months, with the inquiry being one in which "both researcher and educators can reflect upon particular instances of educational practice" (Freebody, 2003 p.81) as understandings of one aspect (what do teachers understand to be comprehension), in order to understand or explain another (how does the teacher's understanding of comprehension influence their practice) are explored.

Data collection

Multiple data sources are used, including teacher interviews, direct observations of teacher practice and documentation, such as student work samples and teacher programmes, therefore providing more than one source of evidence to bring about a balanced understanding of the data collected (Creswell, 2005, Marshall, 2006, Stake, 1995). Illustrations and descriptions of data, in the form of narrative, have also been used to address the research questions and draw generalisations from the inquiry. Data have been collected first hand, without relying on retrospective evidence. Each of the data collection methods will now be elaborated upon. Figure 4.2 shows the sequence of scheduling of interviews and observations across the data collection phase of the inquiry.

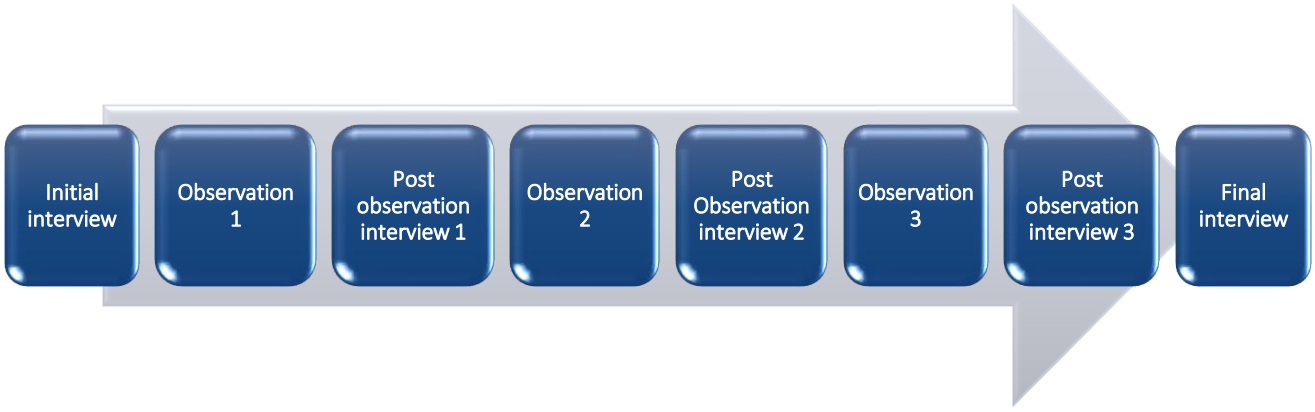


Figure 4.2: Sequencing of interview and observation data

Interview

A series of thirty-minute, semi-structured interviews throughout the inquiry provided insight into the thinking of the participants and allowed for collegial dialogue between

each teacher participant and myself. Semi-structured interviews were considered vital to the data collection process, as this format "allows the researcher to enter into the other person's perspective" (Merriam, 1998 p.72) and "to respond to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic" (Merriam, 1998 p.74). The interview, using carefully worded and relevant questions, is an important source of information in a case study, as the conversation can guide the participant to provide their perspective about the topic and give opportunities for reflection about impressions gained from observations (Fraenkel & Wallen, 2006, Kervin et al., 2006, Yin, 2009). The interviews afforded me insights into the pedagogical decision making occurring in the classrooms and the basis for the disciplinary practices enacted. Furthermore, teacher interpretations of the curriculum and comprehension provided valuable data for the inquiry.

Each teacher was interviewed on five separate occasions:

- an initial interview prior to the commencement of the classroom observations;
- after each of the three observations;
- a final interview at the conclusion of the inquiry.

Using a question framework as a guide for discussion (Appendix B), the interviews afforded teachers the opportunity to reflect upon their practice in terms of comprehension instruction and articulate their understandings of comprehension and pedagogical practices in the context of the lessons observed. Importantly, the interviews provided an opportunity to check my own interpretation of the teacher's understanding of comprehension, based on observations I had made in the classroom.

The initial interview provided an insight into teacher understandings, beliefs and pedagogical practices of comprehension and comprehension instruction in the curriculum domains of English and Science. In addition, teacher understandings of disciplinary knowledge and comprehension and the knower dispositions of students to understand content in the curriculum domains provided some data to explore the specialisation codes of legitimation (Maton, 2010, 2014).

The three post-observation interviews engaged each teacher in a reflective process as each lesson was reviewed and discussed. The purpose of the interviews was to identify discipline-specific practices, as well as common practices evident in the classrooms and the consequent impact these practices have upon the teaching of comprehension in English and Science. The interview responses provided some data to explore the relationship of these practices within the *epistemic pedagogic device* (Maton, 2014) through the specialisation codes of legitimation (Maton, 2010). The semantic codes of legitimation facilitate the exploration of the disciplinary understandings teachers possess and the practices they enact.

The final interview was an opportunity to review teacher understandings of comprehension instruction as practised within their class, and the beliefs held about comprehension instruction by exploring the relationship of beliefs, understandings and pedagogical practice through the specialisation codes of legitimation (Maton, 2010). Teacher understandings and perceptions of comprehension and comprehension instruction in the context of their curriculum domain, from the initial interview, were revisited, with teachers having the opportunity to voice their perceptions about the pedagogy they use and their understandings about comprehension and comprehension instruction.

Observation

Observation of teacher practice is a fundamental component of data collection for this inquiry. Observation as a data collection procedure in qualitative inquiry is embedded in the natural context of the event, and "provides a more complete description of phenomena than would be possible by just referring to interview statements or documents" (Gall et al., 2006 p.276). It was imperative that teachers be observed in the classroom setting to gain understandings and insights into their practice. Each observation afforded me the opportunity to formulate my understandings of the participant's comprehension pedagogy embedded in the context of their classroom, and "notice things that have become routine to the participants themselves, things that lead to understanding the context" (Merriam, 1998 p.95). Such understandings cannot be

made using interview as a singular source of data, and as such, the observations made provided me with reference points for discussion and investigation to be raised during the interview process.

The inquiry has a focus upon teacher practice, with an emphasis upon the pedagogical practices in the teaching of comprehension, used by teachers in two curriculum domains. I was keen to identify with teachers the specific pedagogies they enacted in their classroom that supported students' comprehension and the disciplinary focus of the selected pedagogies. Of interest are the pedagogies identified in the literature as being strongly associated with comprehension instruction and as indicators of student comprehension. These pedagogies include:

- questioning for deeper understanding of the content and critical thinking;
- explicit vocabulary instruction of the relevant content language and metalanguage;
- acting upon students' prior knowledge and connections to personal experiences that are brought to the lesson;
- specific instruction in
    - using prediction
    - summarising
    - evaluating and synthesising content, where students bring about new understandings of the content and concepts taught;
- explanation and re-explanation of content and concepts to bring about student understandings.

(Block & Duffy, 2008, Moje, 2010, Pearson, 1985)

Observations of seven teachers were made during one school year, at times negotiated with each teacher. Prior to the observation, I met briefly with the teacher so they could discuss the lesson to be observed and what the intended student outcomes would be. Lessons varied in their presentation and format and included theory, practical, teacher-led instruction and student group work. Using the entirety of the school year also

provided the teachers time to consider the different literacy and comprehension requirements for units of work the students engaged in. It is important to note that the participant teachers may not see their students daily, due to timetable configurations. Three observations were made of each teacher in their classroom context. Having three observations of each teacher was a deliberate choice, as it provided opportunities for teacher participants to demonstrate comprehension pedagogy across different types of lessons and engage with different content and topics as the year progressed. It also provided each teacher with flexibility in the timing of each observation to meet the individual needs of students and teachers.

Each lesson was videoed, and an audio recording made using a personal voice recorder. Field notes were taken, thus providing a detailed written recording of what I saw, heard, experienced and reflected upon in the course of each observation (Fraenkel & Wallen, 2006, Kervin et al., 2006, Bogdan & Biklen, 1998, Merriam, 1998). In my notes, information was recorded about the classroom setting, participants involved (students and teachers), processes used (discussion, group work, individual tasks, student-led, or teacher-led, learning) and equipment and materials (iPads, data projectors, science equipment, notebooks, interactive whiteboards, work sheets) used in each lesson (Appendix F). These notes allowed me to capture my thoughts as I observed and reflected upon what was occurring in the classroom as it happened, prompting me to identify areas for further discussion and clarification in the post-observation discussion with the class teacher. In addition, identification of suitable student artefacts was able to be done more strategically. Videoing each lesson served two purposes. Firstly, the video evidence became my 'second pair of eyes', allowing me to see what I did not see when in the classrooms. Aspects of teacher and student interaction, such as questioning, explaining and demonstrating, which might have been overlooked in the busyness of an active classroom, have become apparent as I have viewed the video recordings. Secondly, and most importantly, the video evidence allowed me to review and confirm instances of comprehension instruction and application, and the surrounding circumstances of each episode.

Documentation

Documentation collected throughout the inquiry provides further insight into each of the research questions and provided me with avenues "to corroborate and augment evidence from other sources" (Yin, 2009 p.103). Yin further explains that the collection of documentation as a source of evidence is valuable, as "they have been written for a specific purpose and audience, other than those of the case study being done" (2009 p.105). Examples of such documentation include the relevant NESA (NSW Education Standards Authority) curriculum in English and Science, teacher programmes created from the curricula, and student work samples from classroom lessons observed. NESA was previously known as BOSTES NSW (Board of Studies Teaching and Educational Standards NSW) during the data collection period, and curriculum documentation reflects this.

The document analysis of the official English and Science curriculum used by the teachers is of importance to the inquiry. The curriculum expectations of comprehension are explored from a disciplinary perspective and afford insight into the literacy practices of the teachers. The analysis considers the knowledge structures of English and Science, with representations of comprehension in the curriculum outcomes explained via the specialisation codes. The critique interprets comprehension in the curriculum, focusing upon the organisation of content, rationale, teaching and learning outcomes and available support materials.

Documentation created specifically for this inquiry includes field notes from the lesson observations, photographs of classroom settings and teaching spaces, and transcripts of interviews and classroom interactions. All documentation was collected across the duration of the inquiry. There were few difficulties in obtaining each form of documentation from class teachers, as these were collected post observation. Obtaining work samples from students was somewhat problematic, with students forgetting to pass in their books or emailing their work from the observed lessons on to their teacher; which has limited the quantity and variety of student work samples available.

Site and Participant Selection

Participant School Context

This inquiry has been conducted in an independent Transition (pre-Kindergarten) to Year 12 school, located in the south-west region of Sydney, NSW. It caters for early childhood, primary and secondary students. The focus grades of the inquiry are Years 5 and 6, and Years 7 and 8 (Stage Three and Stage Four respectively). The students in these year groups range from 10 years old in Year 5 to 14 years old in Year 8. The school is registered with NESA (NSW Education Standards Authority, 2017) and has developed school and classroom programmes using the NESA syllabuses. In this inquiry, teachers have implemented NESA documents, namely English K – 6 Syllabus (1998); Science and Technology K – 6 Syllabus (2000); English Years 7 – 10 Syllabus (2003a) and Science Years 7 – 10 Syllabus (2003b). The data collection period coincided with the trial and transition to the implementation of the Australian Curriculum in all schools. In 2012, NSW schools were required to trial units of study using outcomes from the NSW Syllabus for the Australian Curriculum: English K – 10 (BOSTES NSW, 2012b).

The research site is divided into three 'schools', each with its own Head of School: the Junior School caters for students in Transition (pre-Kindergarten) to Year 4; the Middle School caters for students in Years 5 to 9; and the Senior School caters for students in Years 10 to 12. The school staff is a combination of beginning and experienced teachers. Teachers in the Middle and Senior School are faculty based, and teach across year groups and curriculum areas, whereas teachers in the Junior School are responsible for one class only and teach across all curriculum areas.

The Middle School is the focus of this inquiry. The school Principal has promoted this structure for Years 5 - 9, drawing upon his own research and observations of similar schools in Australia. A major difference to the conventional structure of primary and secondary schooling found in Australia, in this school, is the pastoral and social perspective of this middle school structure which provides opportunities for students aged 10 to 14 years old to interact across social boundaries in pastoral activities such as Chapel, House Group and assemblies. The students also have a specific middle school

uniform, use the same buildings and playgrounds, and have a dedicated Head of School. The Principal explains:

> *"the school uses a middle school structure for teaching, where the Years 5 and 6 classes look and feel, for the most part 'typically primary' in their curriculum structure. Yet Years 7 and 8 classes, look and feel 'typically secondary' in their curriculum structure. The focus of this structure is socialisation, rather than curriculum, in order to 'smooth out' the changes that occur from primary to secondary school."*

As a Transition (pre-Kindergarten) to Year 12 school, the teaching responsibilities of teachers in this school may be considered atypical to teachers in most primary and secondary schools in Australia. In the participant school, some secondary faculty teachers teach across the Middle and Senior School, teaching Years 5 and 6 students for a number of subjects, such as Science, Music, Personal Development, Health and Physical Education, Indonesian and Drama. Students in these year groups remain with their year teacher for core subjects such as English, Mathematics and Social Studies. Years 7 and 8 have different teachers for each subject.

The school day has six 50-minute periods, across four, ten-week terms per year. This school follows an eleven-month academic year from October to September in Years 7 – 12. As this school is a Transition (pre-Kindergarten) to Year 12 school, to prevent confusion in identifying school terms, the terms are named by seasons (Spring, Summer, Autumn, Winter Terms) rather than numbered. Consequently, in this inquiry, the school year for Year 8 is the first term of the academic year (Spring Term) from October to December Year A, with the final term for the year (Winter Term) ending in September Year B. Year 7 have a school year beginning in late January Year B (Summer Term) with the final term (Winter Term) of Year 7 ending in September Year B. Transition (pre-Kindergarten) to Year 6 follows the traditional calendar year, beginning in late January Year B (Summer Term) with the final term of the year ending in December Year B (Spring Term). Table 4.2 shows the relationship across the schools and terms. While the

structure of the school is somewhat different to other schools, it has not had a bearing upon the curriculum delivered by teachers to the students.

Term names	Transition (pre-Kindergarten) to Year 6 Calendar Year	Year 7 to Year 12 Academic Year
Spring Term Year A		Term 1
Summer Term Year B	Term 1	Term 2
Autumn Term Year B	Term 2	Term 3
Winter Term Year B	Term 3	Term 4
Spring Term Year B	Term 4	

Table 4.2: School terms across the school

While not of major consequence, the differences in the beginning and conclusion of the school year across each of the grades had some implications for data collection. These have been primarily with the scheduling of half year and yearly examinations, which have occurred in April (end of Summer Term) and September (end of Winter Term), respectively, for Years 7 and 8. Transition to Year 6 follows the traditional calendar year, beginning in February 2013 (Summer Term) with the final term of the year ending in December 2013 (Spring Term). There has been no impact upon data collection for Years 5 and 6.

Participants

In this qualitative inquiry, sample selection was purposeful, small and non-random, to ensure that participants suited the unique nature and intent of the study (Bogdan & Biklen, 1998, Creswell, 2007, Fraenkel & Wallen, 2006, Merriam, 1998). Purposeful sampling was an appropriate method of participant selection to meet the needs of the inquiry, as this facilitated the specific focus of the research based upon my knowledge of the teaching staff at the school. Using Merriam's definition, "purposeful sampling is based on the assumption that the investigator wants to discover, understand, and gain insight and therefore must select a sample from which the most can be learned" (1998 p.61).

Criteria for selection required a teaching load of an English or Science class in Years 5, 6, 7 or 8 for the duration of the data collection period of twelve months. This limited the available sample to eleven teachers. All were invited to participate, and seven teachers provided informed consent. The participants are each representative of the "variations commonly encountered" (Freebody, 2003 p.78) in the school environment (the research site), including years of teaching experience, class size, and class attributes such as gender composition and students with and without identified disabilities.

Teacher participants

The number of teachers that would meet the criteria as participants for this inquiry (teaching a Year 5 to Year 8 English or Science class) was small, as Years 7 and 8 had only three classes per year group, Year 5 had two classes and Year 6 was a single class. In addition, there was a combined Year 5/6 class, which catered for students achieving beyond grade level. Late in Year A, four teachers from each of the English and Science faculty were timetabled as teachers for Years 7 and 8 for the duration of the inquiry, as well as three Years 5 and 6 teachers, thus meeting the selection criteria for the inquiry. I approached each teacher, initially through email, explaining the research inquiry, and then personally, asking them to consider participating in the research study. Initially, interest in the inquiry from the Years 7 and 8 teachers was limited, with only one teacher from each faculty willing to be involved.

Interestingly, the Years 7 and 8 English teachers, and each of the Science teachers, were concerned that they would have to do extra work, such as reading journal articles about comprehension or preparing special lessons, in preparation for my visits. As a staff member in the participant school, I was acutely aware of the academic, co-curricular and pastoral demands placed upon all teachers within the school. I assured them that the lessons to be observed should be an authentic representation of the instruction and content of their curriculum area, and no special preparation was necessary. The Years 5 and 6 English teachers did not express concern about any extra preparation. Further discussions with the English and Science teachers eased their concerns, and they were willing to consent to participate in the study. From the interest shown and responses

received, seven teachers were selected as participants, as each met the selection criterion of a teaching load of an English or Science class in Years 5, 6, 7 or 8 for the duration of the data collection period of twelve months.

At the conclusion of Year A, the required number of teachers and classes was confirmed. Each teacher was provided with an information sheet and consent form (Appendix A), outlining the purpose of the research and what was required of him or her in the inquiry. I met with individual teachers also in a casual coffee meeting, to answer any questions they may have had, and to allay any concerns that may have existed about how the observations would be conducted, including the timing of the observations and interviews.

At the beginning of Year B, the circumstances for several teachers changed, and they were no longer able to participate in the inquiry. Therefore, I spoke personally to other teachers in the English and Science faculties regarding participating in the inquiry. They consented to be involved. As a consequence of the teacher withdrawals, I then reorganised which year group and class for each teacher I would observe. I did this because a number of the teachers taught both Years 7 and 8, while other participants only taught Year 7 or Year 8. There were no changes to teacher participants in Years 5 and 6.

The teacher participants have a range of experience and school responsibilities. Experience extends from a teacher in her first year of teaching, to another with more than 20 years of teaching experience. However, the majority of teachers in this study have three to seven years of teaching experience. One teacher has taught in England for much of her career, while two teachers have completed teaching degrees after working in different fields. Of the seven teachers, four have been previously employed at schools other than the participant school. These schools include Government and Non-Government schools. Five of the seven participants have been at the school for three years or less, with two being at the school for more than five years. To maintain confidentiality, each teacher was assigned a pseudonym and a case number.

Table 4.3 and Table 4.4 describe the experience and responsibilities of each teacher participant.

Teacher participant English (pseudonym)	Teaching experience	Years teaching at participant school	School and class responsibilities at the time of the inquiry	Professional Learning Attended Year A and B
Abbey (Case 1) Year 5 English	Graduate teacher	1	*Year 5 mixed achievement class*	Year A • Graduate teacher Year B • Beginning teachers support • Author in residence
Benita (Case 2) Year 6 English	6 years	1	*Year 6 mixed achievement class*	Year A • Creative Writing workshop • Grammar and Writing (webinar) • Strategic Comprehension (AIS consultant) Year B • Author in residence
Colin (Case 3) Year 7 English	7 years	5	*Year 7 English mixed achievement class* Year 9 English; Year 10 English (mixed achievement classes) Year 11 English; Year 12 English (HSC Advanced classes)	Year A – nil Year B • Advanced Comparative Study (HSC English) • Began Master's Degree in Educational Leadership
Deidre (Case 4) Year 8 English	16 years UK 9 years; taught in Australia for 7 years	3	*Year 8 English mixed achievement class* Year 7 English (Honours class) Year 10 English Year 11; Year 12 English as a Second Language	Year A • ESL programming • ESL English - Teaching Stage 6 Year B - nil

Table 4.3: Experience and responsibilities of each teacher participant – English

Teacher participant Science (pseudonym)	Teaching experience	Years teaching at participant school	School and class responsibilities at the time of the inquiry	Professional Learning Attended Year A and B
Elsbeth (Case 5) Year 5 Science Year 6 Science	7 years	7	*Year 5 Science mixed achievement class* *Year 6 Science mixed achievement class* Year 5/6 Science; Year 8 Science (Honours classes) Year 7 Science; Year 10 Science (mixed achievement classes) Year 10 Agriculture (elective class) Head of House* Agriculture Show Team	Year A • Gifted Differentiation • Science of Enquiry Year B • Developing Inquiry Learning
Frank (Case 6) Year 7 Science	21 years	2	*Year 7 Science mixed achievement class* Year 9 Science (mixed achievement class) Year 10 Science (Honours) Year 11 Agriculture; Year 12 Agriculture (elective classes) Head of Agriculture Show Team#	Year A – nil Year B - nil
Gail (Case 7) Year 8 Science	3 years	3	*Year 8 Science mixed achievement class* Year 7 Science (Honours) Year 9 Science (mixed achievement class) Year 11 Biology (elective class) Year 12 Earth and Environmental Sciences (elective class)	Year A • Nil Year B • Earth and Environmental Science
*Head of House is a Pastoral Care Leadership position across the Middle and Senior School in the participant school # The Science faculty of the participant school has a strong agricultural focus in the Middle and Senior School				

Table 4.4: Experience and responsibilities of each teacher participant – Science

The participant school has a strong focus upon the continued professional learning of its staff as part of its strategic plan. The teachers have engaged in a variety of professional development activities prior to and during the data collection period. The

focus of the primary teachers (Years 5 and 6) was primarily upon literacy across the school and the implementation of the Australian Curriculum. Teachers in Years 7 and 8 have also included the implementation of the Australian Curriculum as part of their professional learning. Individually, teachers have selected professional learning relevant to their interests and teaching contexts.

Student Participants

Eight classes were involved in the inquiry, (147 students aged between ten and fourteen years old). Table 4.5 shows student numbers in each class.

Class	Total students	Work samples
Case 1 Year 5 English (Same class as Case 5)	18	5
Case 2 Year 6 English (Same class as Case 5)	27	5
Case 3 Year 7 English	30	3
Case 4 Year 8 English	20	0
Case 5 Year 5 Science (Same class as Case 1)	18	5
Year 6 Science (Same class as Case 2)	27	5
Case 6 Year 7 Science	30	12
Case 7 Year 8 Science	22	3
Total students	**147**	**28**

Table 4.5: Student participants in each class

While the students were not the focus of the inquiry, the interaction of the teacher with the students provided rich data and insight to the teachers' understandings of

comprehension and pedagogical practices. In addition, three to five student work samples from the lessons observed were collected, as these provided written and diagrammatic artefacts of content taught in the class, with the exception of Year 8 English, where none were submitted. To ensure compliance with the ethics approval granted, each student in each participant teacher's class was provided with a participation information sheet and consent form (Appendix A), to be signed by his or her parent or caregiver. All student work samples have been de-identified, to maintain confidentiality and anonymity.

Analytical approaches

The inquiry is theoretically framed by Legitimation Code Theory (Maton, 2010, Maton, 2014), specifically through the lens of the specialisation codes and semantic codes. The specialisation codes (Maton, 2010, 2014) facilitate the exploration of the beliefs and disciplinary understandings of comprehension and the pedagogical practices enacted. The semantic codes (Maton, 2013, 2014) provide a context to interpret practices and knowledge generated in the classroom.

Each of the cases have been examined using a cross-case analysis to identify the similarities and differences visible within the patterns, themes and categories that transcend each case to aggregate findings across the cases (Creswell, 2007, Yin, 2014). Data has been collected over a twelve-month period, and comprise:

- 1200 minutes of video and audio data of classroom observations;
- 1000 minutes of audio data of teacher interviews;
- Documentation and artefacts such as teacher programmes, student work samples, photographs, field notes, transcriptions of observations and interviews, curriculum documents.

Data analysis strategies used in the inquiry are qualitative in design. They include:

- *Inductive data analysis* - the inquiry builds theory and understandings from the data collected and the interrelationships that exist within and between them. Data have

been organised from 'the ground up', establishing and transforming each aspect into increasingly abstract patterns, themes and categories to inform the research questions (Bogdan & Biklen, 1998, Creswell, 2007, Fraenkel & Wallen, 2006, Merriam, 1998, Patton, 2002, Stake, 1995).

- *Interpretive inquiry*- Legitimation Code Theory (Maton, 2010, 2014) guides the interpretations of what is heard, observed and understood in this inquiry. As data are collected, emerging interpretations will be linked to previous contexts and understandings (Creswell, 2007, Denzin & Lincoln, 2011, Patton, 2002). In addition, interpretations will be made by participants and readers of the inquiry.

To situate and explain data from a theoretical perspective, the research questions provide a frame to draw upon the theoretical foci of the inquiry and provide further opportunity for "findings to emerge out of the data, through the analyst's interactions with the data." (Patton, 2002 p.453). Detailed descriptions and interpretive summaries of each case enable the readers to situate themselves 'in the classroom', gaining insight into the understandings and beliefs of comprehension each teacher draws upon and enacts in their practice. Teacher understandings and beliefs of curriculum and comprehension emerge through the interview data. Strengthening and weakening of the epistemic relations (ER) and social relations (SR) reveal the privileging of the knowledge codes and knower codes in the teachers' practice. The interpretive summary at the conclusion of each case provides an insight into the influence each teacher's understanding and belief of comprehension instruction has upon the pedagogical strategies enacted in the implementation of the English and Science curriculum. It provides deeper insight into the relationship between observed beliefs, understandings and practice of comprehension through multiple lenses, in relation to theory from the perspective of the writer. In essence, I have sought out avenues for the "data to speak back to theory" (Maton, 2014 p.16).

Themes and categories

Themes and categories emerging from the data will be identified and coded within each case and across cases in the inquiry. Initially, key points within the substantive

categories will be addressed (Appendix G), prior to common points being identified. These will then be organised using the research questions and LCT as an analytical tool to identify themes emerging from the data, and to guide analysis and discussion. Using the themes, patterns in the data will then be further examined with a view to "analyse episodes with a sense of correspondence, to understand behaviour, issues and contexts in regard to the particular case" (Stake, 1995 p.78). For example, the specialisation and semantic codes facilitate interpretations of themes, such as the scope and influence of teacher understandings of curriculum and comprehension upon the pedagogical practices enacted across the disciplines.

The translation device

The analysis of data has been facilitated by the creation of a *translation device* whereby "theoretical concepts within the data are translated into empirical descriptions, and empirical descriptions into theoretical concepts" (Maton, 2014 p.137). The translation device, as "an *external language,* is primarily intended to serve the analysis of the problem with which the research is concerned" (Maton et al., 2016 p.45). In other words, a 'conversation' occurs between the data collected and the theoretical frame in which they are explained, and then back to the data, bringing into view explanations of the research problem, and "systematically relating concepts to data" (Maton & Doran, 2017 p.4). In this inquiry, the translation device affords an explanation of the strengthening and weakening of relationships within the specialisation codes (ER+/-, SR+/-) and semantic codes (SG+/-, SD+/) which have emerged in the data.

The specialisation codes: Knowledge and knowing in curriculum, comprehension and pedagogy

Of interest are the relationships within the specialisation codes of legitimation which have emerged, between the value teachers place upon comprehension knowledge to inform curriculum knowledge (epistemic relations), and the knower dispositions of comprehension knowledge (social relations), as they teach the required curriculum. Both 'comprehension as knowledge' and 'curriculum as knowledge' can reveal knowledge codes and knower codes. The perspectives of the teacher cast different

interpretations of the strengthening and weakening of the epistemic relations and social relations in their practice. Tensions between teacher understandings of comprehension as knowledge and the knower dispositions students are expected to possess in the learning environment are explained. Tables 4.6 and 4.7 provide a visual representation to assist in the interpretation of teacher understandings and beliefs of 'comprehension as knowledge' and 'curriculum as knowledge' in English and Science. Included are the relative strengths of the epistemic relations and social relations within the specialisation codes. Strengthening epistemic relations reflect the knowledge codes.

English		Comprehension as knowledge		Curriculum as knowledge	
Specialisation codes	**Emphasis**	**Description**	**Example of teacher comments**	**Description**	**Example of teacher comments**
ER+ SR-	Curriculum	Disciplinary comprehension strategy instruction valued Comprehension informs curriculum knowledge Explicit instruction of disciplinary comprehension	*"We have to teach them the strategies. I can only see by explicitly teaching strategies they're going to improve."*	Curriculum instruction valued Explicit instruction of curriculum	*"If you teach them (the students) how to think and write it down effectively… and how to respond to a text.... they have to think conceptually about the idea that they've just been presented with."*
ER- SR+		Comprehension strategy instruction implicit (assumed knowledge) Curriculum knowledge takes precedence	*"The written communication is the most important from our perspective because, in the end, that's what they get assessed on the most.*	Curriculum instruction valued Implicit instruction of some curriculum content (assumed prior knowledge)	*"You can't teach inference, but I think just familiarising them with text and making them (texts) increasingly difficult."*
ER- SR+	Pedagogy	Learner preferences and understandings of disciplinary comprehension strategies shape pedagogy enacted	*"I start the discussion and their responses then navigate the way."* *"I like collaborative learning. I think it improves their reading and understanding."*	Understanding of curriculum does not shape pedagogy enacted	*"I don't explicitly think about it, it's just something I've always done."* *"By the time they come from Junior School, I expect them to have that (comprehension strategies) already, so we're refining that; we're not teaching that."*
ER+ SR-		Knowledge of disciplinary comprehension strategies does not shape pedagogy enacted	*"I assume that I've taught those strategies and they will be implemented throughout the lessons by the children."*	Knowledge of curriculum shapes pedagogy enacted	*"Apart from having to understand what you're reading, this is what we need to know, this is what I'm telling you that you have to know."*

Table 4.6: Translation device for Specialisation codes in comprehension Years 5 - 8 English

Science		Comprehension as knowledge		Curriculum as knowledge	
Specialisation codes	Emphasis	Description	Example of teacher comments	Description	Example of teacher comments
ER+ SR-	Curriculum	Disciplinary comprehension strategy instruction valued Comprehension informs curriculum knowledge Explicit instruction of disciplinary comprehension	*"I can't teach what I want to teach until I am sure they understand these brand new scientific words that they need to understand."*	Curriculum instruction valued Explicit instruction of curriculum	*"…vocab is part of the curriculum they're required to know…… they need to know some of that science vocab and glossary of terms as well – it's a fairly integral part of teaching that part of the syllabus."*
ER- SR+		Comprehension strategy instruction implicit (assumed knowledge) Curriculum knowledge takes precedence	*"I demonstrate it, then they go and replicate it. That's more the understanding rather than the reading - writing comprehension. So, learning by doing."*	Curriculum instruction valued Implicit instruction of some curriculum content (assumed prior knowledge)	*"…if they haven't got a basic understanding of scientific literacy, that's when they start to fall behind."*
ER- SR+	Pedagogy	Learner preferences and understandings of disciplinary comprehension strategies shape pedagogy enacted	*"My job is to get them to think; think scientifically and want to think, ask questions."*	Understanding of curriculum does not shape pedagogy enacted	*"…inference is quite important in the scientific world – they need to think outside of the square and think about what is happening."*
ER+ SR-		Knowledge of disciplinary comprehension strategies does not shape pedagogy enacted	*"…they already demonstrate that understanding."*	Knowledge of curriculum shapes pedagogy enacted	*"It's not just the written form; I think it's more how much they understand."*

Table 4.7: Translation device for Specialisation codes in comprehension Years 5 - 8 Science

Semantic constructs for understanding comprehension in English and Science

The pedagogical practices for teaching comprehension enacted by the teachers reveal strengthening and weakening of the semantic profile over time. Aspects of knowledge building within the context of comprehension, curriculum and classroom are analysed within the semantic codes of legitimation (SG+/-, SD+/-). The strengthening and weakening between context (semantic gravity) and degrees of abstraction (semantic density) in the building of knowledge through classroom practices in English and Science are examined through the translation device.

Semantic gravity

Semantic gravity refers to the relationship of meanings to its context (Maton, 2013, 2014, Georgiou, 2016). Tables 4.8 and 4.10 show the relative strengths of semantic gravity and the organising principles of knowledge building for comprehension in the English and Science classrooms. The abstract level (SG-) is comprised of examples where concepts are introduced or questioned without clear reference to the context of the content. Questions and statements made by the teachers are general, and the students must draw on prior knowledge to make the connections between the content and the context. As semantic gravity strengthens (SGØ), concepts begin to be linked to content. The examples show the teachers providing more detailed comments and questions to the students to support their understandings. At its most concrete level, (SG+), knowledge building is closely tied to the context of instruction, such as the text being studied, or the skills being taught. Comments made by the teachers are more descriptive and contextual.

Semantic density

Semantic density "explores the relationality of meanings" (Maton & Doran, 2017 p.49). Tables 4.9 and 4.11 show the relative strengths of semantic density in relation to the specialised terms used in the English and Science classrooms to impart meaning and build knowledge and understanding of content and comprehension. Stronger semantic density (SD+) is seen where specialised language abstractions are used by the teachers to build knowledge. As semantic density weakens, the terms used become more

generalised, and learning is supported using examples from texts (SDØ). The use of generalised terms with multiple interpretations further weakens semantic density, (SD-).

Semantic gravity	Semantic strengths	Description	Examples of teacher comments
Weaker	SG -	Teacher introduces a new concept or questions students without reference to example	i. *Silent violence. Who remembers what that meant in context?* ii. *Hector Zeroni. Why's that significant?* iii. *Support your answer with evidence from the story.* iv. *What did you find that are similarities?* v. *What does the word plot mean?* vi. *What does it mean guys by the theme of a play or the theme of a film?*
	SGØ	Teachers and students share knowledge of concepts and use examples	i. *We've got to remember that our summaries are meant to be telling us everything that happened in that chapter or that part that we've read without having to read the whole thing.* ii. *She was saying that it seemed violent, what she could see seemed scary and a bit violent. It wasn't violence like people hurting each other but just what she could actually see was making her feel a bit scared.* iii. *There's somebody significant that's set that story into place for Stanley.* iv. *We read two really important chapters. Who can give me a brief synopsis on what's actually happened in those two chapters?* v. *Now what else can we see that is different if we contrast them?*
	SG+	Teacher explains concepts in context and asks questions of students, using specialised terminology and examples	i. *I just wanted to talk through it all together. The sections that we have are "Who", "What', "When", "Where" and "Why".* ii. *Have a listen as I read to you this summary. It was very thorough and a really good example of telling us all about what happened in Chapter Two.* iii. *It's a good prediction.* iv. *What do you see as the key elements of the story, thinking about the characters, the setting and the family?* v. *You have to understand the plot, the whole of the story line, and all of those things, who, where, what, why, and have a really good response of Zed for Zachariah.* vi. *The other term we use for contrast is juxtaposition.* vii. *Themes are ideas that run through the play.* viii. *A composer uses language to create a feeling of suspense for his readers.*
Stronger			

Table 4.8: Translation device for Semantic Gravity in comprehension Years 5 - 8 English

Semantic density	Semantic categories	Description		Examples of teacher comments
Stronger	SD+	Teacher using specialised terminology and examples related to concept	*i.*	*A plot just means the storyline, what happens.*
			ii.	*One of the themes in Much Ado About Nothing which we all know very well, is trickery. People are tricked really quickly.*
			iii.	*So we've got trickery, we've got Beatrice and Benedick. Okay? How they're tricked to fall in love. Remember in the garden? Remember we watched the movie, the garden?*
			iv.	*That way, we've got a good summary to come back to help us when we go to read again and we can check that we remember what's happening.*
			v.	*Contrast. What does it mean if we are contrasting?*
			vi.	*Now juxtaposition is a comparison between two things to highlight the difference.*
	SDØ	Teachers and students share knowledge of concepts and use examples	*i.*	*It's going to be about the language tools it uses and it's going to tell us how they create. suspense. So we know all the techniques that are needed to create suspense.*
			ii.	*That was one of those pieces of the writing that we could infer meaning from. It didn't make a lot of sense – silent violence – but within the context, we understood it.*
			iii.	*We've hit a very significant part in the story.*
			iv.	*What led to that circumstance though?*
			v.	*Now what else can we see that is different if we contrast them?*
			vi.	*The characters of Captain Hardcastle and Corkers are very different in the novel. Think about the contrast between the two masters. What does masters mean in this context?'*
Weaker	SD -	Teacher uses terminology and language which is generalised	*i.*	*Full sentences. Why is it important to use full sentences?*
			ii.	*Here are words included from the text that really thoroughly described.*
			iii.	*Are you going to expand on that?*
			iv.	*Write down two points that could be similarities.*
			v.	*They're peculiar, they're not…normal.*

Table 4.9: Translation device for Semantic Density in comprehension Years 5 - 8 English

Semantic gravity	Semantic strengths	Description	Examples of teacher comments
Weaker	SG -	Teacher introduces a new concept or questions students without reference to example	i. *Can we hold it (blood) very well?* ii. *Has anybody got an idea of what a stem cell is? What's a stem cell?* iii. *Just write down what you think a stem cell is.* iv. *What is all matter made of?*
	SGØ	Teachers and students share knowledge of concepts and use examples	i. *You can pour it (liquid) and it takes the shape of its container.* ii. *Plumbers use it (nitrogen) to freeze pipes –* iii. *The heat is heating up this part of the rod. There are particles inside.* iv. *Different type of shape, yes. Knowing that plant cells and animal cells can be different types of shapes.* v. *It's kind of from a stem but where's the stem from?* vi. *You could say it's lighter (heated air), it's less dense.* vii. *During convection, the particles actually move and carry the heat with them. So not in conduction they vibrate, bump into each other and it's passed along.* viii. *You need to write down, examples of liquids, common daily liquids that we use.* ix. *See how it hugs the side. Now, that's surface tension but this is a meniscus here…*
	SG+	Teacher explains concepts in context or with diagrams, and asks questions of students, using common language and examples	i. *We use measuring cylinders which are much more specific in their measurement.* ii. *One of the skills we teach in Year 7 science is how to read that level of water because no matter which way we use it, it's always going to be parallel to the ground.* iii. *Water and every other liquid besides mercury, sits in a special way in a container.* iv. *Stem cells are in fact animal cells.* v. *Heating directly there makes these ones vibrate a lot. (teacher uses diagram)*
Stronger			

Table 4.10: Translation device for Semantic Gravity in comprehension Years 5 - 8 Science

Semantic density	Semantic strengths	Description	Examples of teacher comments
Stronger ↑	SD+	Teacher using specialised terminology and examples related to concept	*i. When it (air) cools down again, it drops down. This is convection.* *ii. Now conduction – who can explain "conduction" to me?* *iii. There are some other forces that are in effect that you won't need to know about just yet, things like Coriolis force and how things actually move.* *iv. A stem cell is a blank cell; it hasn't been differentiated yet.* *v. It's used for gas exchange but it's not necessarily air. No, it's sort of a liquid-filled vacuole. So, they've (plants) got vacuoles and they've got a cell wall.* *vi. They have a skin; they call it an epidermis.* *vii. The most important thing about a liquid is any liquid that we have will take the shape of its container.* *viii. We're going to look at properties of liquids. Does anyone want to give me a definition of a liquid?*
	SDØ	Teachers and students share knowledge of concepts and use examples	*i. It's a visual confirmation of what's happening but you won't see it vibrate. You'll just see the colour change.* *ii. Plant cells have a cell wall. Why do they need a cell wall? It's an interesting concept.* *iii. Some of the information which I read to you is a little bit difficult to understand because they use words that possibly even I don't necessarily really understand. So, we need to break it down into little bits and pieces.* *iv. Another property of liquid is that they remain level at all times.*
	SD -	Teacher uses terminology and language which is generalised	*i. It's not temperature that you're measuring; it's heat.* *ii. The hotter they (atoms) get and that guy (atom) might bump into this guy here and he'll start vibrating as well. It transfers along.* *iii. We've looked at cells, we've looked at animal cells and we've looked at plant cells and we should be able to tell the difference between plant and animal cells.* *iv. We need to know exact amounts. We don't use a beaker when we know exact amounts – that'll give us a rough amount.*
Weaker			

Table 4.11: Translation device for Semantic Density in comprehension Years 5 - 8 Science

Limitations

Sample size

This inquiry is small, comprising seven participants in one research site. Furthermore, the selection criteria and site for the inquiry limited the availability of possible participants. As such, the findings cannot be generalised to other settings. However, the small sample size afforded opportunities to describe in-depth the individual cases within the school setting, and have provided a "rich and holistic account" (Merriam, 1998 p.41) of each teacher's practice and perspectives of comprehension. Such accounts facilitate the reader's identification of "shared characteristics" (Creswell, 2007 p.209) of events, settings and participants in other education settings.

Impact of the researcher as part of the school community

As a staff member at the participant school, I have a professional, working relationship with each of the participants. The students are also known to me, through my role across the participant school setting. To minimize my impact on the class and the data collected during observations, I endeavoured to reduce my presence the classroom by sitting at the rear of the class, and not engaging with the teacher or students as the lesson progressed.

Ethics approval

An application to conduct this research inquiry was submitted to the Human Research Ethics Committee at the University of Wollongong in early 2012. It included the aims and purpose of the inquiry, methods to ensure the privacy and identity of participants, information for teacher and student participants, and consent forms for participants. Ethics approval for the inquiry was granted on 5 July 2012 (HE12/191). Permission was sought and granted from the participant school.

The inquiry has been conducted in my workplace, where I had been a teacher for nine years at the time of the inquiry. Researching in the workplace can lead to issues affecting the collection of data. The presence of an observer in the classroom may affect the behaviour of the participant or the participant's class, influencing the validity of data collected. As a member of staff within the participant school, the students are used to

my presence in the classroom as part of my teaching role. Consequently, this is a minimal issue for observer reliability and effect. Observer bias, which may result from my prior knowledge of students and teachers, is addressed using extensive field notes and, additionally, the use of participants' accounts and narrative in the thesis to represent the experiences of participants.

Of concern was the power imbalance that may be perceived between the teacher participants and myself, and the impact of this upon the quality of data collected. Furthermore, I hold a middle level leadership role within the school. However, I am not responsible for the supervision or appraisal of staff who have participated in the study. Assurances were made regarding the confidentiality of pedagogical practices observed, and as such these observations have not been made available to the school executive for teacher appraisal purposes.

'Reciprocal vulnerability' (Edwards & Westgate, 1994 p.78) helps to understand the issue of the researcher-researched. As part of my teaching role, I am often in participants' classrooms, team teaching and supporting students with disabilities. My own practice is frequently made subject to scrutiny through peer observation and reflection. The teacher participants had knowledge of this, and as such, were aware that I understood the sense of vulnerability that they themselves may be feeling when I observed their class.

Having the teacher's trust in the research process was critical to the validity of the data gathered. An ethical research relationship was established with the participants, as "when studying people's behaviour, or asking them questions, not only the values of the researcher, but the researchers' responsibilities to those studied have to be faced" (Silverman, 2000 p.200). It was imperative that my relationship with the participants was one where high standards of ethical responsibility were clearly evident to all. Each participant was treated respectfully and professionally throughout the research process, and confidentiality and anonymity were maintained at all times. This ethical research relationship considered several principles of ethical behaviour. Mertler (2006 p.81)

describes these principles as those that consider the benefit, honesty and importance of the research, which are expanded upon below:

1. The principle of beneficence ensures that the research should acquire beneficial knowledge about human behaviour and educational practice without bringing harm to individuals or groups.
2. The principle of honesty ensures that all aspects of the research are exhibited honestly, including specifying the purpose of the study, means of data collection and analysis, and the conclusions drawn.
3. The principle of importance should demonstrate that the value of the findings is worth the time and effort of the researcher and participants, and that the findings are a useful contribution to the field of knowledge.

Essentially, the ethical research relationship created between the teachers and myself encapsulated these principles. Consent forms and participant information sheets for both teacher and student participants clearly identified the research purpose, process and the commitment required by each participant. In addition, "the credibility of an investigator's representation is strengthened if it is recognisable to the participant. For ethical reasons alone, it is important to find out what participants think of our work" (Riessman, 2008 p.197). Participants must be able to review and reflect upon the data they have provided, and ultimately be able to provide their own interpretation to the conclusions drawn. In response to this consideration, each teacher has had the opportunity to review the description of classroom observation and their interview responses to ensure that these reflect each participant's interpretation.

Summary

This chapter has outlined the methodological approach for the inquiry. Framed within a qualitative paradigm, collective case study has facilitated the exploration of curriculum and comprehension understandings of Year 5 to Year 8 English and Science teachers. The chapter has introduced the school context for the inquiry and provided a broad overview of the teacher participants. The research design, data collection strategies and ethical considerations have been explored. Data analysis tools which

support the theoretical perspectives of the inquiry have been explained and elaborated upon. In the following chapter, Curriculum and Comprehension, I have critiqued the NSW and Australian English and Science curriculum through the lens of LCT. The critique provides an insight into each curriculums' content, disciplinary literacies and interpretations of comprehension.

Chapter 5 Curriculum and Comprehension

Introduction

This chapter serves to provide an additional frame through which to read the case studies in Chapter 6 and Chapter 7. It aims to build understandings of the curriculum so the research questions can be interpreted in the context of the research setting. The chapter critiques the English and Science syllabus for NSW and Australian schools, including the NSW Syllabus for the Australian Curriculum - *English K-10 Syllabus* (BOSTES NSW, 2012b), the NSW Syllabus for the Australian Curriculum: *Science K-10 Syllabus* (BOSTES NSW, 2012c), the *Australian Curriculum: English* (Australian Curriculum Assessment and Reporting Authority, 2015a), the *Australian Curriculum: Science* (Australian Curriculum Assessment and Reporting Authority, 2015d), the General Capabilities – Literacy (Australian Curriculum Assessment and Reporting Authority, 2013a) and the Literacy Continuum (Australian Curriculum Assessment and Reporting Authority, 2015h). These official documents have been examined through the lens of LCT, to gain perspectives of comprehension in the curriculum. Of relevance to the inquiry are the Year 5 to Year 8 content outcomes for reading and literacy in each syllabus. An analysis of comprehension knowledge and knowing in the syllabus outcomes and its representation in the curriculum provides an insight to the disciplinary perspectives and practices of comprehension held by the participant teachers.

Implementing the curriculum in the inquiry school

Data in this inquiry were collected during the period where NSW schools were trialling the NSW Syllabus for the Australian Curriculum - *English K-10 Syllabus* (BOSTES NSW, 2012b) and the NSW Syllabus for the Australian Curriculum: *Science K-10 Syllabus* (BOSTES NSW, 2012c). In the participant school, teachers designed and trialled units of study for each year group from the 2012 curriculum, while continuing to implement units of study using outcomes from the previous curricula.

Each teachers' programme in this inquiry indicates a connection to the school scope and sequence, which reflects the relevant syllabus requirements. As the curriculum is recontextualised at the school level through scope and sequence documents and texts determined, the teachers then collaboratively reproduce the scope and sequence documents (the school curriculum) as 'units of study' for the year group.

Figure 5.1: Resources and support documents available to NSW teachers of English

Curriculum planning in the school context is inherently complex. Schools must create and provide the appropriate documentation and supporting resources to meet regulatory requirements and the needs of teachers and students. Resources are made

available to teachers to develop units of study. In addition to the prescribed syllabus, NSW teachers of English may access additional resources and support documents (Figure 5.1) to aid in the selection of texts for each year of schooling.

The mismatch in resourcing for English and Science can be viewed through the lens of horizontal and hierarchical knowledge structures. English is typically considered as representing a horizontal knowledge structure, where knowledge is segmentally organised and context dependent. (Bernstein, 1999, Maton, 2014). The NSW Syllabus for the Australian Curriculum: English includes interrelated components, *Reading, Writing, Speaking and Listening*. Using Reading as an example, the concepts and understandings of texts studied in later primary and early secondary schooling differ. The interpretations and meanings gained from novels and plays studied are dependent on the instructional context and are not cumulative. For example, the Year 6 study of the novel *'Holes'* (Sachar, 2000) is contextually different to studying *'King of Shadows'* (Cooper, 2000) in Year 7, due to the concepts explored and the developmental abilities of the students. Studying one text does not support the understanding of the other over time.

Conversely, school Science is hierarchically or vertically structured. Knowledge is cumulative and builds on previous knowledge over time (Bernstein, 1999, Maton, 2014). For example, Chemistry concepts in Years 5 and 6 Science explored as *the properties of liquids* provide a foundation for understandings of *conduction, convection and radiation* in Year 8. The terminology used is specialised and bounded by the conceptual understandings. These concepts move beyond the context of the classroom and provide a basis for further learning over time.

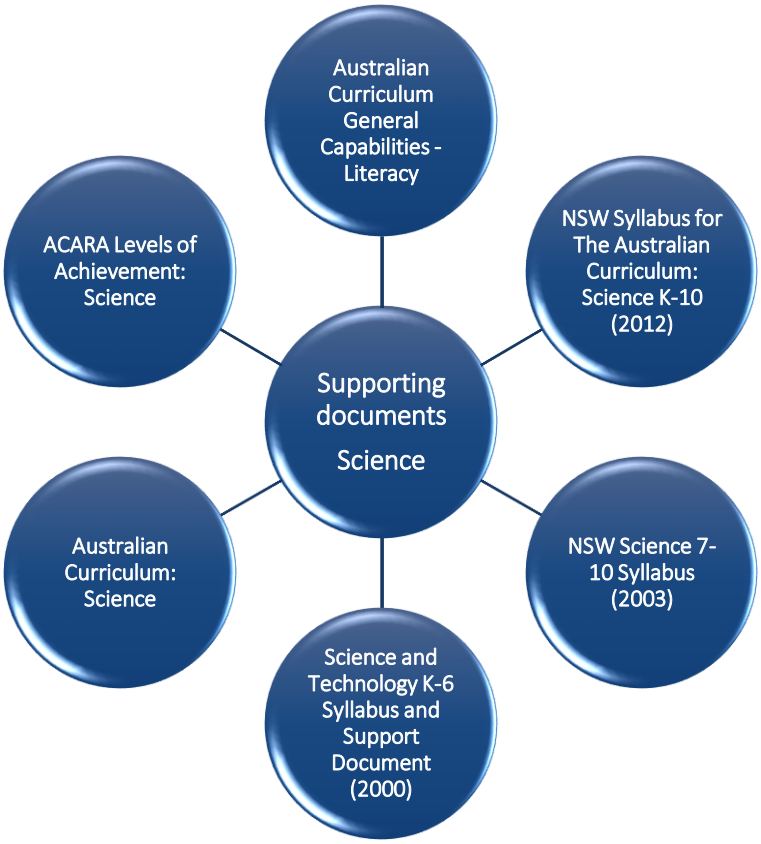


Figure 5.2: Resources and support documents available to NSW teachers of Science

Teachers of English have a wide range of resources to 'tap into'. The syllabus provides information of areas of study. From this, text selection is recontextualised at the school, prior to being reproduced in the classroom. Knowledge is not strongly bounded, allowing teachers to access multiple sources of knowledge to support instruction in the context of the school. In Science, the resources provided by the regulatory authorities are limited (Figure 5.2). This may be explained by the strongly bounded nature of Science knowledge. Resources used must provide teachers with sufficient specialised knowledge to enable accurate communication of syllabus content.

Curriculum and comprehension

The following section of the chapter explores how comprehension is represented in the English and Science curriculum.

A review of the English and Science school curriculum from NESA (NSW) and ACARA (Australia) reveals an explicit definition of comprehension to be missing. Reference is made to the implementation and instruction of comprehension strategies in English and inquiry in Science, but a clear definition of comprehension is not stated to teachers who must implement the curriculum.

Australia (ACARA)

The *Australian Curriculum: English* (Australian Curriculum Assessment and Reporting Authority, 2015a) includes comprehension within the Literacy Strand. The outcomes refer to comprehension strategies, where students will interpret, analyse and evaluate print and digital texts; however, a definition of comprehension is not evident. The *Australian Curriculum: Science* (Australian Curriculum Assessment and Reporting Authority, 2015d) includes comprehension within the Science Inquiry Skills strand with outcomes relating to questioning and predicting, planning and conducting, processing and analysing data and information, evaluating, and communicating. Looking further into the curriculum, the General Capabilities – Literacy (Australian Curriculum Assessment and Reporting Authority, 2013a) provide teachers with levels of student achievement at the end of each stage of learning. The Literacy Continuum (Australian Curriculum Assessment and Reporting Authority, 2015h) discusses in greater detail the expected student behaviours following comprehension instruction but does not specifically define comprehension.

New South Wales (NESA)

The NSW Syllabus for the Australian Curriculum – *English K-10 Syllabus* (BOSTES NSW, 2012b) includes outcomes for comprehension, focusing upon the skills and strategies required by students each stage level. The NSW Syllabus for the Australian Curriculum – *Science K-10 Syllabus* (BOSTES NSW, 2012c) includes outcomes for comprehension where students will develop knowledge, understanding of and skills in applying the processes of 'Working Scientifically' and Working Technologically'. Neither syllabus includes a definition of comprehension. Looking further afield, the NSW Government Department of Education and Training (now NSW Department of Education and

Communities) has provided support materials to teachers to assist them in the teaching of comprehension. It provides a concise and simple definition of comprehension, stating that "comprehension involves responding to, interpreting, analysing and evaluating texts" (Teaching comprehension strategies: Curriculum k-12, 2010 p.2).

Comprehension as making meaning through language in the English curriculum

Students in the curriculum domain of English in Year 5 to Year 8 respond to, interpret, analyse and evaluate the texts presented in the curriculum. Comprehension knowledge in the form of syllabus outcomes and the requisite skills and strategies that must be taught and assessed are included in syllabus documents.

Of interest is the rationale which underpins the curricula. A comparison of the NSW English curriculum documents used by the teachers in this inquiry reveals that the philosophy for instructional content in English has remained steadfast across the iterations and reimagining of the curricula over time. The syllabuses have, as a central focus, an emphasis upon the purposeful and meaningful use of language when engaging with texts within the social context, whereby "individuals learn to analyse, understand, communicate and build relationships with others and with the world around them" (Australian Curriculum Assessment and Reporting Authority, 2015a). The essence of the rationale remains unchanged. Language is used to make meaning, "to make sense of the world" (Board of Studies NSW, 1998 p.8).

This is to be achieved, in part, through the decoding and interpretation of texts in the primary school years, and in the secondary school years through "opportunities to question, assess, challenge and reformulate information and use creative and analytical language to clarify and solve problems" (Board of Studies NSW, 2003a p.7). These perspectives align with commonly held views of teaching reading and comprehension. Reading instruction focuses upon the development of print-based reading acquisition skills and reading comprehension strategies in the early years of schooling, as students 'learn to read', and in the later years where the skills and strategies learned support students to 'read to learn' across differing disciplines (Afflerbach et al., 2008, Freebody,

2007b, Moje, 1996, Paris, 2005). The study of English, as a curriculum domain, therefore affords students the opportunity to "encompass spoken, written and visual texts of varying complexity through which meaning is shaped, conveyed, interpreted and reflected" (BOSTES NSW, 2012b).

In each of the English syllabuses utilised by the teachers in this inquiry, student understanding of the specified content is implied through the outcomes and content descriptions. Reference is made to students using a "comprehensive range of skills and strategies appropriate to the type of text being read" (Board of Studies NSW, 1998 p.31). However, there is no elaboration of what the skills and strategies may be, nor reference to any comprehension strategies. Instead, various synonyms for comprehension, such as analyse, evaluate, interpret and explain, which are also identified as expected student behaviours or knower dispositions for curriculum English, are used. Conversely, later syllabus documents (BOSTES NSW, 2012b, Australian Curriculum Assessment and Reporting Authority, 2015a) provide a clearly identified reference to comprehension strategies to support classroom instruction. The strategies that comprise comprehension instruction (as seen in Figure 5.3) are included in the glossary of both the Australian Curriculum: English (2015a) and NSW Syllabus for the Australian Curriculum - *English K-10 Syllabus* (2012a) rather than with the suggested content.

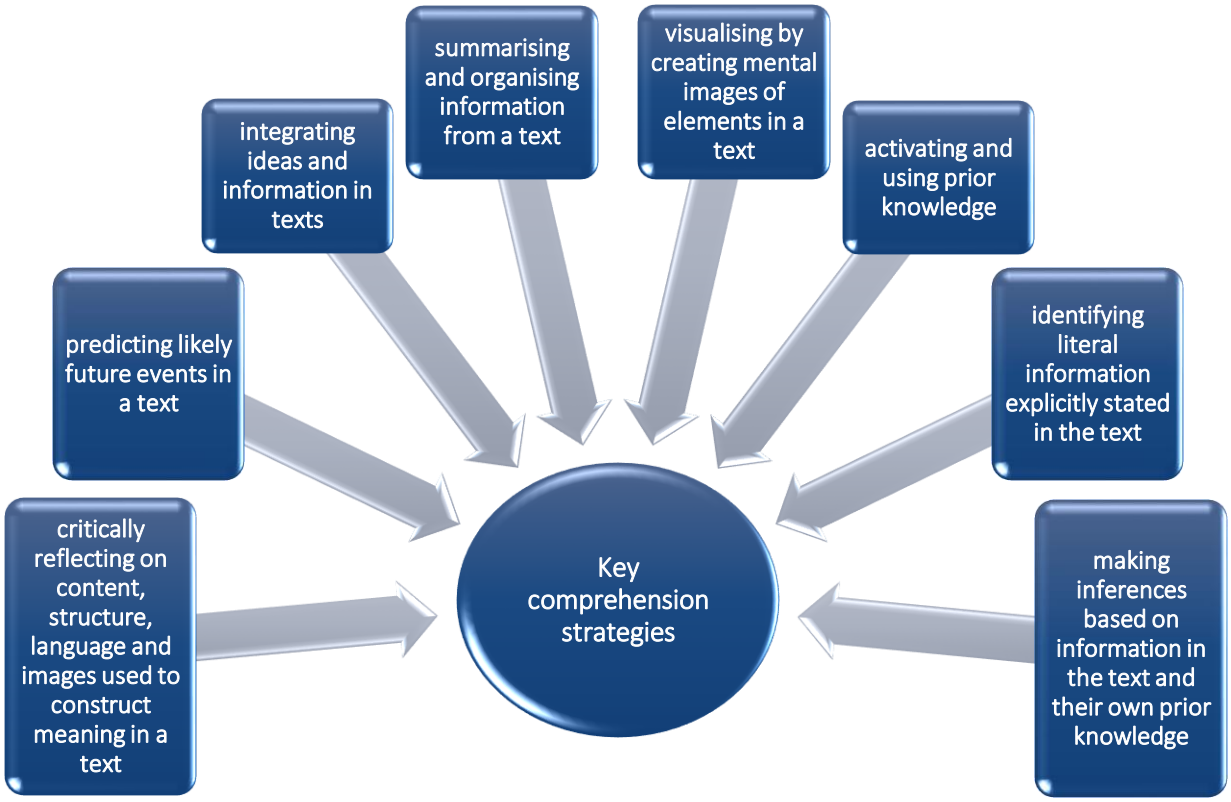


Figure 5.3: Key comprehension strategies located in the NSW and Australian English curriculum (Australian Curriculum Assessment and Reporting Authority, 2015a, BOSTES NSW, 2012a)

Comprehension as scientific inquiry in the Science curriculum

Scientific inquiry is identified in each of the Science curricula used by the teachers in this inquiry. Within the K-6 and 7-10 NSW Science Syllabus (Board of Studies NSW, 2000, 2003b), inquiry skills are included in the skills strand and are separate to knowledge and understanding content outcomes. However, the syllabus states that all outcomes in each strand or element of the syllabus are of equal importance. The Science and Technology K- 6: Syllabus and Support Document (Board of Studies NSW, 2000) further groups the outcomes into content (knowledge and understandings) and learning processes (skills), for clarity. In the Science Years 7-10 Syllabus (Board of Studies NSW, 2003b), scientific inquiry is included within the Domain element. The NSW Syllabus for the Australian Curriculum: *Science K-10 Syllabus* (BOSTES NSW, 2012c) similarly refers to scientific inquiry as the mode in which students will undertake instruction in Science. Situated within the "Working Scientifically' strand of the 2012

syllabus, scientific inquiry refers to, "the processes which enable scientists to develop answers to questions and to improve explanations for phenomena in the natural world." (BOSTES NSW, 2012c).

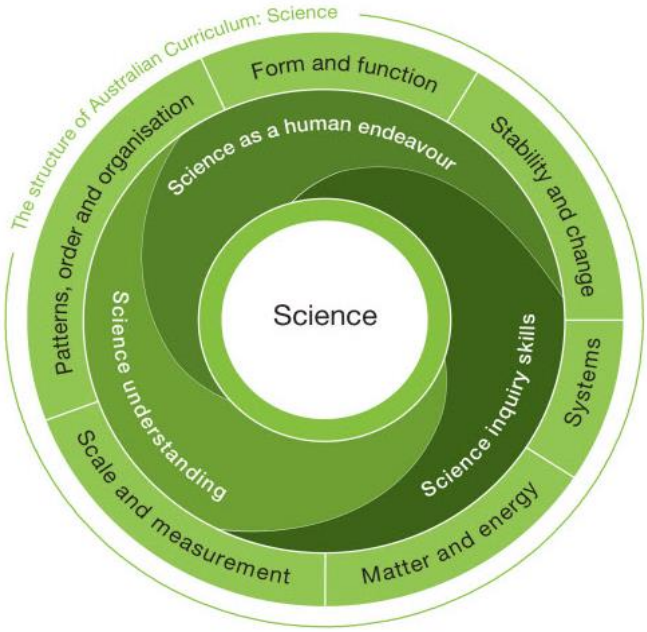


Figure 5.4: Key ideas of the Australian Curriculum: Science F-10 (Australian Curriculum Assessment and Reporting Authority, 2015d)

Science inquiry skills are part of three interrelated strands in the Australian Curriculum: Science F-10 (Australian Curriculum Assessment and Reporting Authority, 2015d), as seen in Figure 5.4. The inquiry skills, represented in Figure 5.5, support the instruction of curriculum content knowledge and enable the students to make meaning of the content. The skills require students to analyse, interpret, evaluate and respond to texts and practical experiences.

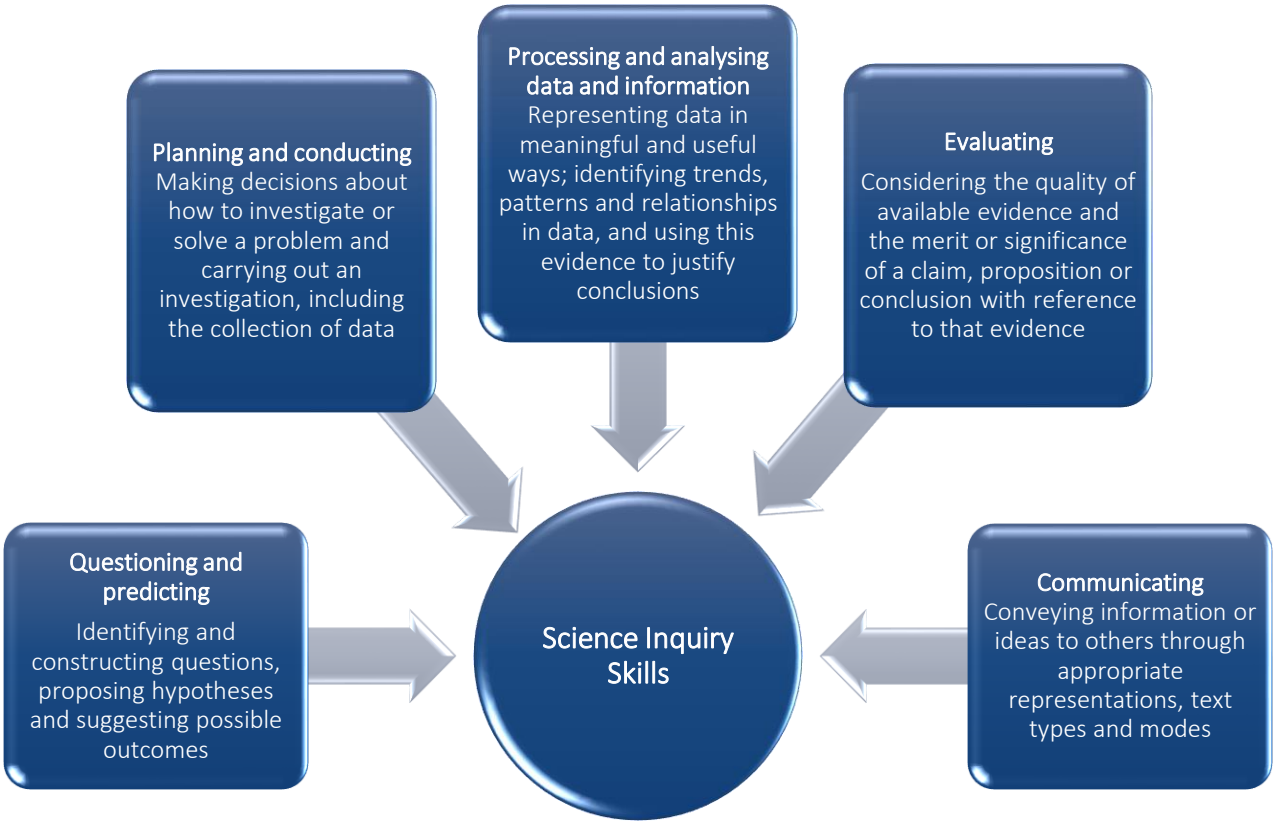


Figure 5.5 Science Inquiry Skills of the Australian Curriculum: Science F-10 (Australian Curriculum Assessment and Reporting Authority, 2015d)

Comprehension and Scientific Literacy

The General Capabilities state that students' learning and understanding of scientific concepts is achieved where,

> "…learning the literacy of science, students understand that language varies according to context and they increase their ability to use language flexibly… providing the link between the concept itself and student understanding." (Australian Curriculum Assessment and Reporting Authority, 2015g).

The curriculum takes a broader perspective on Scientific literacy. Moving beyond the knowledge codes, the curriculum interpretations of Scientific literacy foreground the knower codes, whereby students are expected to utilise an array of skills and strategies

to interpret, evaluate and communicate Science concepts and content. This is especially so in the *Science Years 7-10 Syllabus* (Board of Studies NSW, 2003b), where Scientific literacy facilitates opportunities for students become scientifically literate through the application, evaluation and communication of knowledge learned. The *Australian Curriculum: Science F-10* (Australian Curriculum Assessment and Reporting Authority, 2015d) broadens this view, identifying the influence of Science content in the shaping of interpretations of knowledge and decision making. Curriculum definitions of Scientific literacy are found in Table 5.1.

Curriculum	Scientific literacy definition
Science Years 7-10 Syllabus (Board of Studies NSW, 2003b p.17)	Students apply their knowledge of scientific concepts and processes to the evaluation of issues and problems that may arise and to the decisions that they make in their daily life, about the natural world and changes made to it through human activity
The Australian Curriculum: Science F-10 (Australian Curriculum Assessment and Reporting Authority, 2015c)	An ability to use scientific knowledge, understanding, and inquiry skills to identify questions, acquire new knowledge, explain science phenomena, solve problems and draw evidence-based conclusions in making sense of the world, and to recognise how understandings of the nature, development, use and influence of science help us make responsible decisions and shape our interpretations of information

Table 5.1: Curriculum definitions of Scientific literacy

Interestingly, direct reference to scientific literacy is not evident within the *Science and Technology K- 6: Syllabus and Support Document* (Board of Studies NSW, 2000) or the *NSW Syllabus for the Australian Curriculum - Science K-10 Syllabus* (BOSTES NSW, 2012c) for Years 5 and 6. Each syllabus provides 'stage statements' where general indicators for what students will learn are articulated. On review of the stage statements across each year of primary and secondary school, the focus is upon the demonstration of understandings of content and the behaviours students exhibit as learners in Science, foregrounding the knower codes. In the context of this inquiry, the stage statements for Years 5 and 6 (Stage 3) and Years 7 and 8 (Stage 4) do not refer to scientific literacy.

Rather, literacy in Science is incorporated across content learning areas, whereby the syllabus provides contextual opportunities to learn the 'language' of Science, together with skills to interpret content. The skills are embedded within the disciplinary knowledge of Science.

Searching for comprehension in the English and Science curriculum documents

The English syllabus documents state that comprehension is the "strategies and processes by which readers bring meaning to and extract meaning from texts" (2012b, 2015a). No clear reference to comprehension is made in the rationale, where broader statements encompass the totality of the aims of curriculum English rather than its components. Current curriculum documents for English provide detailed information about the content to be taught over time. What is missing is specific guidance about instructional strategies to support students' learning in comprehension. Understandings of literacy and, therefore, comprehension shape the learning practices of both teacher and students. The ability to read and interpret content strategically is necessary to understand curriculum concepts, but instructional information to meet the disciplinary literacy needs is not forthcoming in the documentation made available to teachers (Allender & Freebody, 2016, Afflerbach et al., 2008, Moje et al., 2009).

The Science syllabus documents do not specify comprehension instruction as part of the Science curriculum. Rather, comprehension skills are represented within the Science Inquiry strands for each stage of learning. Understandings of science concepts are developed through the active investigation of evidence, posing questions and providing explanations of findings to make meaning of science (BOSTES NSW, 2012c, Pearson et al., 2010). It is argued that scientific inquiry requires the simultaneous coordination of instruction in knowledge and skills (National Research Council (US) Committee on a Conceptual Framework for New K-12 Science Education Standards, 2012), yet this is not addressed in the syllabus documents. Comprehension is not explicitly stated within the outcomes located within the Learning Processes strand of the 2000 and 2003 NSW syllabuses and within the Working Scientifically strand of the 2012 NSW syllabus, nor in the Australian Curriculum: Science F-10. Instead, the

language used within the outcomes includes reference to comprehension skills and strategies found in the research literature, such as questioning, making predictions and summarising.

Knowledge and knowing in the curriculum

The English curriculum

The curriculum domain of English is considered to typically privilege knower codes (Christie, 2016, Jackson, 2016, Maton, 2014). However, a closer inspection of the specific outcomes relating to comprehension relevant to this inquiry reveals evidence of knowledge codes in the syllabus outcomes, where specialised knowledge of comprehension and the skills required to gain meaning from texts are the basis of achievement. The outcomes make specific reference to the comprehension knowledge that must be taught, using terms such as processes, skills and comprehension strategies. Table 5.2 shows these outcomes.

The findings reveal varying interpretations of the syllabus and how it informs comprehension instruction in teacher practice. Comprehension knowledge in English is represented by the explicit instruction of disciplinary literacy and comprehension strategies. This may be characterised as a teacher engaging in strategic instruction of comprehension strategies, such as teaching skills in how to summarise a chapter in a text. Stronger epistemic relations for curriculum knowledge reveal an emphasis on knowing specialised curriculum knowledge, such as the content of a unit of study; for example, students having a sound understanding of the characters and setting of Shakespeare's '*Much Ado About Nothing'*.

	Year 5	Year 6	Year 7	Year 8
	→			
BOSTES NSW (1998; 2003)	RS3.5 reads independently an extensive range of texts with increasing content demands, and responds to themes and issues RS3.6 Uses a comprehensive range of skills and strategies appropriate to the type of text being read		Outcome 7 thinks critically and interpretively about information, ideas and arguments to respond to and compose texts	
BOSTES NSW 2012	EN3-3A uses an integrated range of skills, strategies and knowledge to read, view and comprehend a wide range of texts in different media and technologies		EN4-2A effectively uses a widening range of processes, skills, strategies and knowledge for responding to and composing texts in different media and technologies	
ACARA outcomes 2015 Strategies of constructing meaning from texts, including literal and inferential meaning	Use comprehension strategies to analyse information, integrating and linking ideas from a variety of print and digital sources (ACELY 1703)	Use comprehension strategies to interpret and analyse information and ideas, comparing content from a variety of textual sources including media and digital texts (ACELY 1713)	Use comprehension strategies to interpret, analyse and synthesise ideas and information, critiquing ideas and issues from a variety of textual sources (ACELY 1723)	Use comprehension strategies to interpret and evaluate texts by reflecting on the validity of content and the credibility of sources, including finding evidence in the text for the author's point of view (ACELY 1734)

Table 5.2: Knowledge outcomes for comprehension Years 5 - 8 English (Board of Studies NSW, 1998, 2003a, Australian Curriculum Assessment and Reporting Authority, 2015a, BOSTES NSW, 2012b)

A closer examination of understandings of the pedagogy enacted reveals how knowledge of comprehension and curriculum influences the pedagogical choices made. Strengthening social relations in comprehension knowledge favours knower codes. For example, learner preferences for collaborative learning may be viewed in a lesson where small groups of students and the teacher discuss key elements of a text. Conversely, knower codes may also come into view when learner dispositions, such as writing skills, are valued.

As the NSW syllabus is drawn from the Australian Curriculum: English F-10 (Australian Curriculum Assessment and Reporting Authority, 2015a), I have included the relevant

outcomes in Table 5.2 to demonstrate the relationship between the two syllabuses. This is important, as teachers have access to both documents and may access resources from both to inform planning (as seen previously in Figures 5.1 and 5.2).

Outcome RS3.5: RS3.6 and Outcome 7 are found in the 'old' syllabus (1998; 2003) and are identified as outcomes which indicate curriculum content covering 'learning to' read skills and strategies. The content within the syllabus considers notions of comprehension strategies, including making predictions, inference, summarising and synthesising understandings within the content descriptors. The 'old' outcomes are less prescriptive about comprehension strategy instruction as content which students must learn, with instruction implied rather than explicitly stated. Outcomes referring to comprehension strategy instruction (the knowledge codes) become clearer in the 'new' syllabus in Objective A, where,

> "through responding to and composing a wide range of texts and through the close study of texts, students will develop knowledge, understanding and skills in order to communicate through speaking, listening, reading, writing, viewing and representing" (BOSTES NSW, 2012b),

as indicated in outcomes EN3-3A and EN4-2A. Comprehension outcomes are identified in the Australian Curriculum: English (2015a), through the Literacy strand (ACELY 1703; ACELY 1713; ACELY 1723; ACELY 1734). Located in each outcome under the subheading of 'respond to, read and view texts', content descriptors specifically mention comprehension strategies as content knowledge and are elaborated upon in the curriculum documents. Specialised comprehension knowledge in the English syllabus includes knowing, understanding and using in the correct context comprehension strategies, as alluded to in the curriculum outcomes.

Students are expected to develop skills and strategies over time which reflect their understandings and application of comprehension knowledge. These skills and strategies may be perceived as learner dispositions representing the knower codes,

where learner attributes are more highly valued as a basis for achievement than the specialised knowledge of comprehension.

Represented as capabilities and levels of achievement, these dispositions are located within the documents which emerge from the production field, including the Australian Curriculum General Capabilities – Literacy (Australian Curriculum Assessment and Reporting Authority, 2015h), levels of expected achievement (Australian Curriculum Assessment and Reporting Authority, 2015b) and the NSW DEC Literacy Continuum (NSW Curriculum and Learning Innovation Centre, 2012a, 2012b), as shown in Table 5.3. Hence, tensions emerge between the curriculum outcomes representing comprehension knowledge and the capabilities and levels of achievement identified in the supporting documentation that teachers may access.

Of interest in this inquiry is the code shift that occurs from Years 5 and 6 comprehension instruction to Years 7 and 8 comprehension instruction. Here, a change in emphasis occurs within the specialisation codes. The expectations of the 2012 syllabus for Years 5 and 6 English maintain continued explicit instruction in comprehension in these grades, thus privileging knowledge codes. The syllabus expectations of Years 7 and 8 English are similar, but a shift in expectation for students in Years 7 and 8 occurs. Disciplinary literacy skills come to the fore, with an increased emphasis on understanding literary techniques, interpreting and constructing texts in the context of text study.

The English syllabus (Board of Studies NSW, 2003a, Board of Studies NSW, 1998) in use at the time of the inquiry makes no specific reference to comprehension instruction. The English K-6 syllabus (1998) alludes to comprehension and interpretation of texts, but there is no clear statement where comprehension instruction is part of the syllabus. In the English 7-10 syllabus (2003a), the term 'responding' is used to signify comprehension beyond the literal level is required (p.14). No clear reference is made to comprehension strategies in the outcomes. Limited reference is made within the content indicators, but the terminology is not explained or defined elsewhere in the

syllabus document. This differs to the 2012 English curriculum being trialled during the data collection period (BOSTES 2012b). Within the new curriculum, explicit reference is made to the comprehension skills and strategies to be taught.

	Year 5	Year 6	Year 7	Year 8
	→			
ACARA General Capabilities: Literacy 2015	interpret and analyse information and ideas, comparing texts on similar topics or themes using comprehension strategies.		interpret and evaluate information, identify main ideas and supporting evidence, and analyse different perspectives using comprehension strategies.	
ACARA levels of expected achievement 2015	analyse and explain literal and implied information from a variety of texts. They describe how events, characters and settings in texts are depicted and explain their own responses to them. They listen and ask questions to clarify content.	compare and analyse information in different and complex texts, explaining literal and implied meaning. They select and use evidence from a text to explain their response to it. They listen to discussions, clarifying content and challenging others' ideas.	explain issues and ideas from a variety of sources, analysing supporting evidence and implied meaning. They select specific details from texts to develop their own response, recognising that texts reflect different viewpoints. They listen for and explain different perspectives in texts.	interpret texts, questioning the reliability of sources of ideas and information. They select evidence from the text to show how events, situations and people can be represented from different viewpoints. They listen for and identify different emphases in texts, using that understanding to elaborate on discussions.
NSW DEC Literacy Continuum 2012	analyse, evaluate and interpret and respond to texts using a variety of comprehension strategies.	analyse, evaluate and interpret and respond to texts from different perspectives using a variety of comprehension strategies.	apply comprehension strategies and skills across a broad range of texts.	consolidate an increasing repertoire of comprehension strategies.

Table 5.3 Knower dispositions for comprehension Years 5 -8 English (Australian Curriculum Assessment and Reporting Authority, 2015b, 2015h, NSW Curriculum and Learning Innovation Centre, 2012a, 2012b)

The Science curriculum

The curriculum domain of Science is typically considered as foregrounding the knowledge codes, rather than learner dispositions (Maton, 2014). This contrasts, however, with the expectations of the syllabus, where comprehension is constructed as scientific inquiry, thus privileging the knowledge codes. These outcomes are included in Table 5.4.

In contrast to the Working Scientifically outcomes, an examination of the specific content outcomes for each unit of study located in the curriculum foregrounds the knowledge codes. It is within the units of study that specialised instruction in scientific content manifests itself, and the content which teachers identify as instructional knowledge, to be taught, examined and assessed. Specialised content in the Science syllabus is organised under the 'Knowledge and Understanding' strand, and encompasses the study of the Physical World, Earth and Space, the Living World and the Chemical World. In addition to these areas of study, students in Years 5 and 6 learn about Built Environments, the Material World, Information and Products.

Privileging the knower codes, these aptitudes or dispositions can be found within the documents which emerge from the production field, including the Australian Curriculum General Capabilities – Literacy (Australian Curriculum Assessment and Reporting Authority, 2015h) and levels of expected achievement in Science (Australian Curriculum Assessment and Reporting Authority, 2015e), as seen in Table 5.5.

The Australian Curriculum: Science incorporates comprehension skills through the 'Science Inquiry Skills' strand, focusing upon skills and strategies such as questioning, predicting, analysing and evaluating (Australian Curriculum Assessment and Reporting Authority, 2012). The Science curriculum, while highlighting the comprehension skills students should develop and use to further their understandings of scientific content and concepts, does not identify how these strategies should be taught in the Science classroom. Within the NSW Syllabus for the Australian Curriculum - *Science K-10 Syllabus* Students (BOSTES NSW, 2012c), comprehension skills are incorporated in the

Working Scientifically strand of the syllabus. These skills and strategies are identified in curriculum support materials available to NSW teachers, including the Australian Curriculum General Capabilities – Literacy (Australian Curriculum Assessment and Reporting Authority, 2013b).

	Year 5	Year 6	Year 7	Year 8
	→			
BOSTES NSW (2007; 2000)	INV S3.7 conducts their own investigations and makes judgements based on the results of observing, questioning, planning, predicting, testing, collecting, recording and analysing data, and drawing conclusions		4.17 evaluates the relevance of data and information 4.19 draws conclusions based on information available	
BOSTES NSW 2012	ST3-4WS investigates by posing questions, including testable questions, making predictions and gathering data to draw evidence-based conclusions and develop explanations		SC4-4WS identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledge SC4-7WS processes and analyses data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusions	
ACARA outcomes 2015	With guidance, pose clarifying questions and make predictions about scientific investigations (ACSIS231) Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate (ACSIS090) Compare data with predictions and use as evidence in developing explanations (ACSIS218)		Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS124) Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate (ACSIS129) Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence (ACSIS130)	

Table 5.4: Knowledge outcomes for comprehension in Years 5 - 8 Science

	Year 5	Year 6	Year 7	Year 8
	→			
ACARA General Capabilities: Literacy 2015	interpret and analyse information and ideas, comparing texts on similar topics or themes using comprehension strategies.		interpret and evaluate information, identify main ideas and supporting evidence, and analyse different perspectives using comprehension strategies.	
ACARA levels of expected achievement 2015	Students follow instructions to pose questions for investigation and predict the effect of changing variables when planning an investigation. They use equipment in ways that are safe and improve the accuracy of their observations. Students construct tables and graphs to organise data and identify patterns in the data. They compare patterns in their data with predictions when suggesting explanations. They describe ways to improve the fairness of their investigations, and communicate their ideas and findings using multimodal texts.	Students follow procedures to develop investigable questions and design investigations into simple cause-and-effect relationships. They identify variables to be changed and measured and describe potential safety risks when planning methods. They collect, organise and interpret their data, identifying where improvements to their methods or research could improve the data. They describe and analyse relationships in data using appropriate representations and construct multimodal texts to communicate ideas, methods and findings.	Students identify questions that can be investigated scientifically. They plan fair experimental methods, identifying variables to be changed and measured. They select equipment that improves fairness and accuracy and describe how they considered safety. Students draw on evidence to support their conclusions. They summarise data from different sources, describe trends and refer to the quality of their data when suggesting improvements to their methods. They communicate their ideas, methods and findings using scientific language and appropriate representations.	Students identify and construct questions and problems that they can investigate scientifically. They consider safety and ethics when planning investigations, including designing field or experimental methods. They identify variables to be changed, measured and controlled. Students construct representations of their data to reveal and analyse patterns and trends and use these when justifying their conclusions. They explain how modifications to methods could improve the quality of their data and apply their own scientific knowledge and investigation findings to evaluate claims made by others. They use appropriate language and representations to communicate science ideas, methods and findings in a range of text types.

Table 5.5: Knower dispositions for comprehension in Years 5 - 8 Science (Australian Curriculum Assessment and Reporting Authority, 2015h, 2015e)

Summary

This chapter provides an in-depth critique of the representations of literacy and comprehension within the English and Science curriculum used in Australian schools. Of importance to this inquiry is the purview of comprehension in the curriculum from a disciplinary perspective. As explored in the chapter, comprehension is alluded to in educational outcomes for students, yet is not specifically stated or defined in the curriculum. In English and Science, no specific guidance is provided to teachers in the instruction of comprehension in the disciplines. This creates complexity for teachers as they interpret the curriculum and determine the pedagogical practices that best meet the disciplinary literacy and knowledge requirements for their students.

In the following two chapters, the reader will meet each of the participant teachers. Chapter 6 introduces the English teachers, while Chapter 7 introduces the Science teachers. In each case, a detailed analysis of the participant teacher's practice reveals their interpretations of disciplinary knowledge and comprehension in the curriculum, and how such understandings are enacted.

Chapter 6 The English Teachers

This chapter is the first of two chapters which present data showcasing teacher practices in teaching comprehension in their discipline. Chapter 6 will introduce the English teachers, and Chapter 7 the Science teachers.

Introduction

A brief overview of the school context sets the scene for the chapter as the teachers are introduced. A detailed account of each case begins with an overview of the teachers' understandings of and beliefs about comprehension and comprehension instruction in the context of their practice. Competing views held by the teachers of the place of comprehension in the classroom will be discussed. I have used data collected to guide the reader, identifying episodes of 'comprehension pedagogy', where the teacher, guided by their own beliefs and understandings of comprehension and disciplinary knowledge, has taught or facilitated comprehension to aid the students' understanding of the content. Examples of students' work will provide an insight into the students' understanding of the concepts and the teachers' practice. Excerpts from lessons, focusing upon aspects of comprehension identified within the teaching episodes, are interpreted through the theoretical lens of Legitimation Code Theory (as discussed in Chapter 3), specifically the semantic codes. The semantic code analysis of the classroom discourse (Appendix J) identifies the strengthening or weakening of semantic gravity (SG⇧; SG⇩) and semantic density (SD⇧; SD⇩). Interactions between the teacher and students are referred to as 'turns' in the analysis. Each case concludes with an interpretive comment on the relationship between belief, understanding and practice in the teaching of curriculum content and comprehension.

School context

As part of the school policy to support and facilitate the instructional content of comprehension strategy instruction, a commercial product, 'Strategies for Comprehension for informative texts' (Davis, 2012), was purchased as a school resource

for teachers in Years 5 and 6 at the beginning of the school year. The choice of resource was a decision made by the Head of Middle School, as there was a perceived need to build student understandings of comprehension, in response to the new syllabus requirements and to 'upskill' the teachers of Years 5 and 6 in this school. The resource provided teachers with lesson plans, task cards and audio-visual lessons to demonstrate the concepts. The use of this resource in the teachers' lesson planning is commented upon later in this chapter.

Written texts are a key component of the English program. It is important to note variances in the decision-making practices when determining text selection in the primary school year groups (Years 5 and 6) and the secondary school year groups (Years 7 and 8). In Years 5 and 6 English, the selection of novels and texts is determined by the Head of Middle School in consultation with the teachers of Years 5 and 6. The primary teachers have a greater influence upon the texts selected for their classes. This may be, in part, a result of the differences in how classes are organised between the two levels of schooling. In Years 5 and 6, one teacher is generally responsible for one class of students, thus providing some flexibility in text choice and the use of support documents and assessment modes.

By contrast, the Faculty Head and Dean of Studies select the novels and plays students in Years 7 and 8 English will study. In Years 7 and 8, there are usually three or four English classes in a year group. Therefore, under the guidance of a faculty, there is a requirement for some 'standardisation' of the curriculum, assessment and the texts used. The practices observed and described below are evidence of how the participating teachers enacted the units of study as actual classroom interactions.

Teaching and learning spaces in English

The classroom spaces for each of the English classes are similar in size and design, and typical of the Middle School classrooms in the participant school. Each classroom has a data projector mounted for teacher use, which was used in each of the lessons observed. This enabled students to collectively view content presented. In the lessons observed,

this facilitated instruction, discussion and opportunities to highlight points of interest. The teachers projected items such as excerpts of the text under discussion, definitions of terms used, PowerPoint presentations and images.

The Years 5 and 6 classrooms (Figure 6.1) are occupied by one teacher only, and furniture varies in arrangement throughout the year in response to teaching and learning needs. This is typical of primary years classrooms in NSW. The flexibility in classroom layout affords opportunities for student engagement and teacher pedagogical options to address teaching and learning needs (Rands & Gansemer-Topf, 2017). Increased interactions between teachers and students are observed when learning spaces are flexible as instruction becomes increasingly student-led (Brooks, 2012, McArthur, 2015, Rands & Gansemer-Topf, 2017). This may be characterised as collaborative tasks where students and teachers use different spaces in the English classroom for teaching and learning activities; for example, students and teachers sitting together for shared, multiple readings of texts in different modes, such as reading aloud by teacher and/or students, with text on the whiteboard, iPad or in hard copy. Questioning and clarification of vocabulary is initiated by either teacher or students as the need arises throughout the readings as teachers and students become "co-constructers of knowledge" (Rands & Gansemer-Topf, 2017 p.31).

In Years 7 and 8, the classrooms are shared spaces (Figure 6.2), and teachers may be timetabled to different rooms at different times of the day. Therefore, the furniture arrangement does not vary from room to room. The teacher desk is situated at the front of the classroom near the whiteboard, and student desks are arranged in rows. The layout of these learning spaces may be considered as traditional and privileging a teacher-led pedagogical approach (Brooks, 2012, McArthur, 2015, Rands & Gansemer-Topf, 2017). The physical environment restricts the interactions of teachers and students, leading to an increase of teacher talk and passive student listening (Brooks, 2012), and fewer opportunities to engage in small group or individual discussions; for example, in lessons where text reading is teacher led, with students taking turns to read aloud or following the text as the teacher reads. Limited opportunities for discussion,

questioning or clarification of vocabulary are available, and the learning activities are usually individual tasks at the students' desk.

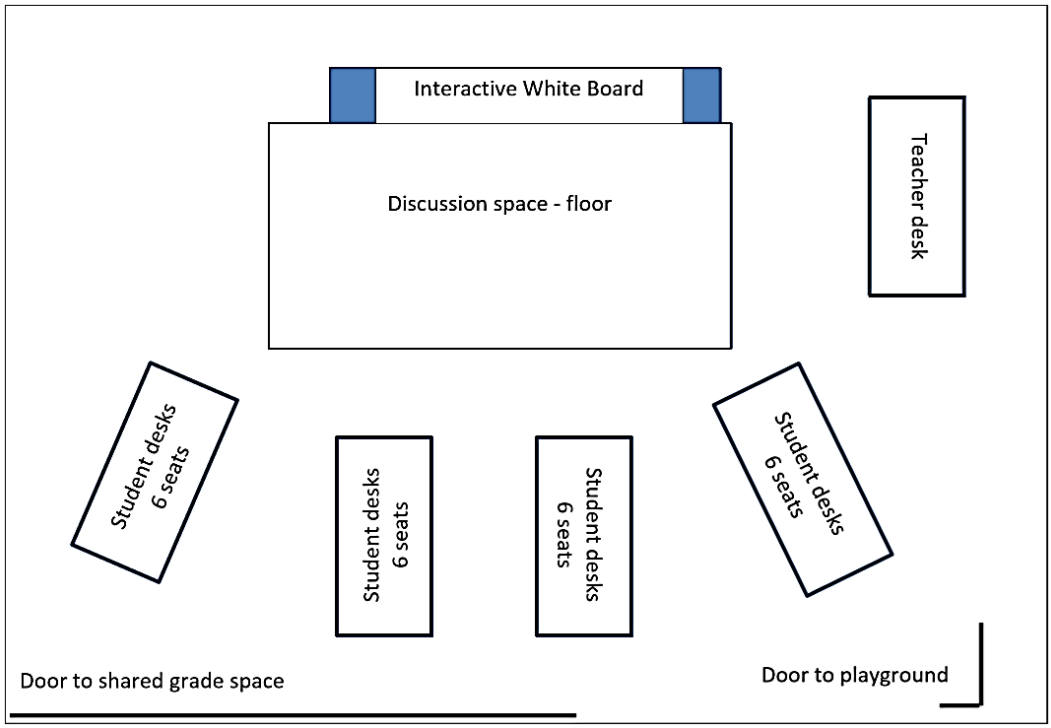


Figure 6.1: A typical classroom layout for Years 5 and 6 English

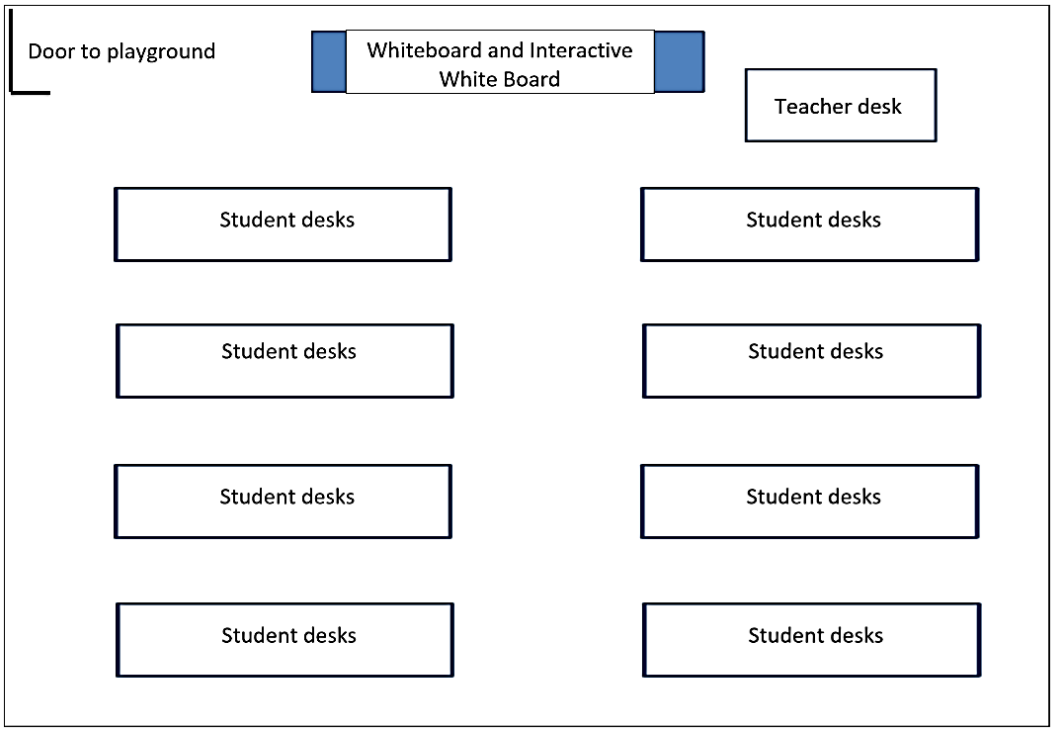


Figure 6.2: A typical classroom layout for Years 7 and 8 English

Introducing the English teachers

This inquiry is a collective case study investigating teacher understandings of comprehension and comprehension instruction. In this chapter, I will introduce you to four teachers responsible for the teaching of English in Years 5 to 8 and provide a detailed insight into each teachers' practice.

Abbey (Case 1) and Benita (Case 2) are qualified primary teachers (teachers of children age 5 – 12 years) in their first year of employment at the participant school and are responsible for the teaching and assessment of curricula in English, Mathematics, Science, History, Geography, Creative Arts, and Personal Development, Health and Physical Education. Abbey and Benita have teaching responsibilities for one class only, as is the normal practice in Primary schools in NSW. Colin (Case 3) and Deidre (Case 4) are qualified secondary teachers of English (teachers of children age 12 – 18 years). They are responsible for teaching several English classes across Years 7 – 12. This is typical practice in Secondary schools in NSW.

The primary years teachers

Abbey Year 5 English

Abbey is a graduate teacher in her second year of teaching and teaches a Year 5 mixed achievement class. The class comprises 18 students, 10 males and 8 females, aged between 10 to 11 years old. Three students have identified learning difficulties, including Dyslexia, ADHD and language delay, and have received extra literacy support through their school years. Abbey describes her class as one which has,

> *"…. very bright and very capable students. They'll often ask me or pick things out that I may not have thought about first either, which is kind of exciting. Then there are other students that need the extra scaffolding."*

Abbey is particularly conscious of the value of the relationship which exists between herself and her students, especially to build understandings of the content taught. She explains:

> *"For me, probably the critical part has been about relationship. Those particular students that at times need that extra, that they're confident in being able to*

communicate that to me, that they feel comfortable to come and speak with me and that we have really open communication in our classroom, where everyone feels that they can take risks and step out and it's a safe place."

To facilitate the varying academic and social needs of her class, Abbey's approach supports the relationships that exist between peers by adjusting the groupings in which the students will complete a task, in response to their current individual learning and social needs. She explains:

"When I do an activity, I mix the groups – they're never the same. I choose the groups and make sure that there's a mixture of students in there … I think there's a real benefit in helping to explain things to other people."

Benita Year 6 English

Benita has six years' teaching experience, primarily in the NSW Government sector. She teaches a Year 6 mixed achievement class. The class comprises 27 students, 15 males and 12 females, aged between 11 to 12 years old. Two students are International students, (from Malaysia and Myanmar), and have English as an additional language. Another student identifies as Aboriginal. Ten students have learning difficulties (no specific cause or diagnosis) and have received extra literacy support through their school years. Two students have other identified disabilities, such as Autism Spectrum Disorder. Benita describes her class as kinaesthetic learners, requiring visual prompts and movement to facilitate their learning:

"*This particular class, they need that movement (and) with these current students in Year 6, it's very visual for them. I find that they work and … by making it visual or tactile, it sinks in more and they retain it better than me just writing notes on the board and them copying it into their books, which I still do.*"

The secondary years teachers

Colin Year 7 English

Colin has seven years' teaching experience and has been a member of staff at the participant school for five years. His teaching experience is as an English teacher only. As part of his teaching load, Colin teaches a Year 7 English mixed achievement class.

The class comprises 30 students, 15 males and 15 females, aged between 12 to 13 years old. Two students have received extra literacy support in previous years and there are no students with identified disabilities in this class. Colin describes his class as one which needs scaffolding to support their thinking. He says:

> "*I try and scaffold but it's not always on the board. I just verbally scaffold too. I quite like talking to the class and getting a discussion going, even if they're yelling out ……they've developed into a class that will say things and explore things, which is all you want them to do."*

Deidre Year 8 English

Deidre has 16 years teaching experience, primarily in the United Kingdom, and has been a member of staff at the participant school for three years. In the United Kingdom, Deidre taught English and English as a Second Language (ESL). In the participant school, Deidre teaches both English and ESL. As part of her teaching load, Deidre teaches a Year 8 English mixed achievement class. The class comprises 20 students, 11 males and 9 females, aged between 13 to 14 years old. One student is Chinese speaking and has English as an additional language. Four students have identified literacy difficulties, including one student with hearing difficulties, and have received extra literacy support through their school years. Deidre describes her class as,

> "*really mixed, I have people who don't have English as their first language, I've got people with learning difficulties…. they need to comprehend because otherwise they don't feel secure in the classroom."*

Deidre is mindful of the specific needs of some of her students, especially those with English as an additional language, stating:

> "*When I teach ESL, that's a whole different ball game. I'm used to breaking it down with ESL – I think that's why I enjoy teaching ESL".*

Deidre draws on her experience when planning for her class. She is very aware of the insecurities her students possess in literacy, and often refers to building their confidence. Deidre goes on to say:

"If someone's not along the right track, I try and frame it in such a way as 'That's a really good idea but what I'm thinking of is more of…' I think it's trying to make them feel at ease, so they can ask me those questions."

Case 1: Abbey – Year 5 English

Comprehension as scaffolded instruction

Abbey views comprehension as being *"more than just being able to read"* text. Comprehension is contextual, where the intrinsic value of reading or viewing a text is in making meaning, moving beyond the skill of 'just' decoding printed text. She comments that she has students *"who can effectively read a text and have no idea what they've just read"*. Abbey defines comprehension as where,

"the students are able to read and view a text in context, and then be able to explain to me (as the teacher) what that means and what it means for them."

This viewpoint is evident in her practice. In each of the lessons observed, Abbey asks her students many questions of varying levels of complexity, but simultaneously engages in comprehension instruction. She models her thought processes to the students, encouraging them to draw on their understanding of the vocabulary within the text, and to make connections to other texts and experiences to facilitate their understanding. This enables the students to move beyond the printed text, and using the strategies taught, create personal understandings of the text.

In supporting her position that comprehension instruction is an important aspect of her practice, she emphasises her understanding of the connection between comprehension knowledge and comprehension instruction, stating:

"I think comprehension is at the centre of English because I think a lot of the other things don't fit the way they should if comprehension isn't sound, and therefore, to achieve good comprehension, there needs to be good comprehension instruction."

Abbey explicitly teaches comprehension strategies referred to in the research literature as part of her English programme. These are strategies she had become aware of due to

her familiarity with both English syllabus documents during her university studies as a pre-service teacher in the previous year. She explained:

> *"as I went through my studies in the interim period, for me it was about finding ways that made sense to teach the students how to break down the texts in ways that were meaningful."*

Abbey made use of a commercial product, 'Strategies for Comprehension for informative texts' (Davis, 2012), to support her instruction of comprehension to her class. The instructional sequence of the strategies taught by Abbey from the resource was informed by several factors. As a graduate teacher, Abbey acknowledged that she was influenced by the presentation sequence of the strategies in the programme, teaching "*the next one in the line of strategies"* presented throughout the term. Of equal importance was Abbey's knowledge of her students' skills and abilities across the curriculum areas. She considered the cross-curricula applications and perceived benefit to the students, explaining:

> *"I chose them because I looked at the particular programme and thought that they were very useful and would work across every area regarding reading …. they're strategies that work throughout all of our subject areas that I can link back for them and get them to talk about again."*

In the curriculum domain of English, Abbey maintains that comprehension occurs as, "*students view or read a text and then are able to explain in their own words."* In the context of her practice, comprehension should be taught, as the requisite comprehension skills and strategies her Year 5 students require to respond to, interpret, analyse and evaluate the texts presented in the curriculum, continue to develop and require further instruction. Abbey's understanding of comprehension reflects her belief that comprehension is cross curricular in nature and *"is critically important for students in all subject areas."* She is cognisant of her experience as a Year 5 teacher, that,

> *"comprehension spreads across not just English but every single subject area and I would say that comprehension is critically important… whether it's an English text*

that we're reading or something for HSIE that kids understand exactly what they're reading."

Importantly, the data reveal that Abbey, together with Benita (Case 2 – Year 6 English), articulate the relevance of specific comprehension instruction across each curriculum domain in their practice. For both primary years' teachers, the cross-curricular importance they place upon specific comprehension instruction may be indicative of the multi-disciplinary requirements of primary years teaching.

Abbey's beliefs and understandings about comprehension and comprehension instruction underlie the teaching of comprehension in her class. She considers that,

"comprehension itself is probably one of the most important things in English and therefore comprehension instruction and students' understanding the different comprehension strategies are really, really important."

Abbey's point of view, regarding the importance of comprehension instruction and its inherent need to be explicitly taught, supports the notion that the comprehension outcomes of the syllabus lie within the bounds of the knowledge codes, where specialised knowledge and skills are measures of achievement. In the context of this classroom, Abbey considers comprehension knowledge and its instruction as an important facet of her practice.

The Lessons

I observed Abbey across three, fifty-minute lesson periods, at times nominated by her. The duration of each lesson varied between thirty-five to fifty minutes, due to the late return of students from timetabled specialist lessons or other 'housekeeping' matters.

In this class, the novels and texts the students studied throughout the academic year were 'hard' copies and not available on their iPad through iBooks. In this class, Abbey determines how the iPad will be used in the lessons. To facilitate comprehension, Abbey uses iPad apps with graphic organisers, such as Tools4Students and Popplet, as the visual representations aid student comprehension and assist *"some of the students in my*

class to respond better ..... being able to look at it and point out different things really helped some of them."

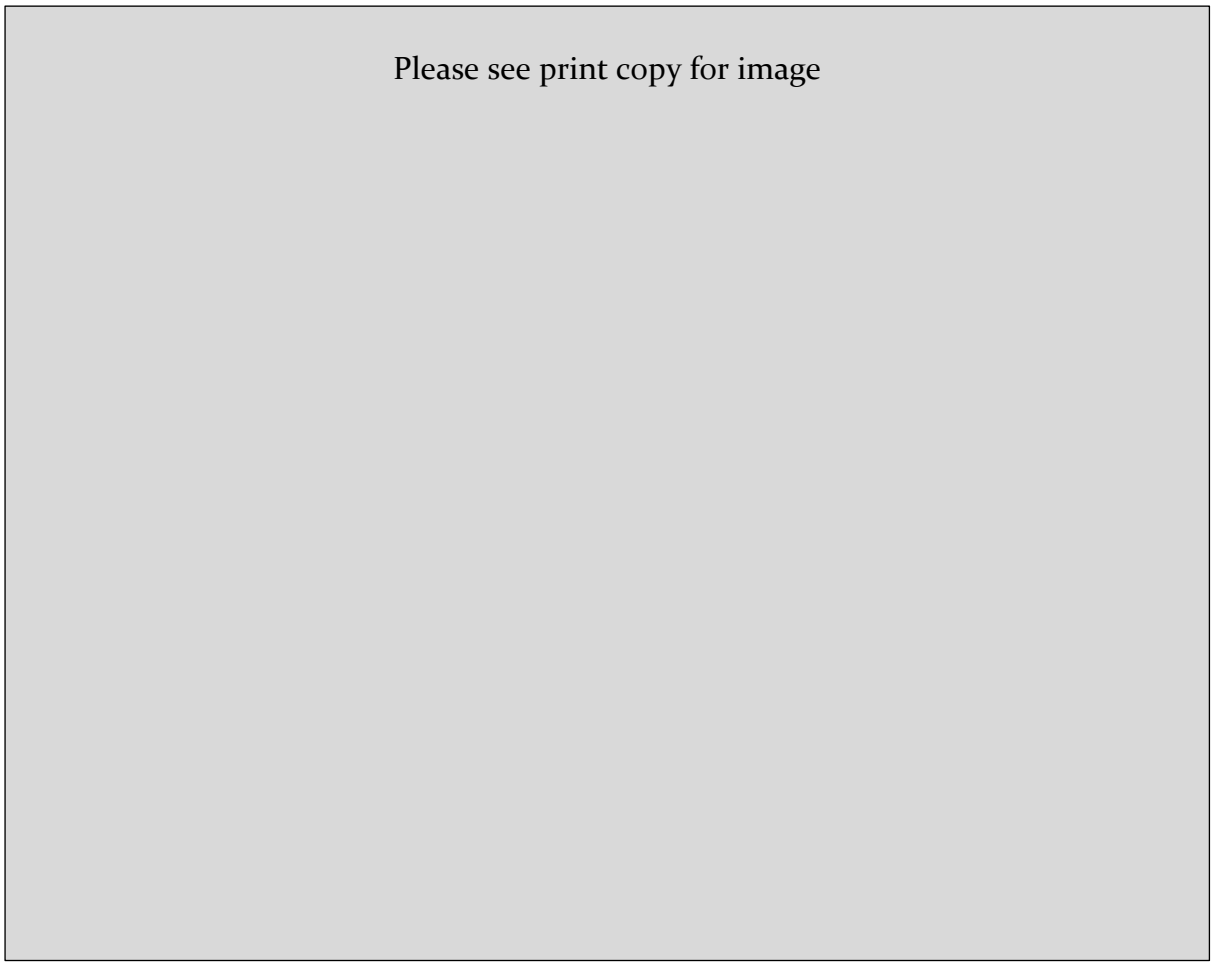


Figure 6.3: The Year 5 classroom

All lessons were observed in Abbey's classroom, as shown in Figure 6.3. In each observation of Abbey's lessons, the units of study reflected outcomes from the 1998 syllabus (Board of Studies NSW, 1998). The focus of Lesson One was using comprehension strategies in the context of the text being studied, *Shatterbelt* by Colin Thiele (1991). In Lessons Two and Three, Abbey used text extracts from a commercial reading programme text, *Desert Centred* (*Desert centred*, 1992), as a resource. The focus of Lesson Two was the identification of literary devices and language features to support the students' understanding of a poem. Lesson Three was similar in focus to Lesson One, where the students used comprehension strategies to demonstrate their understanding of the text. Figure 6.4 illustrates the sequence of lessons observed. To

provide the reader with an insight into the teacher and student activity across the duration of the lessons, each has been outlined in greater detail. Lesson One is illustrated in Table 6.1. Lessons Two and Three are included in Appendix I. Furthermore, a descriptive summary of Lesson One will provide a detailed analysis of comprehension events as they occurred. This lesson has been selected, as it provides an insight to Abbey's position and interpretation of comprehension and comprehension instruction in her practice.

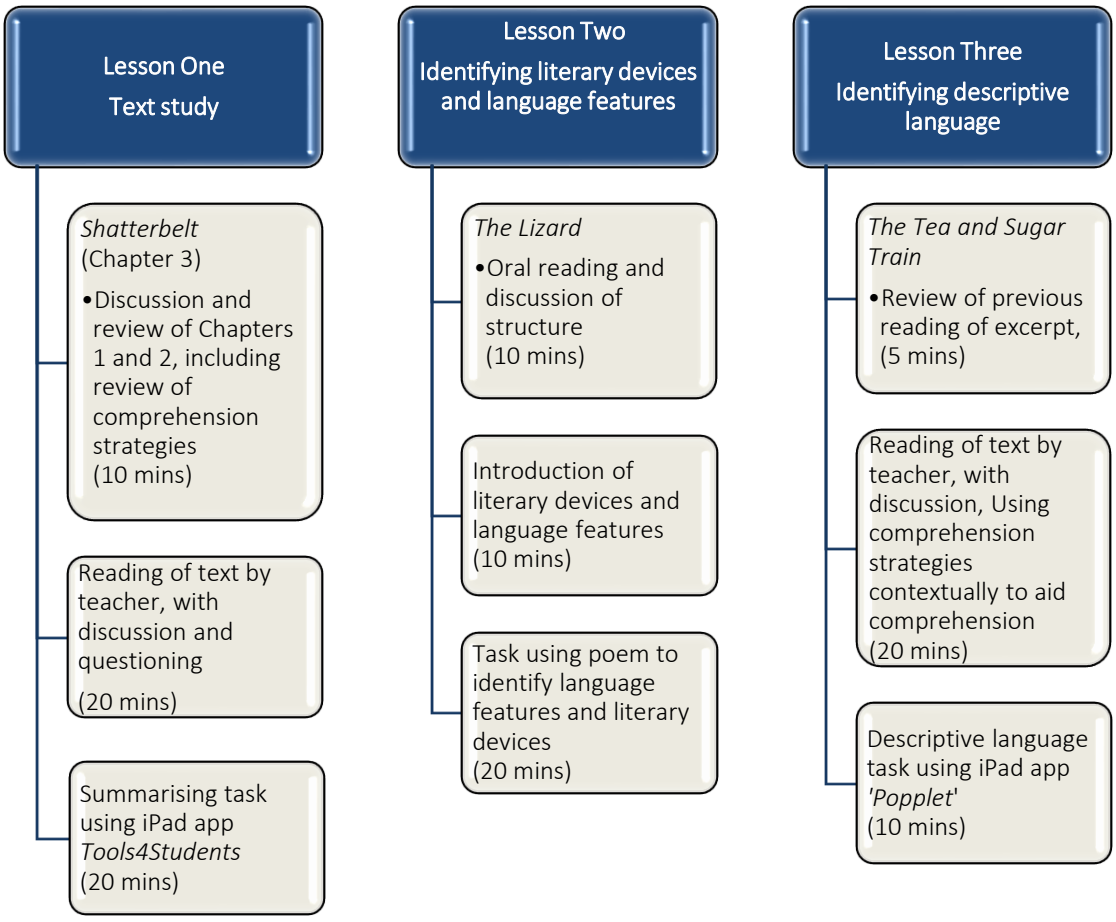


Figure 6.4: The sequence of lessons observed in Year 5 English

Teacher and student participation in Year 5 English

Duration	Teacher activity	Student activity	Resources
5 mins	Review content of the previous lessons (Chapters 1 and 2 of *Shatterbelt*), reviewing the term 'summary' and prompting students for details	Provide a definition of 'summary' and then share summaries written previously	Student workbooks with printed copy of graphic organiser (22 'Summarise') from app *Tools4Students*
4 mins	Explicit review of the comprehension strategies taught to date. Direct students to visual prompts	Define comprehension strategies, using appropriate metalanguage	Small cards on whiteboard with names of comprehension strategies
15 mins	Read Chapter 3 of *Shatterbelt* to the students, drawing attention to vocabulary and asking and responding to student questions as needed	Ask and answer questions and clarify new vocabulary	Individual copies of *Shatterbelt* by Colin Thiele
2 mins	Explicit questioning about Chapter 3 (characters, setting, time)	Answer questions	
5 mins	Explain summary graphic organiser to students and provide examples of summary task	Work in small groups to complete summary in work books, using headings 'who', 'what', 'when', 'where', 'why'. When complete use iPad app *Tools4Students*	Student iPads – one between three students app *Tools4Students* (22 'Summarise')
3 mins	Respond to student question about phrase 'silent violence'. Prompt students to use context of phrase in text, and to recall previous discussion about this phrase	Contribute to discussion, answer questions	
15 mins	Monitor the students and scaffold learning	Complete set task	iPad student workbooks copy of text

Table 6.1 Year 5 English - Overview of teacher and student participation in Lesson One *Text study*

Lesson One – Text study

In Lesson One, which is outlined in Table 6.1, Abbey began by reviewing the students' previous learning of comprehension strategies, using the novel *Shatterbelt* by Colin Thiele (1991) as the context for understanding.

Abbey's usual practice is to read aloud to the students at the beginning of each lesson to 'set the scene' and provide the opportunity to 'activate prior knowledge' of the text. This, she explains,

> *"allows them (the students) to identify things like fluency and reading to the punctuation and reading with expression and all the things that I want to see them doing. It's important to model it for them and discuss that with them and then let them have a go. I do that at the beginning of every lesson; I'll start and read a little bit to them. It also kind of gets momentum happening, it gets them firstly interested and then, when other people are reading, they seem to flow a bit better on…"*

As she reads the chapter aloud, Abbey draws the students' attention to aspects of the vocabulary that may be unfamiliar, stopping at different points to respond to students' questions or to clarify any unfamiliar vocabulary contextually, modelling to them strategies that she engages to aid understanding of the text:

> *"it's such a great opportunity to discuss lots of words …… just words in context and being able to teach them… we can use some of the strategies that we are teaching."*

On the class whiteboard were displayed small posters to aid the students' recall of the comprehension strategies which had been explicitly taught earlier in the term from the 'Strategies for Comprehension for informative texts' resource. Abbey explained that these aided students learning, as *"some of the students in my class respond better to the visual."* Prior learning included instruction in strategies referred to in the literature and professional learning materials, such as predicting, inferring, monitoring and clarifying, making connections, activating prior knowledge, visualising, vocabulary, summarising and questioning. As I observed the lesson, it was evident that many of these strategies

were being used by Abbey in her instructional talk. She engaged in an explicit review of each strategy with the students very early in the lesson. Abbey specifically prompted students to use the comprehension strategies learned, directing their attention to those that were contextually relevant at the time: *"I put them up on the board so that we can keep thinking about them."*

Abbey's specific instruction and review of the strategies with her students indicates that she views comprehension knowledge as curriculum content. Abbey explained her reasoning behind the choice of strategies focussed upon in the lesson:

> *"The key strategy, the predominant one, that I focused on all term is "summarising" and being able to create accurate and useful summaries. That's what the whole lesson, I guess, was based around but there were a lot of other strategies that we use when reading as well."*

Her focus on these strategies was a deliberate choice, as Abbey,

> "*wanted the students to understand that the strategies weren't being taught to them just in isolation because that was what we were doing at the time (in Term 1) but that they were critical strategies that they could use in every text that they read from then on."*

Abbeys' practice can be examined within the organisational principles of the semantic codes. A transcript of the analysis is located in Appendix J. To assist the students to understand the concept of summary, Abbey recaps with the students (Turns 3-15) the elements of a summary (SG⇧), prior to drawing upon a piece of work completed in a previous lesson by a group of students (Figure 6.5). She explained to the class (Turn 21) that the example was, *"very thorough and a really good example of telling us all about what happened in Chapter Two."* (SG⇧)

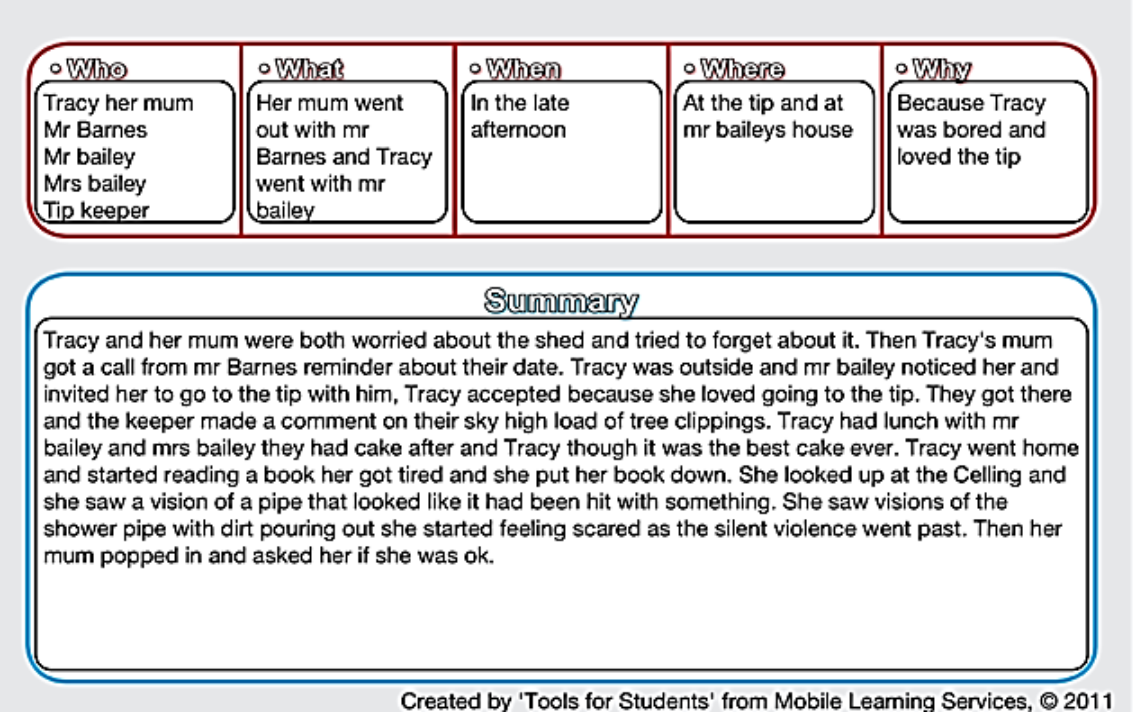


Figure 6.5: Year 5 student work sample of graphic organiser from *Tools4Students*

Of interest at this point was Abbey's focus upon 'unpacking' the phrase, 'silent violence', from the text. This teaching and learning sequence is visually represented in Figure 6.6. She engages in explicit instruction of inference as comprehension knowledge (Turn 23), working with the students as they use context and literary devices such as metaphor, to assist their understanding of this section of the text (SG⇧). Abbey elaborates on the students' response, using specialised terms such as 'infer' and 'context' to support their understanding (SD⇧). As this discourse continues, there is a weakening of the semantic density (SD⇩), as Abbey provides a context for the metaphor 'silent violence', encouraging her students to recall previously learned strategies of inference (SG⇧):

> *"Silent violence. Remember we talked about what that actually meant. Who remembers what that meant in context? That was one of those pieces of the writing that we could infer meaning from. It didn't make a lot of sense – silent violence – but within the context, we understood it. Do you remember?"*

The students respond with their interpretations and elaborations (Turns 24, 26, 28), providing suggestions such as, *"it was like there was violence, but you can't hear it……we were silent, and the pipes are violent and moving a lot …the sound would be like shaking"* (SD⇧). Abbey continues to repack the concept (Turn 29), affording students opportunities to generalise their understanding, that specific vocabulary and the use of comprehension knowledge can aid understandings of texts (SD⇧):

> *"That's right, because what she was talking about with the silent violence was the shaking pipe, wasn't she? She was saying that it seemed violent, what she could see seemed scary and a bit violent. It wasn't violence like people hurting each other but just what she could actually see was making her feel a bit scared. 'She saw visions of the shower pipe with dirt pouring out and she started feeling scared as the silent violence went past.' Then her mum popped in and asked her if she was okay."*

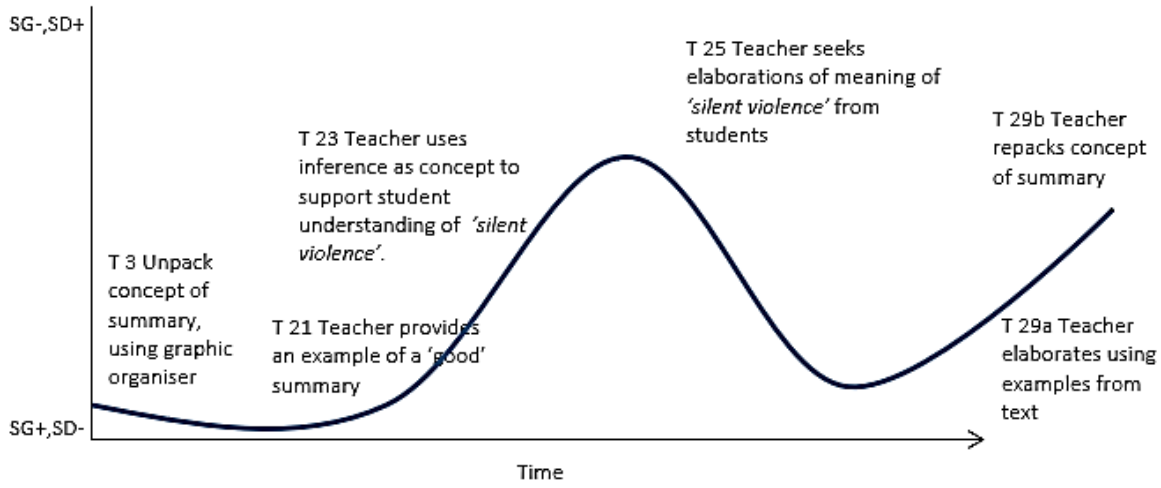


Figure 6.6: Semantic wave in teaching and learning comprehension in Year 5 English

Abbey actively assisted the students to make connections, between what had been previously learned in the structured comprehension programme earlier in the year, and the content in this lesson:

> *"Earlier in the term one of the first lessons taught, I just focused on summarising. We did verbal summaries, some dot point summaries in our books and just broke*

it down in a few different ways, which was great and appealed to some of the students, and different students were good at different types of summaries."

Abbey explained the purpose of summarising as a comprehension strategy, repacking the concept (SD⇧) and reviewing a scaffolded example (SG⇧) prior to the students beginning the task (Turn 29). She linked the purpose of the lesson (writing a summary using a graphic organiser) to the text by using specific questions, such as who, what, where, when and why, to scaffold the students' learning (Figure 6.7).

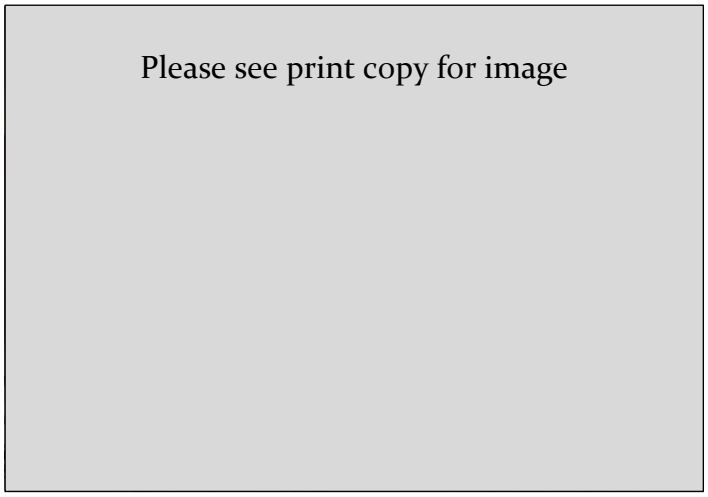


Figure 6.7: Scaffolding learning in Year 5 English using a graphic organiser from *Tools4Students*

She explained:

"I wanted my class to understand that summarising is a great way of retaining what we're reading and gaining a real understanding of what it is that we're reading. I focused on that as well because it can be approached from many different aspects; there is the verbal summarising and we can write it, we can put it into the graphic organiser like we have…. if they can understand how to summarise things, not just these types of texts, but also things they're doing in class, it's just a critical skill."

Evident in her teacher talk is the use of the appropriate metalanguage required, with explicit and overt references to comprehension strategy terminology such as making

connections, inference, summarising and predicting. Privileging the knowledge codes, her pedagogical approach facilitates the students' learning and ensures that,

> "*they know what those strategies are, what they're called and how to refer to them so that, when those things come up like "inferring" – they know what that means without me having to explain it every time and they can identify that that's what they're doing. I've even got them up on the board for them to be able to just look at and be able to remember."*

As the lesson continued, the students worked individually, first recording notes in their workbook using the key questions asked earlier in the lesson (who, what, where, when and why), then in small groups, organising this information into the graphic organiser app *Tools4Students* to create a summary of the text. The graphic organiser selected by Abbey in this lesson (Figure 6.5) supports the students' learning, as,

> "*it helps to scaffold their summary by first asking them the "Who", the "What", the "When", the "Where" – all of those questions and they can fill those boxes in and then they've got a scaffold already for their summary."*

Many of the students were keen to work on the iPads and were distracted by the workbook task, asking Abbey when they could use the iPads. Her knowledge of this class influenced the pedagogical choices made here, as she was aware that often only one student would complete the task while the rest of the group made no contribution. Abbey explained that she wanted the students to demonstrate their own understandings first before moving into small group work using the iPads. The use of technology (iPad) for the concluding session of the lesson was a deliberate one, as Abbey determined that, *"the Tools4Students app has a very clearly defined structure and scaffold to guide the student responses and to make them think about the text."*

When asked if Abbey observed any evidence of the students engaging in using the strategies taught, she responded:

> *"...throughout the grouped part of the lesson, the modelled, guided part, I'd stop every so often and ask different students in the class and then they would verbally*

respond using the strategies they were being taught. Then when they went into the smaller groups to create their own summaries, again I would move around and be questioning where they were up to and what have they found out and how did they find those things, and get them to both verbalise it to me in conversation but also then show me through their graphic organiser how they are using those different strategies."

It was evident to myself, as an observer, that the students were using strategies such as predicting, summarising and inference, with support from Abbey who prompted the students through her questioning to use the strategies, and elaborating upon the responses given.

Interpretive summary of teacher practice and comprehension instruction

Abbey understands comprehension to be the process of making meaning across all curriculum areas she teaches, not just in English. She views comprehension as contextual and cross curricular, where there is value in seeking meaning rather than just decoding. She considers that comprehension instruction is closely linked to all content, as it "*quite closely related to and goes very much hand in hand"* with other subjects she teaches.

Abbey's practice is supported by the beliefs and understandings she holds regarding comprehension, and she considers comprehension instruction as an important element of her practice:

"I'm here as a teacher to teach the students how to do those things that eventually should come naturally, but they need the scaffolds and structures and the understanding of that to begin with and that's my role at this point for them."

Throughout each of the teaching episodes observed, Abbey engaged in practices that scaffolded the students' learning and understanding of content. She consistently reviewed the previous learning, introduced new content in a guided manner, followed by students completing independent tasks. Abbey scaffolded her students' learning by

engaging in conversations with them, asking questions and encouraging them to demonstrate their understanding. In each of the lessons observed, Abbey was the initiator of the discussion, guiding the teaching and learning activities in a pre-planned direction. The students were observed taking notes and responding to questions when asked. When the students asked questions, it was often at Abbey's request. However, some students were confident to speak out and ask questions without prompting.

Abbey's teaching and the discussions with students indicate that comprehension strategies are at play within this classroom. Comments made by Abbey reveal that she attempts to show a connection between the teaching of comprehension strategies and the use of strategies by teacher and students. This became clearer when she was asked about the comprehension strategies she observes her students using in class:

> *"I try to make sure that nothing in my classroom is taught in isolation. If we are talking about a strategy, I will try and incorporate those (such as summarising, predicting and inferring) into everything that they come up in, so that the students understand that reading and comprehension and those things aren't just in that one period a day in reading, that reading is in everything they're doing and if we can be really good at it, it will help in all areas."*

When viewed through the lens of the specialisation codes, Abbey's practice reveals a strengthening of the knowledge codes. Clear reference is made by her to the comprehension strategies and how they may be utilised by the students as they engage with the texts in English. Strategies taught include *activating prior knowledge, predicting, making connections, inferring, questioning, self-monitoring and clarifying, visualising, summarising* and *synthesising*. In each lesson observation, the metalanguage of the strategy was articulated to Abbey's students, together with her reasoning behind a strategy's selection, where she modelled how it aided her understanding. This, in turn, represented further instruction on the strategies. She prompted her students to use the appropriate metalanguage as they discussed ideas and concepts about the texts being studied. Throughout the data collection period, she encouraged her students to identify which strategy they may have been using and

questioned their reasoning, both to check student understanding of previous explicit teaching of comprehension strategies, and also to inform future teaching and learning. She explained:

> *"I wanted the students to actually understand that those strategies weren't being taught to them just in isolation because that was what we were doing at the time, but that they were actually critical strategies that they could use in every text that they read. I've even got them up on the board for them to be able to just look at and be able to remember."*

Differences in the pedagogical approach to teaching comprehension by Abbey compared to the practices of the English teachers in this inquiry were observed. Abbey consistently modelled and used comprehension strategies contextually in her practice, referring to them by name. This may be explained by the syllabus requirements for the students' stage of learning. Students were prompted to use these strategies and refer to visual resources provided in the classroom to aid their understandings. This pedagogical approach is of great importance to Abbey, as is the opportunity for discussion between herself and her students, and between the students themselves. She explained:

> *"I really try and promote a lot of discussion, and for a lot of the students that works really, really well; it's the students at that mid to lower end that really enjoy that interaction and then they can clarify what their understanding is."*

Abbey claims that her pedagogical practices support explicit comprehension instruction in English lessons, and she uses teaching strategies such as modelled and guided instruction. By contrast, she also engages in student-led practices to allow her students to explore the use of the strategies learned and to implement them contextually across all curriculum areas. Acting as a facilitator, she has supported her students to identify the links between comprehension strategies, as a specific area of knowledge which will aid their learning of the content being taught, thus indicating a code shift from knowledge to knower codes in her pedagogy. During the inquiry, she has remarked that some of her students have become more confident to make these connections themselves.

Case 2: Benita – Year 6 English

Comprehension as discussion

Benita understands comprehension to be the meaning made from any text which is read, viewed or heard and is more than the sum of its separate parts. *"Understanding the reading and understanding the whole text, not just bits and pieces of the text"* is important to comprehension and is supported by a student's understanding of "*the vocabulary, sentence structure, and text structure."*

In the curriculum domain of English, Benita maintains that, in the context of her practice, comprehension should be taught to "*build their capabilities"* as the requisite comprehension skills and strategies that her Year 6 students require, to respond to, interpret, analyse and evaluate the texts presented in the curriculum, continue to develop and require further instruction.

During the data collection period, Benita implemented lessons based upon the outcomes of the 2012 syllabus. The syllabus makes explicit reference to the comprehension skills and strategies to be taught. This has impacted upon Benita's practice, as she stated: "*we have to teach them the strategies. I can only see by explicitly teaching strategies they're going to improve."* Privileging the knowledge codes, the comprehension outcomes of the syllabus guide the specialised knowledge that Benita states she explicitly teaches her students. The perceived clearer direction from the new curriculum has prompted Benita to become more explicit in her instruction in comprehension:

> *"I now explicitly teach strategies in Term 1 - more specifically in Term 1. I've started differently so I know they've got those strategies so that they can actually go back to and reflect on (them)."*

In addition, in Term 1 Benita used 'Strategies for Comprehension for informative texts' as a resource to facilitate the instructional content in Year 6 English (as did Abbey, teaching Year 5). In determining the instructional sequence of the strategies identified in the programme, Benita considered the relevance of the strategies to be taught to

other curriculum requirements at the time. Of equal importance were the current and perceived future needs of her students to acquire and develop the 'tools' to understand the syllabus content:

> *"Apart from having to understand what you're reading, this is what we need to know, this is what I'm telling you that you have to know. It's because I want them to actually ultimately enjoy what they're learning or be interested in something they may not have thought of before."*

Benita's beliefs and understandings about comprehension and comprehension instruction and its 'centrality' to English underpin the teaching of comprehension in her class. Benita views comprehension as encompassing all aspects of the English syllabus, stating:

> *"Well, it's in your reading, it's in your writing, it's in spelling, it's in... It's everywhere. It's all around. I think all aspects you have to know. Yes, it's all over it."*

Benita is cognisant of the value of comprehension across curriculum domains, explaining: *"I think reading and comprehending – it's vital. I think everything relates around comprehending information; maths, science, HSIE, everything. It's a holistic approach."* Holding similar beliefs to Abbey (Case 1 - Year 5 English) to the cross-curricular nature of comprehension and comprehension strategy instruction, Benita believes comprehension to be,

> "*the understanding of what you are doing. It is how you interpret what you have read or experienced, and then how you go on to apply it (the interpretation) as per your understanding of the topic, be it English, Science or Mathematics as examples."*

In Benita's practice, the specific instruction of comprehension strategies and their application in English and across other curriculum areas is highly valued. *"English is so integrated into History and Science. I use a lot of those strategies I use in reading comprehension in History and Science."* She believes her students require explicit instruction in comprehension in all disciplines. When viewed within the organisational

principles of the specialisation codes, Benita's beliefs and understandings of comprehension in her practice reflect the knowledge codes, where specialised knowledge forms the basis of achievement.

The Lessons

I observed Benita across three, fifty-minute lesson periods, at times nominated by her. The lessons were of forty to fifty-minutes duration, due to the late return of students from specialist lessons or other 'housekeeping' matters. All lessons were observed in Benita's classroom (Figure 6.8).

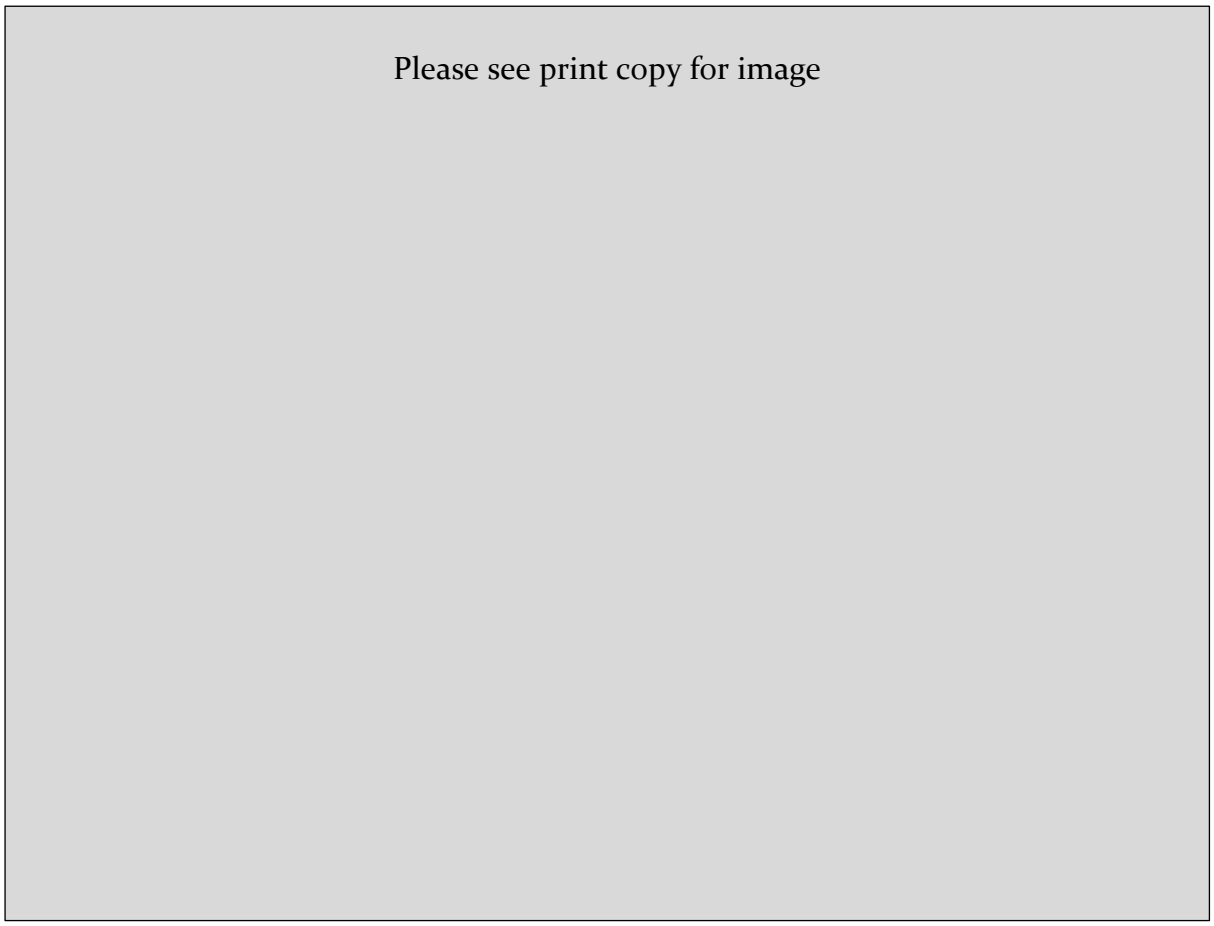


Figure 6.8: The Year 6 classroom

The first lesson observed focused upon using comprehension strategies using a short text, *Wheel Away* from a website, *Literacy Planet* (*Literacy planet*, 2011). In the second and third lessons, the text, *Holes* by Louis Sachar (2000), was used as a resource. In Lesson Two, the focus was upon identifying key elements of the text read to that point in time. Lesson Three was a continuation of Lesson Two, where the students used

comprehension strategies to demonstrate their understanding of the text to compare and contrast the characters.

In each of the lessons observed with Benita's class, the syllabus outcomes for the units of study differed. Lesson One, a text study using a web-based resource, referenced the previous syllabus outcomes (Board of Studies NSW, 1998); while the unit of study, *Holes (Sachar, 2000)*, which explores friendship and adversity (Lessons Two and Three), references the 2012 syllabus outcomes. Lessons One and Three are included in Appendix I. Figure 6.9 illustrates the sequence of lessons observed. To provide the reader with an insight into the teacher and student activity across the duration of Lesson Two, it has been outlined in greater detail, as illustrated in Table 6.2. Furthermore, a descriptive summary of Lesson Two will provide a detailed analysis of comprehension events as they occurred. This lesson has been selected because it provides evidence of Benita's position and interpretation of comprehension and comprehension instruction in her practice.

In this class, the novels and texts that the students study throughout the academic year were 'hard' copies and not available on their iPad through iBooks. Benita determines how the iPad will be used in the lessons. She considers *"the use of iPads as a wonderful tool, especially for students in this technological era."* In the lessons observed, Benita did not utilise the iPads, preferring the students to record their thinking on the worksheets provided or a teacher-prepared graphic organiser. Her reasoning for this pedagogical choice not to use an iPad as an instructional tool was based upon her lack of knowledge and skill at the time, *"of how to do this practically and easily, as they were new and not one to one at this stage of their implementation into the classroom."*

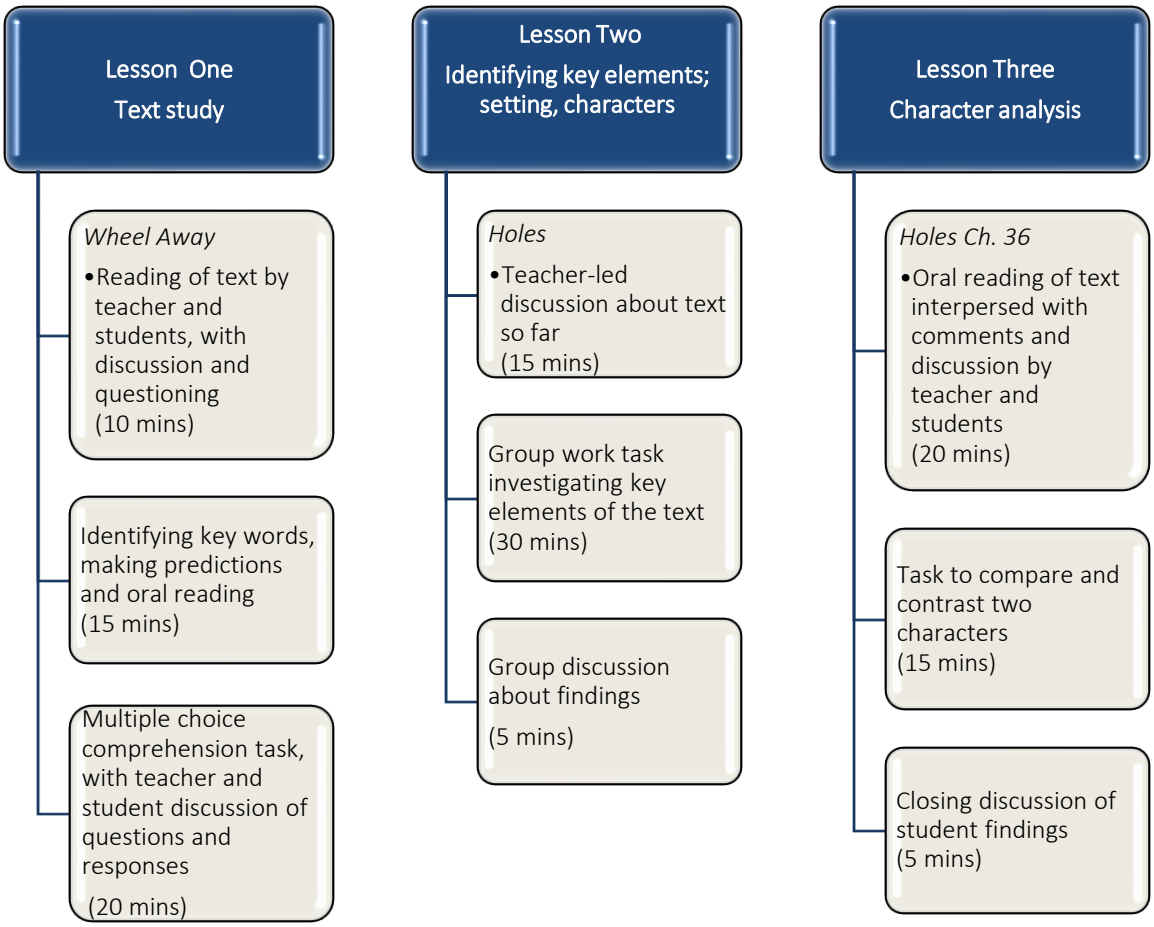


Figure 6.9: The sequence of lessons observed in Year 6 English

Teacher and student participation in Year 6 English

Duration	Teacher activity	Student activity	Resources
5 mins	Lead discussion about the text, questioning students about their understanding of the events and characters	Respond to questions and participate in the class discussion	Individual student copies of *Holes*
10 mins	Introduce and explain the task to explore four different aspects of the text	Ask clarifying questions as needed	Teacher-made task sheet
30 mins	Assist students as they complete the task	Work in small groups and respond to each aspect	Individual student copies of *Holes* Teacher-made task sheet
5 mins	Lead discussion with students as they share their work	Provide examples to demonstrate their understanding of each aspect of the text explored	Completed teacher-made task sheet

Table 6.2: Year 6 English - Overview of teacher and student participation in Lesson Two *Identifying key elements*

Lesson Two – Holes - identifying key elements; setting, characters

This lesson is based upon outcomes from the 2012 English syllabus. As stated previously, Benita's practice in comprehension instruction has been influenced by her understandings of the syllabus outcomes for comprehension in the 2012 curriculum.

The novel *Holes* by Louis Sachar (2000) is used contextually to support students in their learning about setting and character development in narrative texts. Specifically, Chapter 36 is studied in this lesson. The lesson begins with Benita asking students to recall the events of the previous two chapters read (Chapters 34 and 35). Her aim is to probe the understandings the students have made so far, questioning them to think beyond their literal interpretations. In addition, she aims for the students to identify the significance of the relationships between the characters and the importance of these relationships upon the developing story line,

> *"because I didn't want to move on without them understanding if they missed that relationship with Zeroni and Yelnats, … it still makes sense, but I think the finer points of that book, there's so much hidden in that book. I mean, that wasn't hidden; it was out there but I still felt if I didn't actually get that one across they'd miss that part of the story."*

The instructional sequence for this part of the lesson is bound by the context of the text being studied. A transcript of the analysis is located in Appendix J. Using the semantic codes, it provides an example of semantic gravity, where meaning is based in the context in which it occurs. In this example, the context presents as the key elements of character and setting in one chapter of a text. The student responses show a literal understanding of the characters and setting, with no elaboration or inference beyond the text. At this point in the lesson, Benita was not observed 'repacking' the ideas and concepts to facilitate the students' understandings of the key ideas in the text and their relevance to the underlying themes.

The students contributed examples to the discussion, *"Zero's real name is Hector Zeroni"*, justifying the response with an example from the text as requested (Turn 2):

"because of Madam Zeroni……she helps Stanley's great, great grandfather get up the hill every day." (Turn 6). The initial responses remained literal (SG⇧), with no reference to the themes of the text or evidence of deeper thinking. Benita used questions or comments when responding, aiming to facilitate further discussion from the students. She used some specialised language to support the students (SD⇧), asking, *"what led to that circumstance?"* (Turn 21), and "*why is that line significant?"* (Turn 27).

Benita and her students engaged in discussion, with questions about the key elements being raised by all participants. Benita's intention for the lesson was for the students to justify their responses, throughout the discussion. She prompted the students to use evidence from the text to support their thinking (SG⇧), asking the students to *"support your answers with evidence from the story"* (Turn 75), something I did not observe in Lesson One. She explained: *"I'm trying to get across to them, you need to justify."* This was achieved, with the student responses remaining embedded in the context of the text. They were not able to refer to the abstract themes of the text, such as the importance of friendship, family relationships, fate and destiny, indicating strengthening semantic gravity for the duration of the discourse. This teaching and learning sequence is visually represented in Figure 6.10.

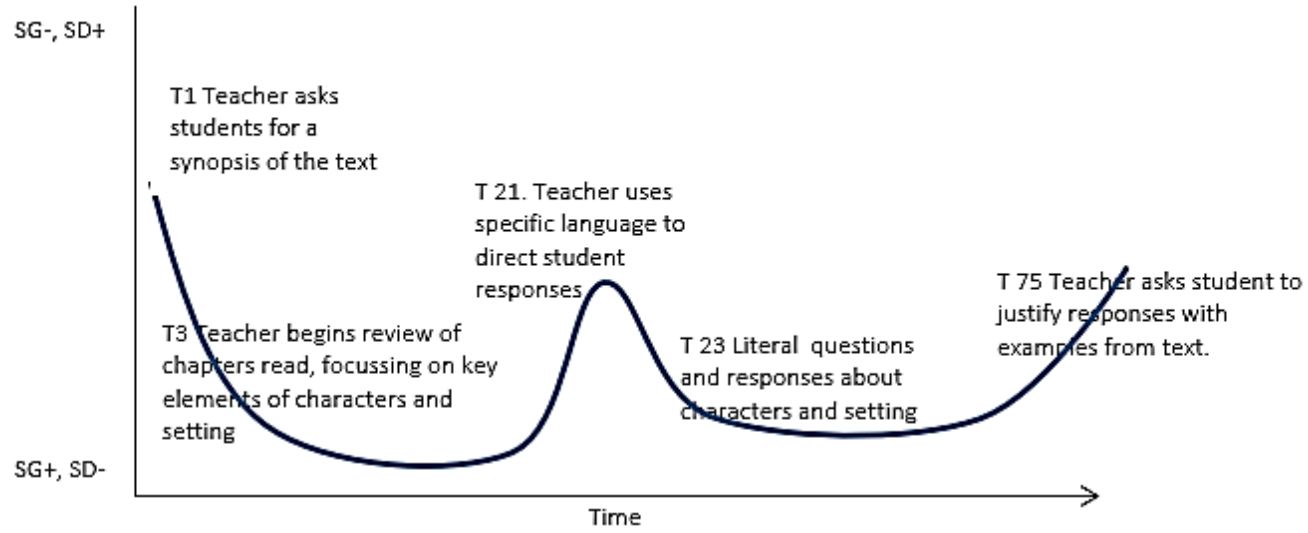


Figure 6.10: Semantic wave in identifying key elements of a text in Year 6 English

The group task was a key strategy for learning in this lesson (Figure 6.11), using most of the available lesson time. It required the students to consider the key elements of the text, specifically about the setting and the character Zero, and where the story may head to in the following chapters, as seen in Figure 6.12. Benita explained that she wanted the students to think on a deeper level about the text and,

> *"to think about realistic predictions... to infer things, to read between the lines and pick up... because a lot of the... especially in Holes, it's not straight out there for you."*

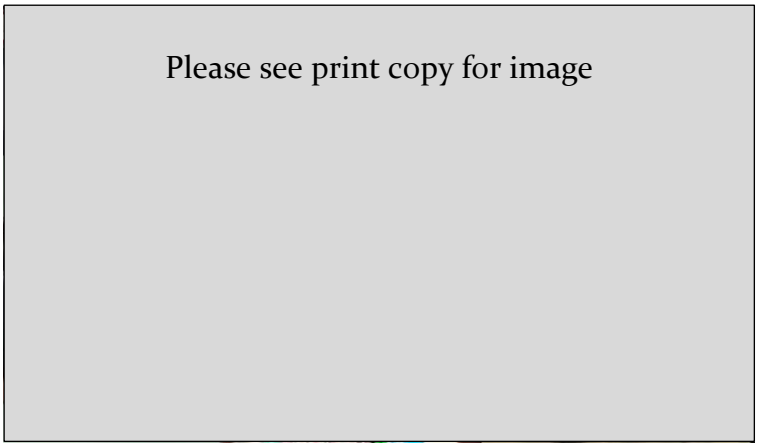


Figure 6.11: Students working collaboratively in Year 6 English

During the group task, the students discussed the connections between the main characters across the time period in the text, articulating their thinking with examples such as, "*When Zero told Stanley that his real name was Hector Zeroni.... it relates back to the past."* Benita guided the discussion, asking the students, *"Why is that significant? Are you going to expand on that? What led to that circumstance?"*, to support their understandings and to clarify their thinking:

> *"They've got to make those connections and so they're looking at the past and the present and they are trying to connect the two back and forth and I think we did do that quite well."*

Throughout the group task, Benita moved from group to group, questioning the students and probing their understandings, reminding them she was "looking for the

significance" of each of their responses. The students provided responses as required, identifying the significance of their answers with examples from the text.

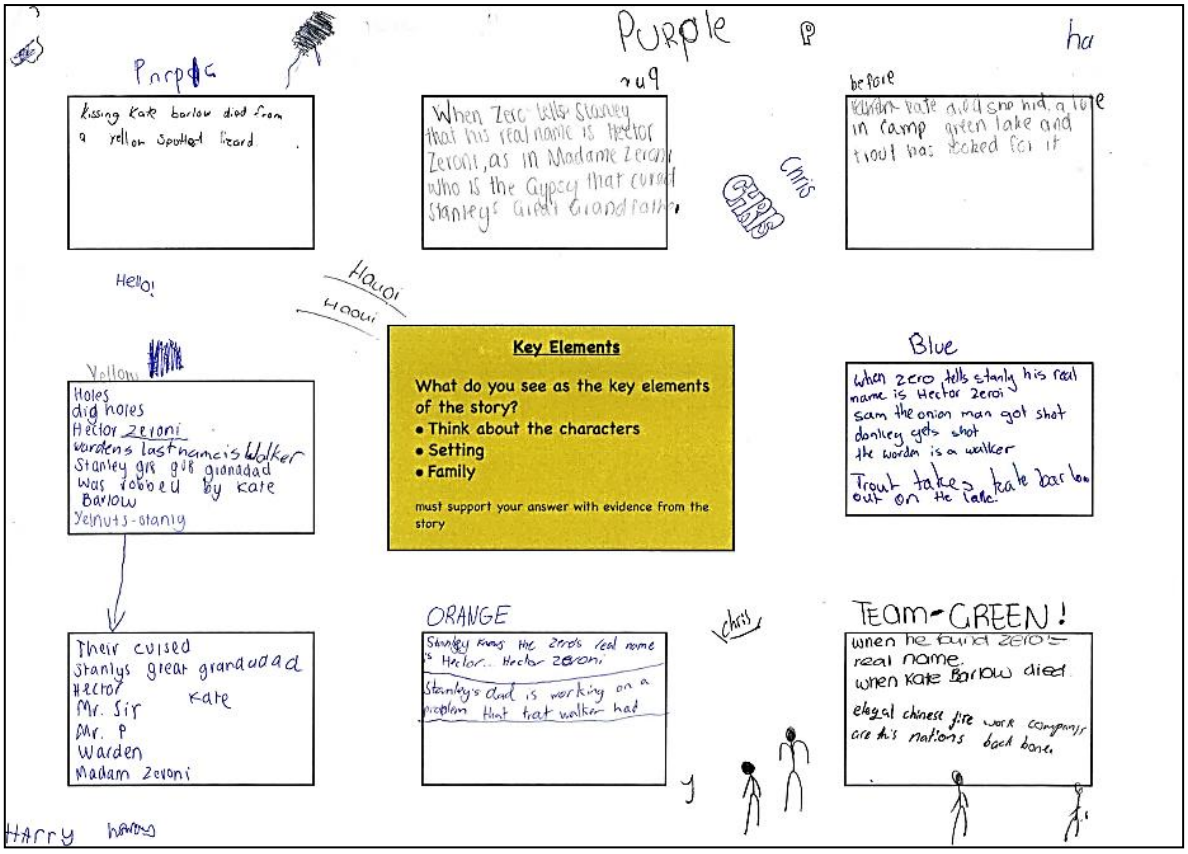
For example, in a small group context, the students discuss the character Zero and the other character's opinion of him. Initially, they think the nickname Zero is given because *"he is not intelligent."* Through reading the text, they later realise that *"Zero is a quick learner"* and he *"never got the education that he needed."* Benita guides the discussion (SG⇧), providing elaborations of the students' comments, for example:

> *"He didn't get the education that he needed. That's right. He couldn't read or write so they go, oh no, he's not intelligent… He was actually a very clever child wasn't he? His maths was awesome, wasn't it? So, he just needed to learn how to read and write. So, was he an intelligent boy?"*

The student responses, ideas and understandings of the characters and settings (Figure 6.12) remained grounded in the text (SG⇧) in this activity. This may be attributed to the students' interpretation of the task. The shared scaffold for the task provided direction for the students to answer the guiding questions. It was these questions the students focused upon, overlooking the request to identify the significance of the characters, setting and events previously discussed as a class. As Benita worked with each small group, she guided the students to identify the significance of the character or setting. This supported the students to achieve the aim of the lesson, which was to understand the significance of a character or setting in the text and provide examples from the text to support and justify their understanding.

Benita acknowledged that much of this lesson, and as part of her pedagogical approach, is spent talking with the students and listening to their responses, discussing different aspects of what is being learned:

> *"This particular class, I have found that verbal discussion works better than written. I just think they can express to me verbally better than they can write. We still write but, to me, what was more important was actually understanding what they were reading, not how well they could write that I suppose."*



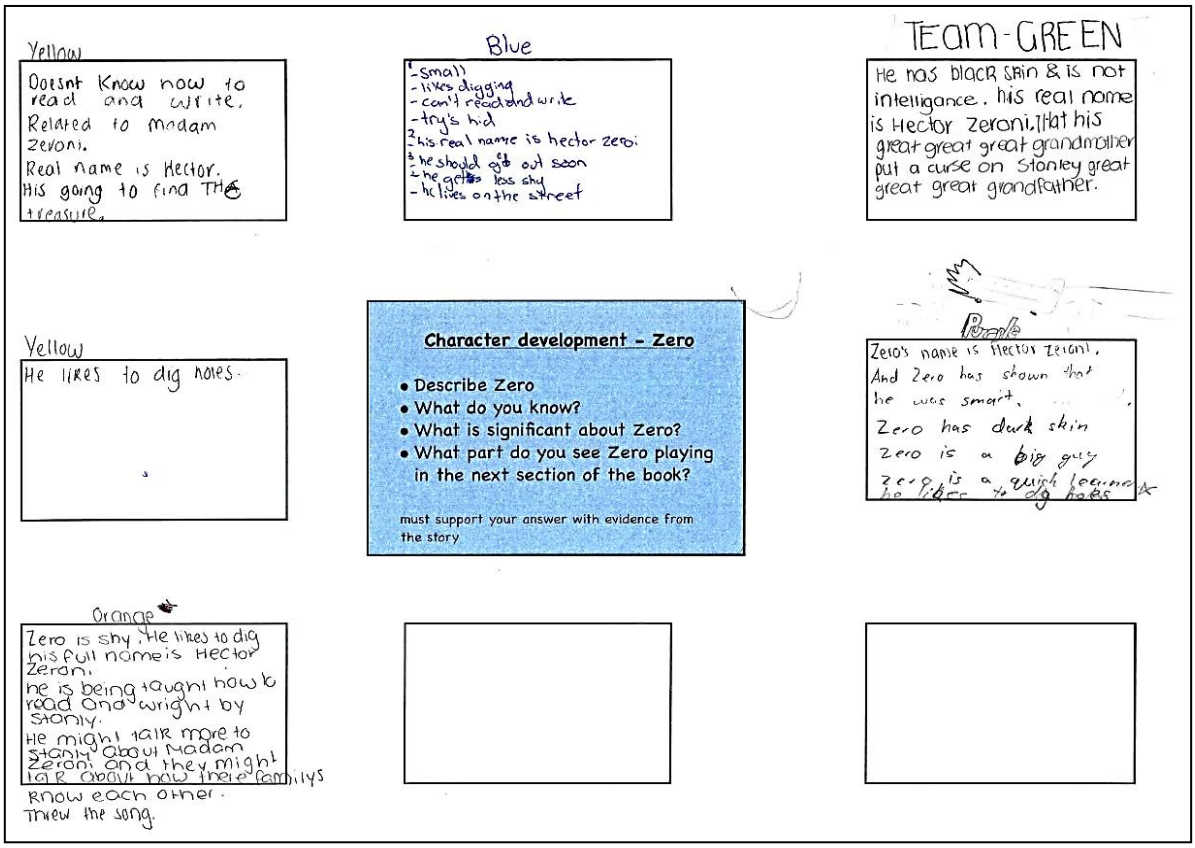


Figure 6.12: Year 6 English – identifying key elements of the text *Holes*

She continued to say that, *"a lot of my comprehension within class is discussion I'm big on talking and listening"*; and it is this pedagogical strategy that she utilises most frequently in her practice. Benita's holistic approach to comprehension across curriculum areas draws upon her disciplinary knowledge of school English. That is, teacher and students asking the 'right' questions and responding appropriately is a measure of success. Her application of these strategies in other disciplines, while appearing contradictory when considered as disciplinary knowledge in English, informs and guides the literacy practices she enacts in other curriculum areas. Benita emphasises the importance of questioning and discussion to develop her students' deeper understandings of the content she is teaching. This, she explains, is the strategy she implements consistently across all curriculum areas, as she considers the most important aspect of comprehension to be *"the understanding of what you're doing, why you're doing it and how to do it."*

In the lesson observed, as well as in others, she engages the students with the text and the task set, by,

> *"talking about it but also reading the question and understanding what the question is being asked and then talking about it within their small group and then at the end, talking about it together."*

Benita takes this approach to develop deeper thinking because she considers it best suits her class and their specific learning needs, because,

> *"It's the little things that they can recall and bring up. When you're talking to a student they think of something else, then I can ask them a question that follows on with their answer and it just takes it that bit further. I can feel where they're going, and I can work through that together. By having that talk, I think it furthers their understanding of what's happening in the book."*

When asked if Benita had observed any evidence of the students engaging in using comprehension strategies previously taught, she responded:

"It was in the results of what they were writing down and the discussion that was actually happening within the groups and then coming together afterwards……because they were pulling it apart. They had to infer things, they had to read between the lines. I think they were questioning themselves as well, because the nature of the book just led to that too."

Interpretive summary of teacher practice and comprehension instruction

Benita views comprehension as making meaning of the whole rather than the parts of the text. That is, comprehension of a text is more than the sum of separate parts. To facilitate her students' understanding of curriculum content, Benita believes they must understand the necessary tools to support their learning. She states that she achieves this through the explicit instruction of comprehension strategies and drawing upon them in class when teaching content. As a consequence of such targeted instruction, Benita has observed that the quality of class discussions as a pedagogical tool to support student learning has improved:

"Discussion I think comes first but then I think teaching the strategies explicitly actually brings that up another level. I think… yes, it's really tricky because I haven't always explicitly taught strategies. Now I do, because I find it helps, it really, really helps in what we do, and I found that the discussion has improved with that."

In each teaching episode observed, Benita enacts a range of comprehension strategies, such as acknowledging her students' prior learning and experiences, questioning and using key vocabulary in discussions, to scaffold student learning and understandings of the content and concepts being taught. The pedagogical approaches observed included individual assignments, small group tasks and whole class lessons.

Benita's explains that her extensive use of strategies such as questioning and discussion in her practice is in response to her own pedagogical preferences in meeting the learning needs of her students. *"What I can get from the children verbally is very important and I guess that's a part of my teaching – that discussion."* She acknowledges that she is the

initiator of the class discussions and guides the direction of the students' contributions using pre-planned questions, stating:

> *"I start the discussion and their responses then navigate the way… In my programme, there are questions that I want to answer. I may start at the first one and there's the list going down and I'll end up over here, but I still find that valuable learning. I might not have asked question number eight, but we got there."*

The data reveal a change in Benita's practice and focus in comprehension instruction across the data collection period. Initially, Benita used worksheets containing a short passage and questions sourced from education resource websites such as 'Literacy Planet' (*Literacy planet*, 2011) (Appendix K), together with a commercial programme as resources for comprehension instruction. The short passage and question tasks, while intended by Benita to teach comprehension strategies, were more an unintentional assessment of comprehension skills (Durkin, 1978, Ness, 2011) rather than comprehension instruction. Her choice of the web-based resource was perplexing and did not readily align with her stated understandings of comprehension. Benita validated her choice of resource as that it provided an example of, *"visual imagery……and an opportunity pull it apart and look at it"*, enabling discussion amongst,

> *"the boys in my class. It would have piqued their interest… it was interesting to those students who I knew struggle with just reading and answering questions."*

The use of a teacher-directed commercial programme for comprehension instruction provided both Benita and her students a framework for learning about comprehension strategies. She maintains that, while the content lacked context, it afforded her the opportunity to introduce comprehension strategies explicitly to her students:

> *"Even from just the beginning of the term, I'm noticing, by teaching them the strategies and working specifically in comprehension, I'm seeing more involvement in class, I'm seeing more risk-taking in the answering of the questions as well to me, which is showing more confidence in their abilities."*

As the data collection period continued, Benita was observed regularly referring to the comprehension strategies previously taught with her students and encouraging them to use the appropriate metalanguage. Her practice supported the explicit instruction of comprehension strategies in her teaching and learning programmes:

> *"I'm quite specific in what I'm teaching, and I do believe that they (the students) have to have those strategies. Yes, I believe in specifically teaching the strategies and I believe it's explicitly taught. I'd have to say yes, that's part of my teaching programme."*

I noted also that the content for the class lessons changed. Isolated passages and questions had been replaced with set texts as the context for instructional content, thus affording the students opportunities to contextually apply the comprehension strategies previously learned. Of interest is the shift in the specialisation codes as the data collection period continued. Initially, the content in Benita's English lessons privileged the knowledge codes, where the explicit instruction of comprehension and comprehension strategies was observed. Benita engaged in the explicit instruction of comprehension, having identified the relevant curriculum outcomes as a guide to indicate the specific knowledge she was required to teach her students. As previously noted, the introduction of the 'new' English curriculum provided Benita with background knowledge, or 'what to know', to support her practice in comprehension instruction. Over time, the comprehension strategies taught by Benita remained as part of the discourse. Observed was deeper questioning and conspicuous strategy use by Benita in English lessons. It was, as Benita remarked, a time of learning for her and her students:

> *"I like them to know what they're doing. I think comprehension is something that you do need to teach and teaching different strategies... because not every strategy is going to work for every child. By teaching a variety of different strategies and using different strategies, I think you can help more of the students. I do believe in teaching actual strategies."*

Emerging over time were assumptions by Benita that her students would independently select and use a contextually appropriate comprehension strategy as they participated in English lessons. *"I assume that I've taught those strategies and they will be implemented throughout the lessons by the children."* The shift in focus by Benita from explicit comprehension instruction to implicit understandings is reflected in the comprehension tasks completed by her students. Questioning and discussion remain at the core of Benita's pedagogy, and this aligns with her beliefs regarding comprehension instruction:

> "*Yes, we do a lot of talking… it's back and forth. I'll ask a question, they'll give me an answer and then I'll feed off that answer for the next question…. I'm not doing anything different in this that I didn't do in something I did last week or even earlier that day."*

The data reveal an increased emphasis in small group tasks where the students independently ask questions of each other and seek out assistance from Benita as needed. She perceived the continued questioning in her pedagogy as being explicit instruction in comprehension,

> *"to further their understanding, to deepen their understanding. I like them to have a bit more than just a surface content information; I want them to really understand."*

Benita has stated she has continued to teach comprehension, with the data showing a shift from explicit instruction to an increase in the use of the metalanguage over time. This aligns with a code shift in the specialisation codes towards the knower codes in her practice, and is supported by her perceptions of strategy use by her students in set tasks, where,

> *"They had to infer things, they had to read between the lines…. I think they were definitely inferring what was not written. I think they were questioning themselves as well because the nature of the book just led to that too, like, 'Where can this go? What's going to happen?'"*

Based upon her assumptions of the comprehension strategy knowledge acquired by her students, together with their understanding of the content and concepts of the texts, the data show an increase in the expectations she has of her students to use the comprehension strategies taught. "*They actually use the language of the strategy. To me, by them using that language they're gaining an understanding."* Using this premise, Benita considers that the students understand the concepts previously taught.

Case 3: Colin – Year 7 English

Comprehension as literary techniques

Colin understands comprehension to be a process of finding meaning beyond the text, where the reader must make inferences to understand what is read, viewed or listened to. He considers comprehension to occur when the students demonstrate an,

> "*understanding of the text, drawing inference from text, like the information that they can get out of it and then apply to questions or the real world."*

Colin views comprehension as predominately a question-answering process, where students respond with written answers to prepared questions. This reflects the nature of assessment practices in specialist curriculum domains in secondary school education, where written responses to set questions are highly valued as a measure of student understanding of content and concepts, privileging the knowledge codes. These questions may require short responses or extended written responses in the form of an essay.

The difference in perspectives underlies Colin's understanding of English as a curriculum subject and the generic literacy skills which students bring to English. In Year 7 English, Colin expects the students to have prior experience and knowledge of comprehension strategies, learned in the earlier years of primary school. Foregrounding the knower codes, these skills indicate to Colin the students' possess the ability to "interpret and evaluate information, identify main ideas and supporting evidence, and analyse different perspectives using comprehension strategies" (Australian Curriculum Assessment and Reporting Authority, 2013b p.12). Based upon this view, he does not engage in specific instruction in comprehension strategies referred to in the research

literature. Instead, he takes a disciplinary literacy approach, where the literary and writers' techniques are effective comprehension strategies in English. Colin states, "*in English we always look at the techniques used within the text"*; and it is these that he focuses his instruction upon. Clarence notes, "disciplinary educators seem to be principally concerned with educating students within specific disciplinary traditions, canons or ways of knowing" (2016 p.124). Colin's beliefs and understandings of comprehension hold with this perspective. He believes that comprehension is achieved through the understanding of the literary devices that authors use and revealed in the written responses of the students:

> "*I guess that's part of the comprehension strategy for me; to look at the meaning within the words, like the connotation, the metaphorical or the figurative language and try and get them to understand that and then apply it to the text.*"

Colin focuses upon writing as evidence of student comprehension, with comprehension occurring when a student understands the writers' techniques and purpose.

> "*If you teach them (the students) how to think and write it down effectively… and how to respond to a text…. they have to think conceptually about the idea that they've just been presented with*."

This, he acknowledges can be challenging as,

> *"often in English the challenge is actually to get them (the students) to write it out. It just takes a lot of practice for them to be confident to write things down."*

Colin values opportunities for discussion about the content and concepts in the unit of study between himself and his students in his practice. "*The collaborative aspect of working with the text together*," where ideas and understandings can be shared and elaborated upon in the classroom is of great importance to his classroom pedagogy. Colin encourages his students to ask questions, especially to verify their understanding of the vocabulary found in the text being studied. He views collaborative learning as a comprehension strategy. "*I like collaborative learning. I think it improves their reading*

and understanding." This, he says, affords him opportunities to gauge and clarify the students' understanding of the content and concepts.

Colin's understandings of comprehension and comprehension instruction underlie the teaching of comprehension in his class. He does not explicitly teach any comprehension strategies referred to in the research literature as part of his English programme, and acknowledges that he is unsure of what the strategies are, commenting, *"I don't know the names,"* continuing to state,

> *"We talk about in the class about activating their prior knowledge and connecting what they know. We do a lot of vocabulary work, we look at how to infer, we look at summarising, visualising so putting a picture in their head. A lot of predicting as well so those sorts of things."*

Colin's practice reflects the disciplinary perspectives of English as a subject, rather than instruction the generic comprehension skills he believes his students have learned in primary school. He places an emphasis upon the teaching of writing, literary techniques and text structure as a means for students to comprehend the content of the curriculum.

> *"It's important from a comprehension perspective to teach them the structure of writing. If comprehension also includes how the composer constructs a text, then it's really important for them to understand how the text is being constructed and manipulating them so that's – what's the term for it – critical literacy. See that's a goal by the end of high school to say "The text is manipulating you. You've got to realise how it's doing it, so you can respond to it in a certain way".*

Colin acknowledges with the introduction of the new English curriculum there is an increased strategy focus within the content compared to the 2003 curriculum. Aligning with his understandings of comprehension instruction, Colin considers these changes from the perspective of writing and literary techniques, noting the emphasis upon grammar and punctuation, rather than comprehension strategy.

The beliefs Colin holds regarding comprehension instruction differ to his understandings of comprehension. He states that comprehension can't be taught, but instead, comprehension is learned through practice by,

> *"just increasing the amount that they read and then trying to draw inference. A lot of it you can't teach either; you can't teach inference, but I think just familiarising them with text and making them (texts) increasingly difficult."*

As with each of the English teachers in this inquiry, Colin considers comprehension as an important element of the curriculum domain of English. He acknowledges the importance of comprehension, stating:

> *"it's probably one of the crucial things isn't it, because without comprehending the text… it's probably the initial thing that you do, so if you're teaching a poem or you're reading a novel, whether you get them to read in class or at home, the first thing you want to get them to do is to understand what's going on and then you delve into it deeper, whether it be the motives of the characters, or the techniques used by the composer."*

The Lessons

I observed Colin across three, fifty-minute lesson periods, at times nominated by him. All lessons were observed in Colin's usual classroom, as shown in Figure 6.13. The first lesson observed used the text, *King of Shadows* by Susan Cooper (2000). Initially, the students read silently, then they participated in a class discussion based upon set questions provided by Colin. This was followed by written responses to the questions. In the second and third lessons observed, Colin used the text, *Boy: Tales of Childhood* by Roald Dahl (1986). In Lesson Two, the focus was upon identifying language devices within the text. Lesson Three was a continuation of Lesson Two, where the students were required to write creatively using the language devices introduced previously.

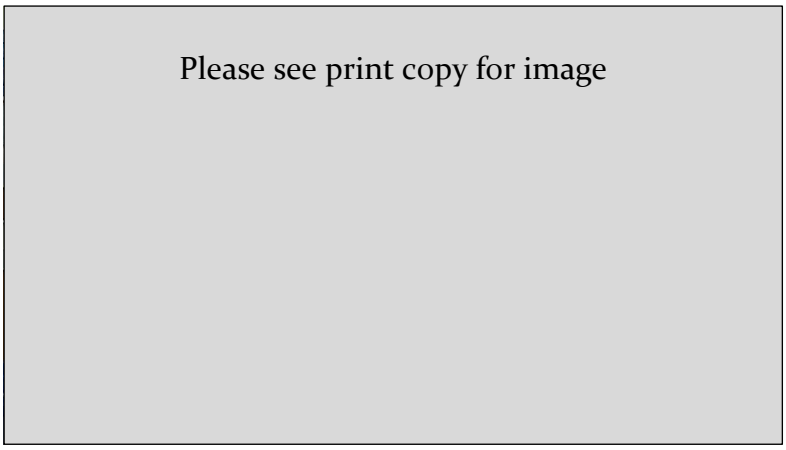


Figure 6.13: The Year 7 English classroom

The unit of study titled, *Introduction to Shakespeare*, using the text, *King of Shadows* (Cooper, 2000), in Lesson One, referenced the 2003 syllabus outcomes (Board of Studies NSW, 2003a), while Lessons Two and Three, using the text, *Boy: Tales of Childhood* (Dahl, 1986), was referenced to the 2012 syllabus outcomes (BOSTES NSW, 2012b). Figure 6.14 illustrates the sequence of lessons observed.

To provide the reader with an insight into the teacher and student activity across the duration of the lessons, each has been outlined in greater detail, as illustrated in Table 6.3. Lessons One and Three are included in Appendix I. Furthermore, a descriptive summary of Lesson Two will provide a detailed analysis of comprehension events as they occurred. This lesson has been selected because it provides evidence of Colin's position and interpretation of comprehension and comprehension instruction in his practice.

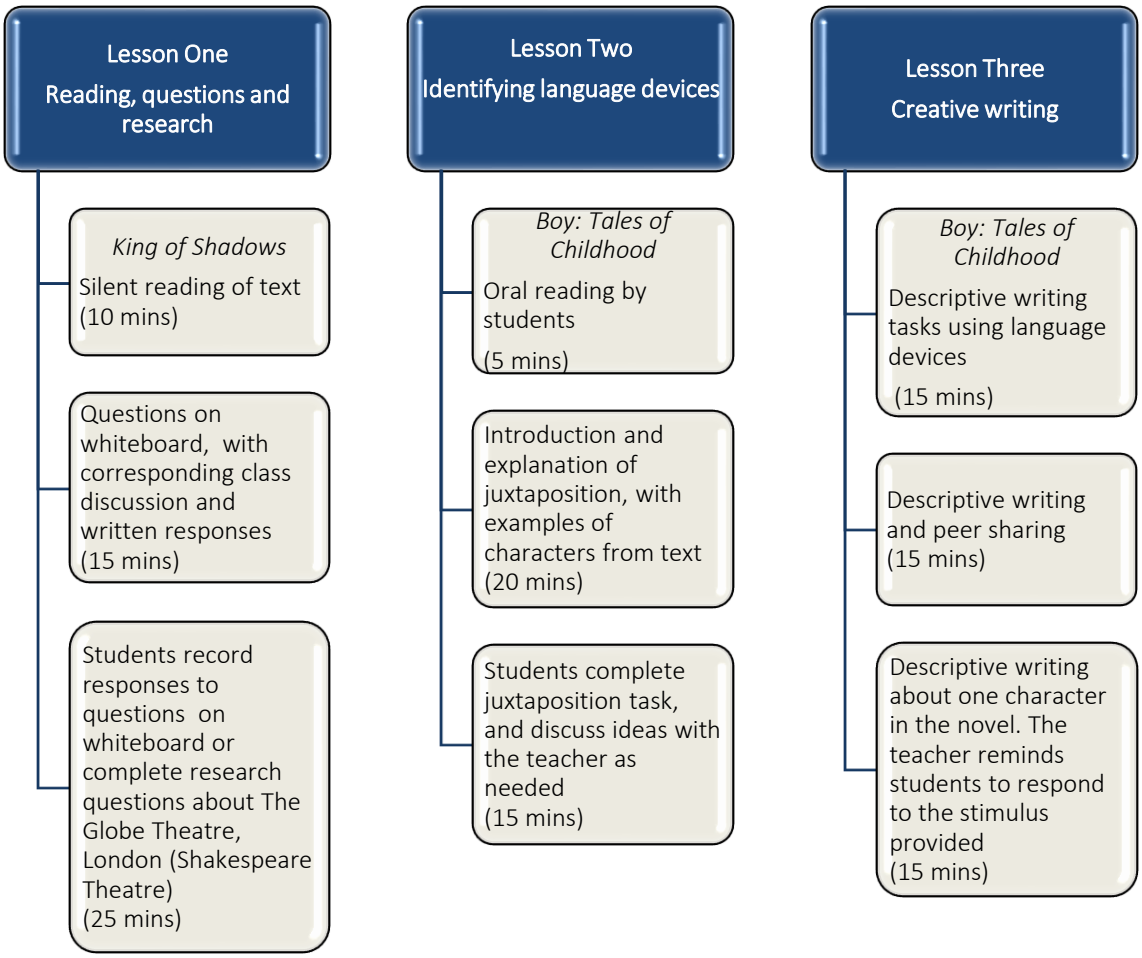


Figure 6.14: The sequence of lessons observed in Year 7 English

Teacher and student participation in Year 7 English

Duration	Teacher activity	Student activity	Resources
5 mins	Instruct the students to read aloud Chapter 22 'Corkers' of *Boy: Tales of Childhood,* taking turns around the class.	Read aloud when asked, and follow on silently	Individual copies of *Boy: Tales of Childhood* by Roald Dahl, e-book or hard copy
5 mins	Direct student attention to a PowerPoint presentation about 'contrast'. Review of prior learning about 'similes' and then introduction for the concept of 'contrast' as a writing technique.	Respond with answers to questions asked, and record answers in notebooks Demonstrate their understanding through examples	Student workbooks, teacher provided question sheet PowerPoint presentation
10 mins	Provide students with the correct metalanguage for 'contrast' - 'juxtaposition', providing a definition and examples from the text	Ask questions and record definitions in notebooks. Complete a table to show contrasts between two characters	Student workbooks, iPad, copy of text
10 mins	Lead a discussion with the students, asking them to identify contrasts and similarities between two characters discussed, before they complete the set task	Complete set task, and ask questions of the teacher as needed	Student work books, iPad, copy of text Teacher-prepared worksheet
20mins	Direct students to write similarities between characters, using PEEL structure	Complete set task, and ask questions of the teacher as needed	Student workbooks, iPad, copy of text

Table 6.3: Year 7 English - Overview of teacher and student participation in Lesson Two *Boy: Tales of Childhood - identifying language devices*

Some of the novels and plays the students study throughout the academic year are accessible on the school's MOODLE page and on the iPads through iBooks. In the lessons observed, Colin preferred the students to make notes in a workbook, rather than using iPad applications such as *Notes* or *Pages.* This pedagogical choice is based upon his belief that,

> *"I can quickly check how they are going and the parents can also check. It is much harder if it is done on their iPad to check their work."*

Colin explained that he prefers the students to use notebooks for class work rather than iPads in each of his classes, from Year 7 to Year 12, *"as currently the HSC is a written examination"*, and he considers that *"it is hard to find their responses to questions later or to find study material quickly on a device as compared to a book."* In addition, he believes that,

> *"the students do not mind using their iPad for research but in general class discussions and answering questions they tend to like to write it in a book."*

He does, however, prefer the use of technology for extended responses and essays, *"as the editing of an essay is far easier using technology than hand writing it. They can email it directly to me."*

Lesson Two – Boy: Tales of Childhood - identifying language devices

In Lesson Two, which is outlined in Table 6.3, the content focus of the lesson is *Boy: Tales of Childhood* by Roald Dahl. Colin uses this text to contextually teach about the language devices used by writers, primarily juxtaposition, through the examination of two characters, Captain Hardcastle and Corkers. His focus upon literary techniques aligns with Colin's understandings of comprehension and its instruction. A transcript of the analysis is located in Appendix J.

The lesson begins with the students taking turns reading aloud Chapter 22 from a hard copy of the text or an e-book on their iPad. Colin considers this an important aspect of the students' literacy skill development, and an aid to their comprehension, as,

> *"when they get difficult words, if they struggle over them, they're not only trying to decipher how to say the word, they've got to decipher it in the meaning and put it in the context of the sentence and the paragraph, so I think the better they can get in recognising the words and the meaning, just a little bit more confidence comes about then."*

As the students complete reading the assigned chapter, Colin questions the students about language devices, asking for examples in the text read, which the students

successfully do (Turn 2; 4; 6). He prompts the students to *"remember last week when we did similes and I said they enhance our understanding."* (Turn 11). No further elaboration is made by Colin prior to the next part of the lesson. Displayed on the whiteboard is a PowerPoint slide (Figure 6.15) which asks the question, 'What is contrast?' (Turn 14). This is the main concept for the lesson observed. Colin asks the students for their understanding of the term without context, where they provide brief responses (SD⇧). To support the students' understanding, Colin introduces a game-based activity using language and experiences the students are familiar with (SG⇧). Before moving on to an explanation of the term 'juxtaposition' (Turn 28), the students are engaged in a lively discussion as they share their understandings of contrast with peers and Colin. Discussion is a key feature of Colin's practice; and he explains:

> "*the class discussions, group work and even the pair work increases their understanding and it allows them to take risks without writing anything down initially. I think they've developed into a class that will say things and explore things, which is all you want them to do. I guess that's... usually what I try and do is get them to talk about things, get them to draw out deeper understanding, I might probe them a little bit more and then at the end of the lesson try and get them to write."*

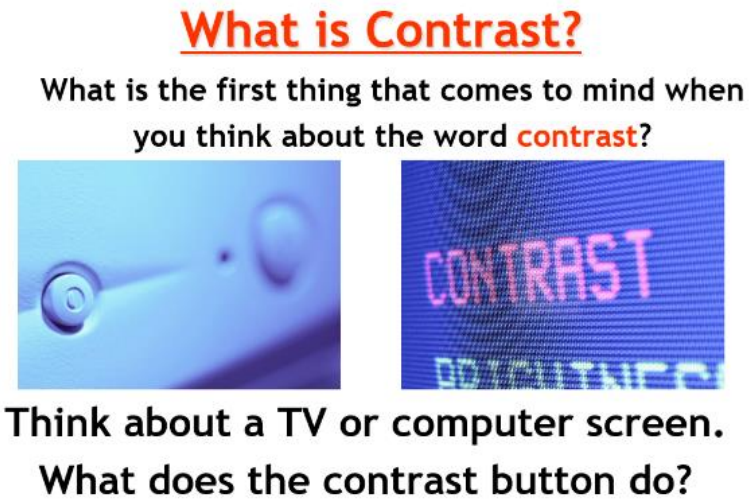
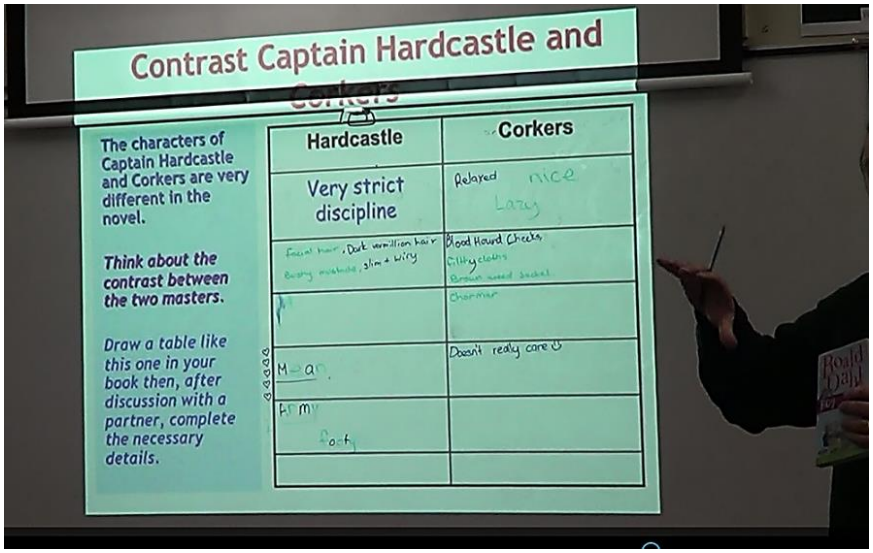


Figure 6.15: Year 7 English – What is Contrast?

To facilitate the students' learning of juxtaposition, Colin provides a definition on the whiteboard, as he discusses the concept with the students (Turn 31). To further consolidate their understandings, he uses examples from the text (SG⇧), highlighting the two characters to be studied, Captain Hardcastle and Corkers. This aids the students in identifying the contrasts and similarities between these characters, as seen in Figure 6.16. Throughout his discussions, Colin uses the terminology 'juxtaposition' and 'contrast' with the students, which is included in the slide presentation and work sheet for the class task.



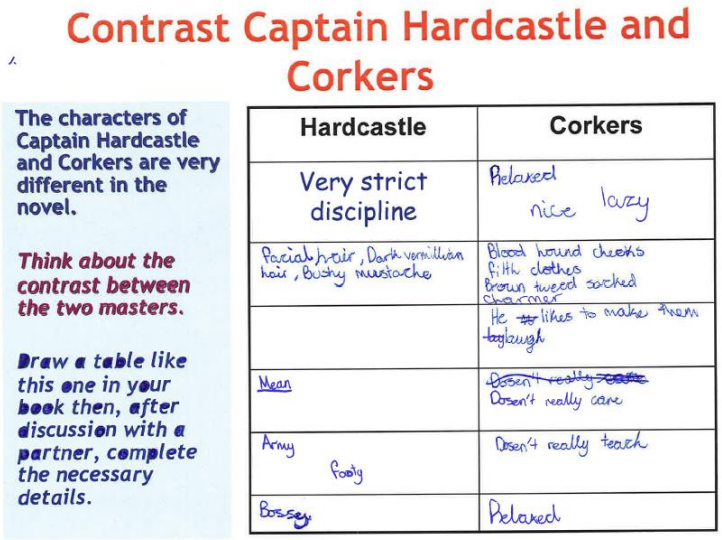


Figure 6.16: Year 7 English character contrast task

The instructional discourse used by Colin as he explains the term juxtaposition can be examined within the organisational principles of the semantic codes. Strengthening semantic gravity (SG⇧) is evident as Colin provides a 'real-life' example of contrast in language the students can engage with. That is, he provides an image and explanation of contrast on a television, followed by a short activity where the students are asked to contrast their uniforms and features (Turn 14). As he unpacks the concept, he introduces the specific metalanguage, 'juxtaposition' (SD⇧), providing a written definition to support the students' understanding (SG⇧). He then repacks the term with specific examples from the text being studied (SD⇧). This teaching and learning sequence is visually represented in Figure 6.17.

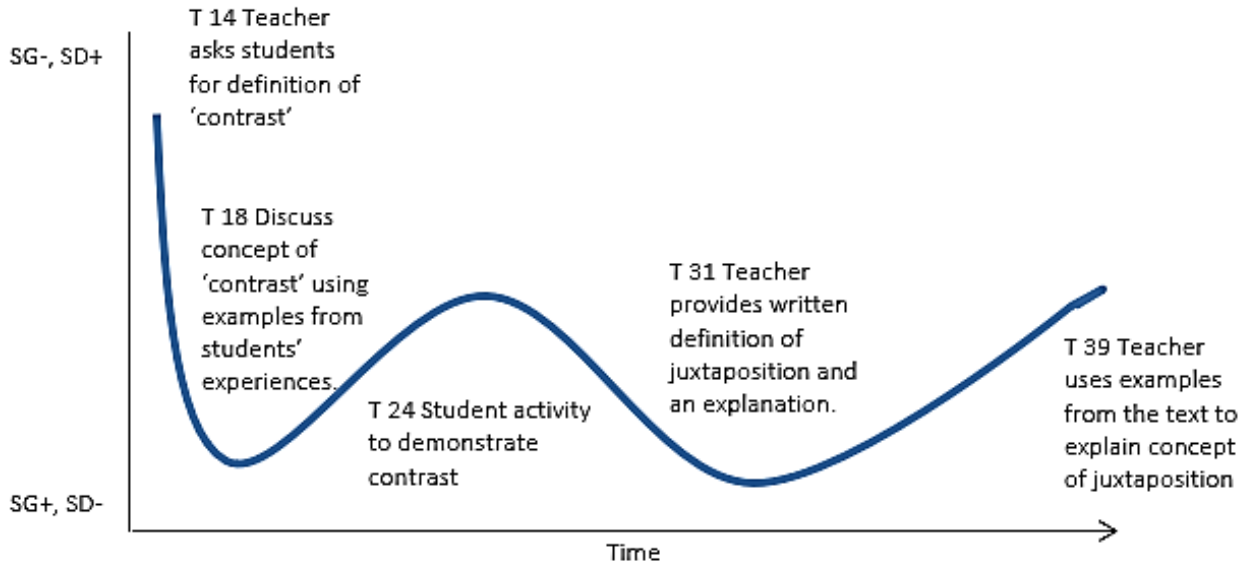
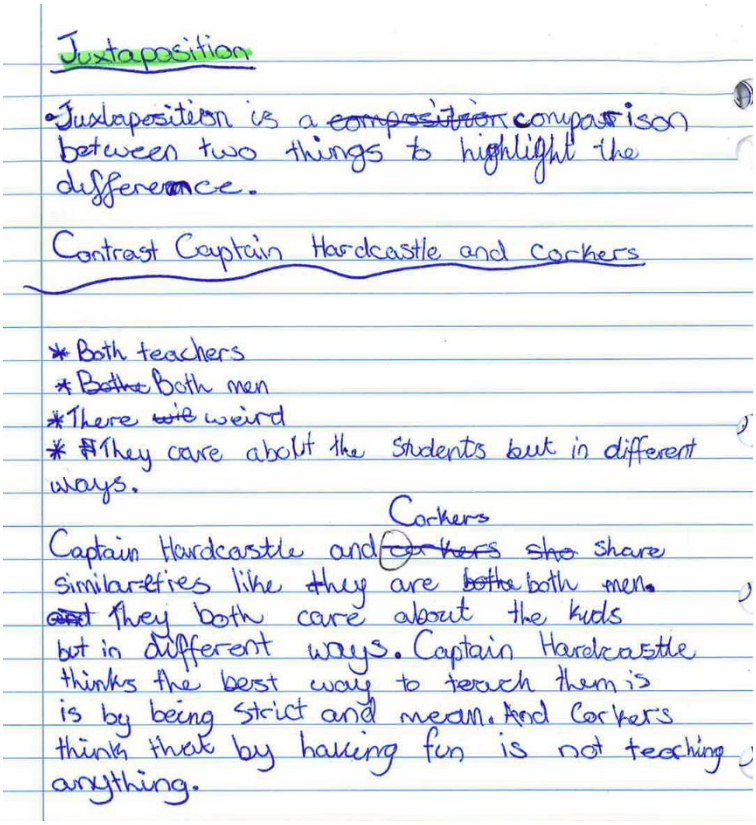


Figure 6.17: Semantic wave in teaching and learning language devices in Year 7 English

The final twenty minutes of the lesson require the students to write about the two characters, highlighting the similarities between them, as seen in Figure 6.18. While not explicitly stating to the students, Colin hoped that *"there'd be inference and alluding to things"* evident in their work. His aim was for the students to,

"find an example from the text, analyse the example to say what that example is saying about the character and then also discuss or analyse the technique that's being used."

The aim of the final part of the lesson indicates the importance Colin places upon writing as a comprehension strategy in Year 7 English and through secondary school. In this part of the lesson, the learner dispositions of the students perceived by Colin's perspective of comprehension are observed. The task requires the students to juxtapose two characters from the text. He prompts the students to find examples from the text to support their thinking. Initial responses from the students are grounded in the text, and they experience difficulty moving beyond a literal interpretation (SG⇧) (Turns 53, 55, 59). The responses from Colin to each suggestion acknowledge the students' effort, and he questions the students to provide more information from their own knowledge and understandings (SD⇧) (Turns 49, 54, 56, 58).



Juxtaposition

Juxtaposition is a ~~composition~~ comparison between two things to highlight the difference.

Contrast Captain Hardcastle and Corkers

* Both teachers
* ~~Both~~ Both men
* There ~~are~~ weird
* They care about the students but in different ways.

Corkers

Captain Hardcastle and ~~Corkers~~ she share similarities like ~~they~~ are ~~both~~ both men. ~~and~~ They both care about the kids but in different ways. Captain Hardcastle thinks the best way to teach them is is by being strict and mean. And Corkers think that by having fun is not teaching anything.

Figure 6.18: Year 7 English character contrast writing task

As the lesson continues, Colin asks the students to think *"more deeply"* about the characters rather than writing what Colin considers the *"obvious answers"*, such as *"they're both men, they're both teachers*" (Turn 60). He reinforces the responses he is looking for, seeking a deeper understanding from the students (SD⇧). To support the students, he further unpacks the concept and elaborates with examples from the text (SG⇧), prompting them to *"look at their (characters') peculiar behaviour and how they care about the students"* (Turns 69, 71).

Throughout the lesson, Colin was observed using comprehension strategies such as questioning, making connections between characters in the text, and drawing upon the students' prior learning. Colin was particularly focused upon drawing out responses from the students to *"get that initial understanding and then through questioning they can draw out deeper understanding."* By questioning more deeply, asking 'why' questions and expecting examples from the text to support their thinking, Colin states that he was also scaffolding the students who were finding the task difficult.

When asked what strategies his students were using to understand the text and characters discussed, Colin identified that,

> *"they had to relate back to their prior knowledge with the novel. Also, some of the questions were a little bit of inference… at an early level like Year 7, they sometimes miss inference if it's just a little bit subtle. Also, the writing part, so the verbal communication, but also the written substantive communication which, at the end of the lesson, I was actually impressed with what they were writing."*

He continued, identifying aspects of writing techniques as indicators of comprehension, as,

> *"I think understanding the concepts covered in class in that lesson, if it's understanding the character, that they're looking to see the construction of the text, so is it adjectives that they're using to construct that character, is it a metaphor, is it a simile – what technique is the composer using, so that's critical literacy that you're looking at."*

Colin considers his focus upon writers' techniques to be crucial for students and their ability to demonstrate their understanding, as, *"from a specific English perspective, what you need them to do is to write really insightfully."*

Interpretive summary of teacher practice and comprehension instruction

Colin's disciplinary approach to comprehension is guided by his interpretation of the English curriculum. He views comprehension through the lens of the writing, where the students' understanding of text structure, literary devices and written responses is a primary instructional goal. As such, he does not consider that specific instruction in generic comprehension strategies is needed in Year 7 English. Colin's interpretation of writing as a curriculum emphasis for comprehension is drawn from the importance he places upon the highest academic credential for NSW school students, the Higher School Certificate. This high-stakes assessment evaluates student understanding of curriculum content through writing. As noted in Chapter 5, the official English curriculum for schools in NSW and Australia alludes to comprehension but does not clearly state how comprehension is to be taught in schools. The central tenet of the curriculum is the purposeful and meaningful use of language when engaging with texts.

Colin's disciplinary view of comprehension instruction values writing, as he states that it is important to teach his students,

> *"…. how to write a paragraph or how to structure a response because you just notice… and this is thinking ahead again, you just notice that students that can't write a paragraph and just blurt out information, it's like they don't… I guess in English, the top marking criteria is always that concept, so they don't actually understand the concept, they've just got a lot of information that they've got down. I do like them to learn that – the structure."*

It is in the students' written responses and their use of literary devices where Colin sees the demonstration of comprehension strategies by his students. How they construct a response, both orally and written, signifies to Colin that they have comprehended the content taught. He acknowledges that the students ask questions, draw on their prior

knowledge of the text, and make some connections to their own experiences and the text studied, and that there is evidence of inference in the discussion between himself and the students.

Colin's disciplinary understanding of English and comprehension privilege the knower codes. His understanding of the curriculum views research-based comprehension strategies as literacy dispositions and attributes his students have previously acquired. Colin's belief of comprehension as writing techniques, based upon his disciplinary understandings of English, privileges the knowledge codes, whereby the specialised metalanguage used by the students in their written responses is the content of instruction.

In each of the teaching episodes observed, Colin engages in practices to scaffold his students' learning and understanding of content. He primarily uses discussion to facilitate the students' learning, together with set tasks which are completed individually:

> *"I do plan my lessons out but usually I go in with an idea and I like to get class discussion, because I think it's good for them to discuss it and then try and get them to write, which they are a little bit reluctant to do."*

Colin has developed a collaborative culture in his classes, where the students are encouraged to ask questions, seek clarification and share their understandings of the concepts and content. He views his pedagogical approach as predominately 'student-led'. The data, however, reveal that the three lessons observed were mainly 'teacher-led', whereby the content to be addressed, the direction of the students' learning, and the initiating of the question-answer sequence, were guided by Colin.

Throughout the data collection period, Colin was observed implicitly using research-based comprehension strategies in his practice. These included the provision of learning experiences requiring students to make predictions and summaries, ask questions and make connections between their experiences and the texts being studied. Colin did not

refer to these strategies by name and was unaware that he modelled these in context to his students as part of his practice. Across the data collection period, Colin predominately identified 'prior knowledge' as a strategy used by his students:

> "*They were drawing on their prior knowledge, but they didn't always lean to their prior knowledge of the text, which was a bit unfortunate at times.*"

The data reveal that Colin's understanding of comprehension is discipline specific. The research-based comprehension strategies identified in the 'new' curriculum are skills that he believes his students have already learned in their earlier years of schooling and therefore do not need to be taught in Year 7. This perspective privileges the knower codes and underlies Colin's belief that the comprehension skills he is required to teach in secondary school English are disciplinary-specific literary techniques and understandings of how writers convey meaning through their use of language. He reiterates this point throughout the data collection period, regularly commenting that it is important for his students to, "*get in their mind that they've got to talk about techniques."* He believes, "*the written communication is the most important, like from our perspective because, in the end, that's what they get assessed on the most."*

The data reveal Colin's regular focus on ensuring the students' awareness of how to maximise assessment and examination marks, especially as they continue through their secondary schooling until Year 12 and the Higher School Certificate (the highest academic credential for NSW school students). This focus is important to him and influences the pedagogical choices he makes in his practice. It supports his view of the importance of teaching writing structures as comprehension in his classes, and he considers this the most important aspect of comprehension in English:

> "*The upshot is that, if they can't write, it doesn't matter how well they can verbally say it, if they can't effectively write it down and write it fast and get a really sophisticated argument going… but to get that, you also have to be able to manipulate your ideas, so you need to be able to have a deep, conceptual understanding and draw upon those ideas and express them in writing."*

Case 4: Deidre – Year 8 English

Comprehension as understanding

Deidre views comprehension and reading comprehension are two different phenomena, appearing confident of what comprehension is not, rather than what it is. In the context of her practice, reading and reading comprehension should be taught, but the requisite comprehension skills and strategies that her Year 8 students require should already be in place. In Year 8, students are expected to "interpret and evaluate information, identify main ideas and supporting evidence, and analyse different perspectives using comprehension strategies" (ACARA 2013). Similarly, the Literacy continuum (ibid) states that students in Year 8 should be "consolidating an increasing repertoire of comprehension strategies".

There is tension between Deidre's beliefs and understandings of comprehension and the pedagogy she engages in the classroom. Deidre considers comprehension to be one of two things, either reading comprehension or understanding a text, but not both:

> *"It depends what you think comprehension is doesn't it? I don't think it's just about reading comprehension and then finding the correct answers in a text. I think that's a different skill set isn't it?"*

She further elaborates this point, explaining that comprehension is a skill that goes beyond reading a passage or text and finding the correct answers in a text-based task: it is a cognitive process which necessitates her students to demonstrate deeper understandings of a myriad of visual, print-based and multimodal texts, primarily in the dialogue around a text between the students and Deidre:

> *"When I think of reading comprehension, I'm thinking of the old school reading… I immediately think about reading a block of text and being able to find meanings in that text… but, you know, the reality of it is these days, a lot of the work we do is not just based on text. It's based on things like film and stuff like that… but when I'm talking about comprehension in my classes, I'm talking about whether they've understood what's been asked of them as well as their concepts."*

The data reveal that Deidre is unable to reconcile the disciplinary practices of teaching English with the more generic concepts of comprehension and comprehension strategies. In her practice, the dispositions and understandings surrounding comprehension which her students bring to English as a subject are highly valued. Deidre sees a distinction between the comprehension strategies she uses as part of her practice and the strategies she teaches her students. She believes that her students should already possess the required comprehension knowledge skills and therefore need no further instruction, as, *"by the time they come from Junior School, I expect them to have that already, so we're refining that; we're not teaching that."*

The Lessons

I observed Deidre across three, fifty-minute lesson periods, at times nominated by her. All lessons were observed in Deidre's usual classroom, as shown in Figure 6.19. The focus of the first lesson (writing techniques and language devices studied in the previous term) differed from the focus of the second and third lessons observed (reviewing of texts and examination preparation).

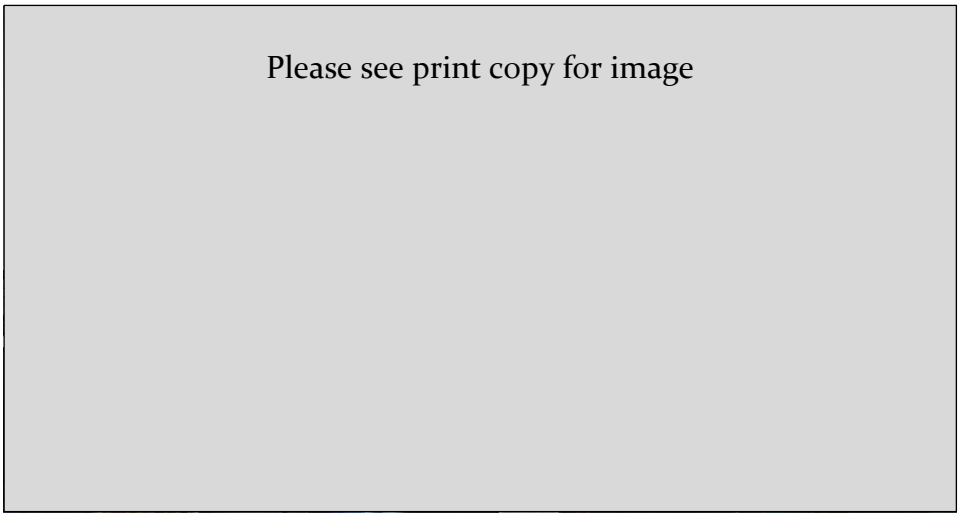


Figure 6.19: The Year 8 English classroom

The unit of study, titled *Shakespearian Performance*, using the text, *Much Ado About Nothing* (Lessons Two and Three), referenced the 2003 syllabus outcomes (Board of Studies NSW, 2003a); while the unit of study, *The End of the World as We Know It*, using the text, *Zed for Zachariah* by Robert O'Brien (Lessons Two and Three), was referenced

to the 2012 syllabus outcomes (BOSTES NSW, 2012b) as was Lesson One, reviewing writing techniques and language devices. Figure 6.20 illustrates the sequence of lessons observed.

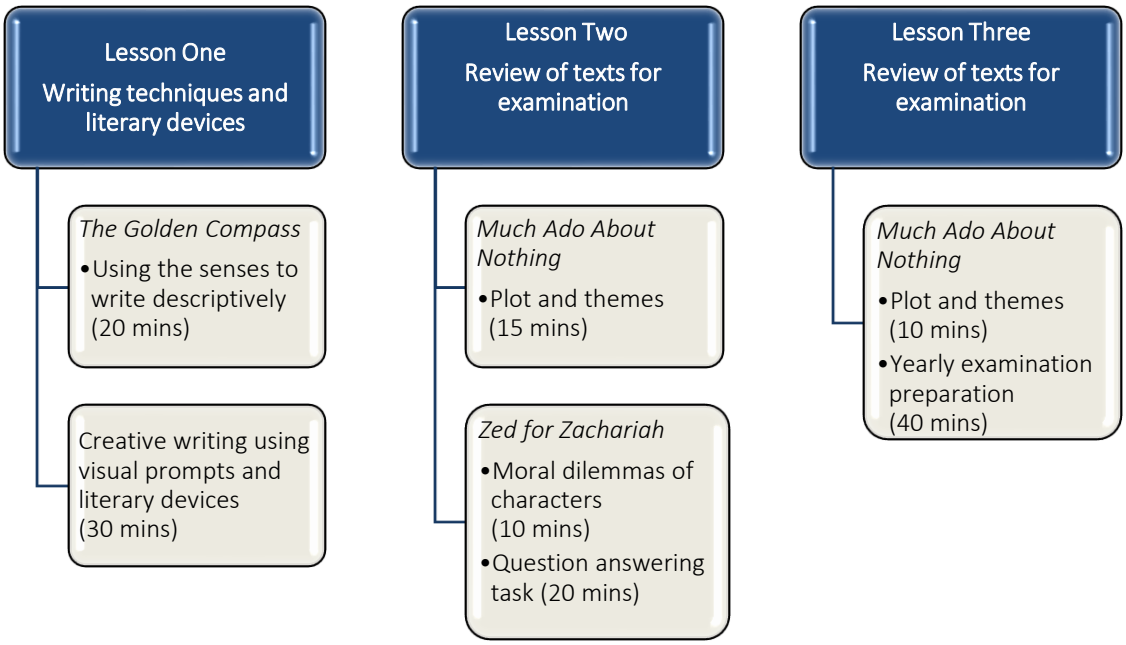


Figure 6.20: The sequence of lessons observed in Year 8 English

To provide the reader with an insight into the teacher and student activity across the duration of the lessons, each has been outlined in greater detail, as illustrated in Table 6.4. Lessons One and Three are included in Appendix I. Furthermore, a descriptive summary of Lesson Two will provide a detailed analysis of comprehension events as they occurred. This lesson has been selected because it provides evidence of Deidre's position and interpretation of comprehension and comprehension instruction in her practice.

Teacher and student participation in Year 8 English

Duration	Teacher activity	Student activity	Resources
15 mins	Lead review and discussion of previous content on themes in *Much Ado About Nothing*, drawing attention to aspects of the plot and characters	Provide examples of themes, such as trickery, love Record ideas on iPads or in their notebook	Student work books, iPad
10 mins	Lead a discussion about the moral dilemma facing the character Ann in Chapter 3 of *Zed for Zachariah*	Respond to questions being asked by the teacher, making comments regarding their understanding a moral dilemma and the example in the text	Student work books, iPad Text or e-book *Zed for Zachariah*
20 mins	Discuss comprehension task based on Chapter 8 of *Zed for Zachariah* to the students. Explain task and remind students about the correct writing of written responses	Record their responses using iPads or notebooks, asking questions and responding to teacher questioning	Student work books, iPad Comprehension task Text or e-book *Zed for Zachariah*

Table 6.4: Year 8 English - Overview of teacher and student participation in Lesson Two *Review of texts – identifying themes*

Each of the novels and plays that the students study throughout the academic year are accessible on the school's MOODLE page and on the iPads through iBooks. In this class, Deidre usually gives the students the choice to make notes in a workbook or directly onto the iPad using software applications such as *Notes* or *Pages*, telling the students, *"whether you want to write it down or do it on your iPad that's fine with me. Whatever works for you."* She makes this pedagogical choice with this class because,

> *"it's a mixed ability class and some – especially the boys in the class – are very visual learners so they like to use their iPads. Since we've had iPads I've encouraged them to use them.... I think as well for visual learners it makes it really easy."*

Across each of the three lessons, I observed many of the students in the class using the iPad to make notes. Interestingly, the students with literacy difficulties and English as a Second Language demonstrated a personal preference to regularly use their workbooks to record notes, using the iPad to access the relevant text.

Lesson Two – Review of texts – identifying themes

In Lesson Two, the content focus of the lesson is *Much Ado About Nothing* by William Shakespeare (1992), examined in a previous teaching and learning unit on Shakespearean performance, and *Zed for Zachariah* by Robert C. O'Brien (2007), a text related to a teaching and learning unit called 'The End of the World as We Know It'. While the texts are from separate units of work, they are being used as the content materials, as the skills focus of this lesson is comprehension, in preparation for the upcoming yearly examinations. An overview of the lesson is shown in Table 6.4.

The initial part of the lesson is an explanation of the curriculum content for the examinations. Deidre uses the play *Much Ado About Nothing* and the novel *Zed for Zachariah* as the content focus. Her aim is to consolidate the students' understanding of the themes, plot and characters in the play, through discussion and supporting evidence and examples from the text. As observed in the previous lesson, Deidre uses questioning to activate the students' prior knowledge about the play, revising the concepts of plot, characters and theme. The data reveal that both Deidre and the students use metalanguage such as 'themes' and 'plot' to support understanding of the content. In using the metalanguage, Deidre is providing opportunities for the students to think in an abstract manner, beyond the literal nature of the text. However, the student responses remain literal and grounded in the text, with few examples of elaboration to support their reasoning (SG⇧). In this part of the lesson, and as it continued, the students continued to recall prior learning about the plot and themes of the texts and the characters, prompted by Deidre's questioning (SD⇧). This teaching and learning sequence is visually represented in Figure 6.21.

Throughout the lesson, movement between semantic density and semantic gravity comes into view. In Turn 5, Deidre explains the concept of 'plot', implicitly referencing *'Much Ado About Nothing'* (SD⇧), prior to questioning the students, "*What do we mean by themes?"* (SD⇧). Deidre seeks responses from the students, with incorrect responses from the students, such as "*like romantic or like horror or something like that"* (Turn 6), addressed immediately:

"that's a good idea, but that would be a genre. Themes are ideas that run through the play…. so, a theme is an idea that we see more than once in a play or a novel";

which are elaborated upon to facilitate student learning. She draws attention to themes of the play (SG⇧), *"so for example, one of the themes of 'Much Ado About Nothing' which we all know very well, is trickery"* (Turn 7). Deidre elaborates extensively on the concepts using examples from the text (SG⇧), with the level of abstraction increasing over time to support student learning (SD⇧). A discussion (SG⇧) ensues as students share their knowledge and understandings of the text, (Turn 10) with literal responses such as, *"when Beatrice and Benedict get tricked by Claudio and Hero."*

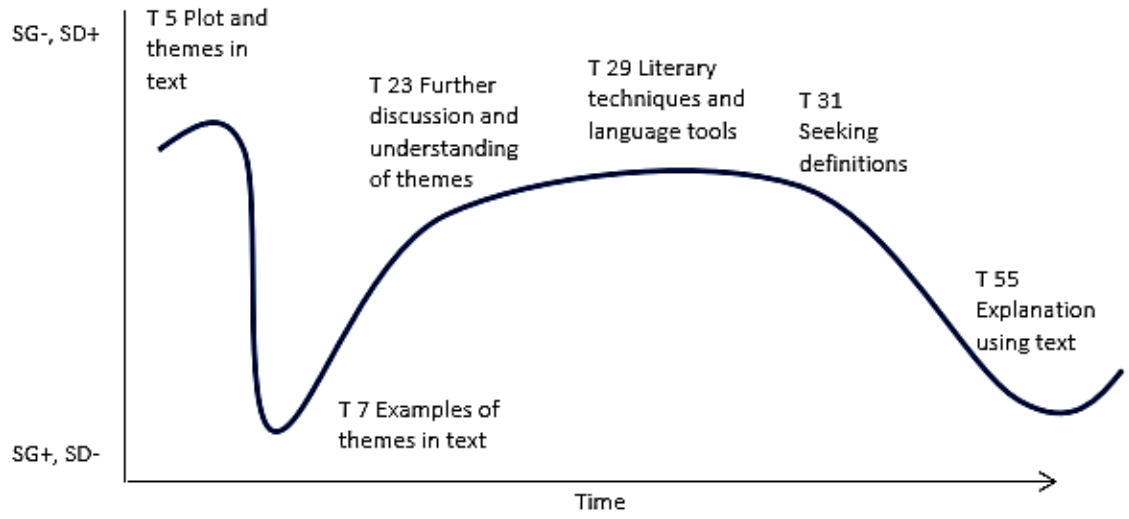


Figure 6.21: Semantic wave in identifying themes in Year 8 English

As the content focus shifts to *Zed for Zachariah,* Deidre leads a discussion about the concept of a moral dilemma. *"Yesterday we started to talk about the moral dilemma that Ann faces at the end of Chapter Three."* She questions the students, asking for *"a concise definition of what a moral dilemma is,"* (Turn 31) and continues to draw on their prior knowledge (SD⇧). The students share their understandings (Turn 32; 34),

"It's when there's a problem that the person has to choose whether to do the right thing or the wrong thing…. A personal problem that you need to decide."

as Deidre supports the students to make connections (Turn 41: 43) between the concept and one of the characters in the novel (SD⇧).

> *"A moral dilemma is a really hard choice to solve about how you behave..... what's Ann's moral dilemma at the end of Chapter Three? .... what two choices does she have to decide between?"*

The students respond with their own thoughts and understandings: *"The situation... Like if she should do the right thing and tell him not to get into the water or should she not? .... Like, just stay away?"* (Turns 42, 44). Deidre acknowledges the responses without elaboration, waiting for further input from the students, which is not forthcoming. She moves on with the lesson, revisiting a prior discussion about the text (Turns 45, 47) as the students put forward their point of view (SD⇧). Deidre brings the discussion to a conclusion (SG⇧), consolidating the points raised (Turn 55):

> *"But we also said, did we think that if the nuclear war hadn't happened, if everything was normal, would Ann have stopped Mr Lumis from going in the water? ... So, her morals changed because of the circumstances, the unusual circumstances, because everyone she knows is gone. So, what we were saying is that your moral code changes according to the circumstances."*

As in the previous lesson, the questioning and the elaborations made about the content were initiated by Deidre. In contrast to the other English teachers in this inquiry, Deidre does most of the talking in her lessons, with limited comments by the students. She acknowledged:

> *"sometimes children are a bit reluctant to put up their hand and ask a question because they think they might sound stupid. My philosophy – if I go through it in detail then I know that everybody's understood. Sometimes I think it might be a bit too much detail for some people but it's really important that everyone's on the same page."*

As this discussion ends, Deidre, using a prepared question and answer work sheet (Figure 6.22), leads the discussion based upon the questions in the task, reminding

students to locate the relevant evidence from the text (using the page numbers provided) that will support their responses. The task has questions of increasing complexity, requiring students to demonstrate deeper thinking in their written responses. The initial questions are predominately literal and require the students to locate information directly from the text (SG⇧). Deidre asks the students to provide answers *"in their own words… using full sentences",* to enable the students to demonstrate their understandings of the text. Deidre does not review questioning strategies or inference skills at this point, as she notes she has previously provided opportunities for deeper thinking in the extension task. Here, the students create their own questions, using inference and ideally based upon Chapter 1, as this chapter is *"going to be in the exam."*

Why is the stranger sick? (Chapter 5 page 42)

Can you describe John's journey from Ithica to the valley? (Chapter 6, page 47)

What are the three secret designs made by Mr Lumis and Professor Calmer in their laboratory? (Chapter 5 page 49, 51)

Extension activity. Write 10 questions of your own based on any of the chapters you've read so far.

Figure 6.22: Examples of comprehension questions for *'Zed for Zachariah'*

She remarks that this lesson provides opportunities to teach comprehension in context, with the context being the forthcoming end of year examinations, using this task to demonstrate to the students how to construct a written response for the upcoming exams (SG⇧):

> *"I would use the question for the first part of my answer to make it easy. So, when we're doing the answer we're basically repeating the question… add in some more detail and that will be really good."*

Deidre explained that she prefers to use pedagogical strategies that enable the students to engage in discussion where concepts and understandings can be clarified. The approach taken in this lesson, of *"straight reading comprehension"* questions, is perceived by Deidre to be comprehension strategy instruction. It is focused upon the students gaining higher marks in the exam and is part of the 'narrative' of this lesson. She considers this pedagogical approach, *"not to have as much of a place because you don't need that all the time."* She explains further:

> *"It's boring just to answer questions all the time. It's boring and I don't very often ask them to do that. I know sometimes there is a place for that (question worksheets) but I don't like the whole, 'These are your questions for this chapter', because it gets boring. I wouldn't want to do it."*

Interpretive summary of teacher practice and comprehension instruction

Deidre's understanding of comprehension is complex and contradictory. Her beliefs about comprehension underlie the teaching of comprehension in her classes, but do not align with her personal understandings of comprehension instruction. She considers that comprehension instruction is *"absolutely"* part of her role as an English teacher, with her perspectives on instruction supporting a disciplinary understanding of school English and the curriculum she teaches. She explains her view of comprehension as "*two strands. It's the comprehension if they understand it and its comprehension when it's appropriate."* She differentiates between the two strands: as one being "*comprehension questions"* such as passages of text with set questions to answer which lack context, such as, *"you can't use (these) all the time depending on what you're doing"*; the second strand being contextual, which is "*the comprehension as in understanding you use every single lesson."*

Throughout each of the teaching episodes, Deidre engages in contextual practices that scaffold the students' learning and understanding of content, which is drawn from the English syllabus. She reviews the previous learning, and introduces new content in a guided manner, followed by students completing independent tasks. Deidre scaffolds student learning by engaging in conversation, asking and answering questions of

students to demonstrate their understanding and using the appropriate metalanguage relevant to the content.

Deidre implicitly uses the comprehension strategies of *'activating prior knowledge, connecting, vocabulary and questioning'*, but does not refer to them by name. She was observed modelling these strategies in context to her students. Deidre elaborated upon her reasoning for this:

> *"I'm not a primary school teacher….in England we didn't talk about how to teach comprehension strategies because when we get them in Year 7, that's all done in a primary school. We don't do reading comprehensions in England. It's kind of like, "Well all that's done and now we're going to get onto the finer aspects" – that's the wrong word to use, but I think, maybe I have done it but it's always for me checking understanding."*

In the lessons observed, the pedagogical approach is teacher-centred, where Deidre initiates most of the discussion and her students take notes and respond to questions when asked. Deidre explains that her pedagogy is 'teacher-led':

> *"I don't really deviate from that, maybe that's something I need to do but that works for me. Of all the things I've tried in the many years I've been teaching, that's one that I always come back to because I think you have to…. this class need structure and they need someone to say, "This is what we're going to do. This is why we're going to do it, and this is how we're going to do it and you will do this."*

Deidre's teaching and the discussions with students indicate that comprehension strategies are at play within this classroom. She acknowledges her use of comprehension strategies in her practice, but *"doesn't explicitly think about it, it's just something I've always done"*, and perceives these to be separate to the syllabus content she teaches her students. The differences in Deidre's views and perceptions may be the result of her understanding of what she has previously described as *"old school"* comprehension, and what she sees has relevance in her practice for the students in her classes. She emphasises:

> *"… comprehension in the classroom is understanding… their understanding of what I've said and the concepts that I've taught. It's whether they've (the students) understood the text that they've read and whether they're understanding what I'm telling them. So, on two different levels."*

Through each of the observations, Deidre is a source of content knowledge in this class. The students respond with brief answers, which Deidre then elaborates upon and connects with a prior learning task. The dialogue in the lessons is constructed by Deidre; and while both Deidre and the students participate, the semantic wave constructed is based upon the discipline knowledge Deidre has determined as valid. The students are witnesses to the interaction, contributing as required. Comprehension in this instance has become appropriating the 'expert' voice.

This is contrary to Deidre's purposes, in that her intentions are to provide knowledge and understandings that can be transferred to other contexts. In the lessons observed, the pedagogy enacted did not demonstrate this. Moreover, within Deidre's pedagogical approach is a privileging of the knower codes, rather than specialised knowledge about comprehension, which Deidre believes her students should already have acquired by Year 8. Deidre remained steadfast in her view that comprehension strategies need not be taught to her students, as she *"would expect them to have that understanding (of comprehension) – I'm checking out comprehension of the concepts rather than the text."*

This is evident when asked about the comprehension strategies she observes her students using in class. Deidre looks to the interaction between herself and her students as evidence of the students using comprehension strategies, and identifies questioning, activating prior knowledge, and use of metalanguage, as strategies the students frequently use. She considers participation in the class discussion and activities as evidence of comprehension strategies being used by the students. Deidre explains:

> *"…the fact that they're participating in the lesson and they're able to produce what I've asked them to and the fact that they question me as well. They ask questions and I think that's really important… I can see evidence of it in their written work.*

Yes, they obviously have used those strategies because they've understood what we've said, so they've hit those targets."

Deidre acknowledges that the students primarily use questioning as a strategy. The data reveal that the students consistently question Deidre to confirm and clarify understandings, while continuing to develop the skills and confidence to question the texts or content themselves:

"They were asking me questions and responding to the question and they were following me and locating the information. Of course, when we went to the questions, they were locating information and then paraphrasing that."

Deidre encourages her students to use the specialised language or metalanguage associated with the unit of work she is teaching. The observations show that the students are embracing this. When asked about the students using metalanguage to improve their comprehension, Deidre commented:

"…they were using the correct terms and that's really important because they have to know them, they have to use them, but they have to feel… because they felt confident – that's how I know that they understood because they felt confident. What I tried to say to them is that, sometimes terms like metaphors – they're simple concepts, they're big names for simple concepts."

Comparing teacher practices in Year 5 to Year 8 English

As can be seen in the above cases, the English teachers hold differing perspectives and interpretations of comprehension in the curriculum, and the pedagogies enacted to achieve the curriculum outcomes. Abbey's (Year 5) approach to scaffolding the students' learning, explicit modelling and instruction of individual comprehension strategies over time contrasts with the teachers of students in older grades. Similarly, Benita (Year 6) began the year with explicit instruction of comprehension strategies. As the year progressed, she moved towards a conversational style of instruction, engaging her students in discussion and contextual applications of the comprehension strategies, while still providing explicit modelling to reinforce concepts. Colin (Year 7) and Deidre

(Year 8) interpreted comprehension in the curriculum from a disciplinary perspective. Colin used instruction of literary techniques to support students in comprehending texts, and to facilitate their understanding of the author's intent and how meaning is conveyed through language. Deidre held the view of comprehension as a process requiring deep understanding of all aspects of the text. Furthermore, she expected her students to have a prior understanding of comprehension strategies, learned previously in primary school. She used contextual opportunities with her Year 8 class to question their understanding through discussion, preferring this to traditional written question and answer tasks.

Summary

This chapter has used data from classroom observations, teacher interviews and student work samples to investigate the beliefs, understandings and enacted pedagogies of comprehension of four English teachers. The chapter began with a contextual overview to the school's teaching and learning spaces, text selection practices and the teachers' classes. This was followed by a detailed account of each teacher's practice in the context of their beliefs and understandings of comprehension and curriculum. Each account was viewed through lens of Legitimation Code Theory. The teachers' interpretations of the curriculum and comprehension in their practice revealed strengthening or weakening of the specialisation codes. The pedagogies revealed in the data were interpreted through the lens of the semantic codes. An interpretive summary at the conclusion of each case elaborated on the teachers' perspectives of comprehension and enacted practices in the context of the data presented. The data revealed the different perspectives of comprehension and comprehension instruction in each teacher's practice relative to their understandings of comprehension in the curriculum and disciplinary literacies. The findings from this chapter, 'The English Teachers', and the following chapter, 'The Science Teachers', will inform the discussion to answer the research questions in Chapter 8 'Comprehension: Generic strategies or disciplinary practices?'.

Chapter 7 The Science Teachers

Introduction

This chapter is the second of two chapters where the practices enacted in teaching comprehension are highlighted. This chapter introduces the Science teachers and presents data showcasing teacher practices in teaching comprehension in their discipline.

School context

To support the teaching of Science in the participant school, specialist teachers are allocated a primary class in addition to the secondary school allocation. This is not typical practice for all schools in NSW. In Years 5 and 6, the class teacher and specialist Science teacher share the programming and instruction for the class. In Year 7 to Year 12, programming is a faculty responsibility.

The decision-making procedures for syllabus content to be taught, resources selected and the timing and sequence of implementation of the 'units of study' in Science, are a similar process to the practices identified in Chapter 6. In the Primary school (Years 5 and 6), the class teachers collaborate with the specialist Science teacher to select the appropriate resources and support materials. Assessment tasks are shared between the teachers. In Years 7 and 8, there are three Science classes in each year group. As typical practice in Secondary schools in NSW, the curriculum, assessment and resources are developed by faculties for consistency.

Teaching and learning spaces in Science

Science classes in Year 5 to Year 8 are timetabled in one of the Science laboratories, as shown in Figures 7.1 and 7.2. Each teacher uses the same room for all classes allocated to them, which are similar in size and layout. There are eight practical workstations around the outer perimeter of the classroom, with rows of desks in the middle area for students to complete theoretical lessons. At the front of the room is a demonstration

bench, as well as an interactive whiteboard and data projector. Teachers use this to display PowerPoint presentations of content, images, experiments and course booklet and textbook pages. Students complete written tasks and record experiments in a notebook. The students are also provided with a course booklet, which contains information about the topic, questions and practical tasks.

In addition to the school Science laboratories, the school farm is used as a classroom, as shown in Figures 7.3 and 7.4. The farm environment provides the students with a contextual environment for teaching and learning. Agriculture is a focus of the participant school, and students are informally introduced to the farm from the early school years. Formal lessons and units of study using outcomes from the Science curriculum, for example, 'Chicken Eggs: Farm to Table', are programmed to begin at the farm from Year 5.

In Science, students participate in experiments and practical activities. Therefore, instruction observed has been both theoretical and practical, affording opportunities for collaborative pedagogies. Different spaces in the classroom were utilised across each lesson, depending upon the features of the task and the location of the lesson. Movement in the classroom space prompted peer to peer engagement, collaborative learning and student engagement (Brooks, 2012, McArthur, 2015, Rands & Gansemer-Topf, 2017). This was especially so when lessons were conducted in the poultry shed.

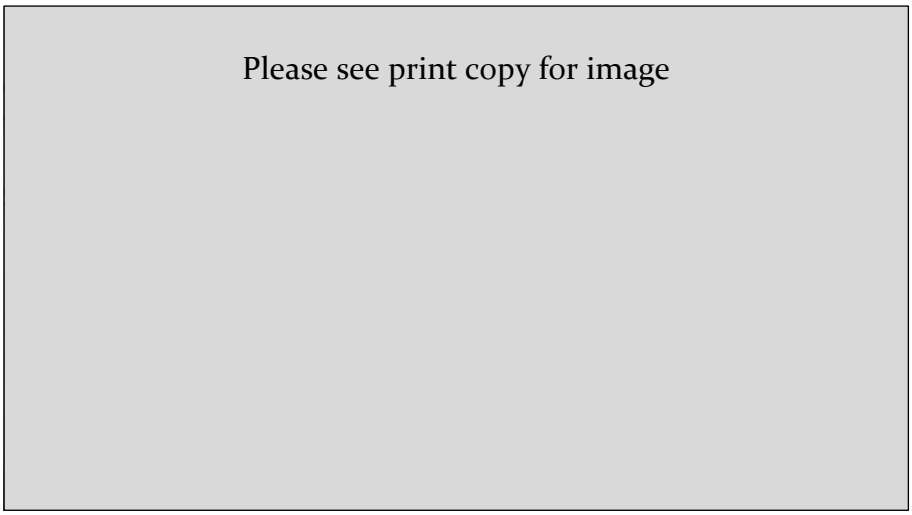


Figure 7.1: A typical Science laboratory layout for Years 5 to Year 8 Science

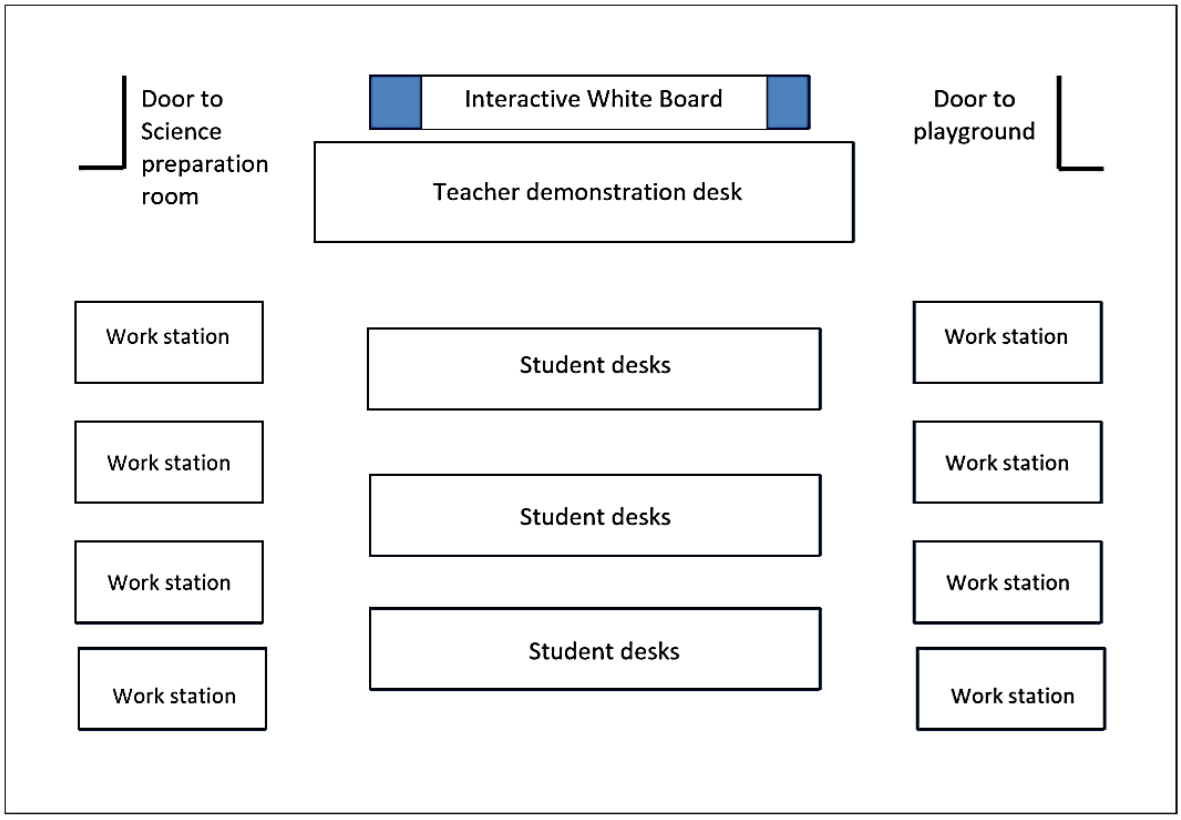


Figure 7.2: A typical Science laboratory layout for Years 5 to Year 8 Science

Figure 7.3: The school poultry shed

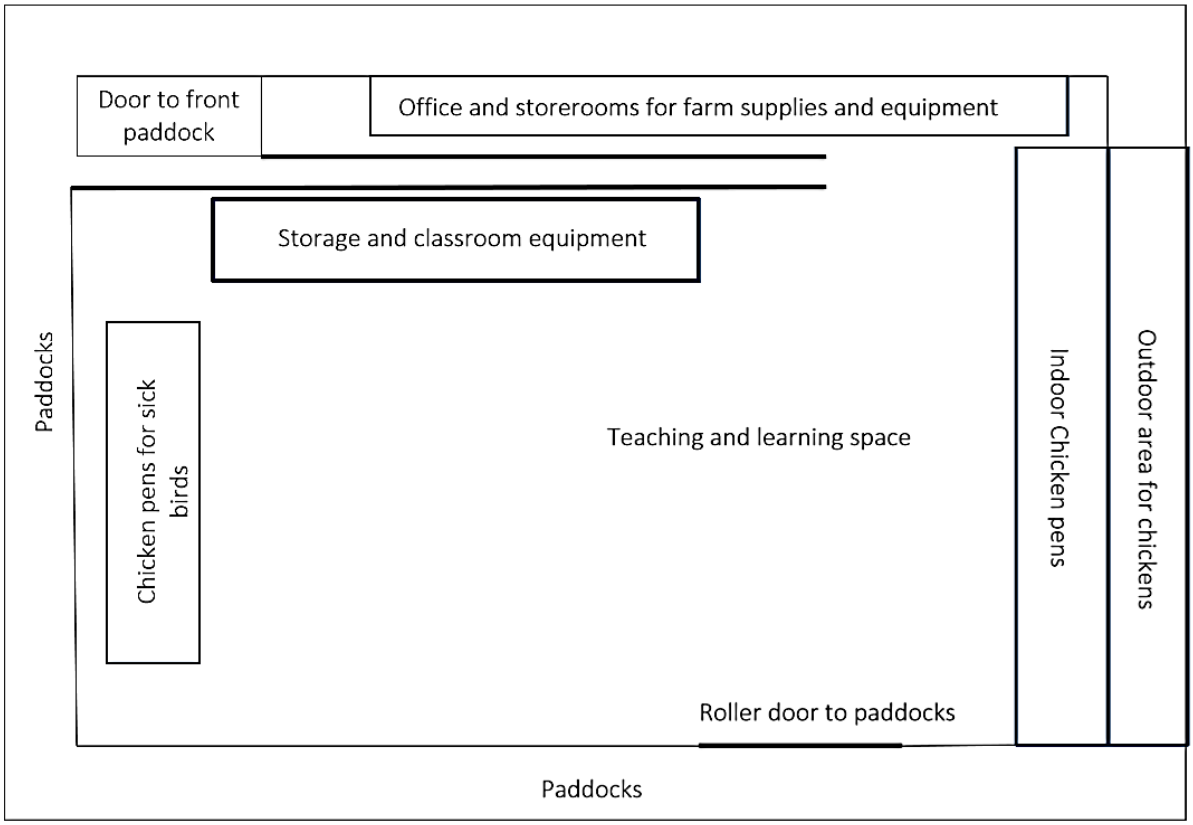


Figure 7.4: The school poultry shed

Introducing the Science teachers

In this chapter, I will introduce you to the three teachers responsible for the teaching of Science in Years 5 to 8. Part Two of the chapter provides the reader with a detailed insight into each teachers' practice.

Elsbeth (Case 5), Frank (Case 6) and Gail (Case 7) are qualified secondary teachers of Science (teachers of children age 12 – 18 years) of varying experience and teach several Science classes across Years 7 – 12. This is typical practice in Secondary schools in NSW. In the participant school, there are three Science classes in each year group for Year 7 and Year 8. The teachers are responsible for one of two mixed achievement classes. These focus upon content and skills identified in the syllabus documents for the grade level; while the third class is an Honours class, providing extension teaching and learning for students working above grade level.

At this school, stage-based instruction for Science occurs in Years 5 and 6 (known as Stage 3), a decision made by the school executive. That is, the content and skills identified in the Science syllabus are taught to both grades in the same calendar year over an alternating two-year cycle. This is a common practice in NSW primary schools (Kindergarten to Year 6), as the NSW curriculum for all Key Learning Areas is stage-based, rather than grade-based.

iPads are used by students, a policy introduced at this school in 2013. In Years 5 and 6, each student has access to an iPad for use at school, although not individually. iPads were not used by the students in Years 5 and 6 during Science, as a class set was not made available during the data collection period in the Science laboratories. In the Years 7 and 8 classes, each student in the class has their own iPad. Students use their iPads for research purposes in the lessons, including taking photos and recording experiments for later reference. I observed this practice in Year 7 Science. In Year 8 Science, the students did not use their iPads; however, the class teacher states that she utilises them as a tool for research purposes in other lessons. Her reasoning for this pedagogical

choice is primarily a behaviour management one, as she perceives that *"they're too busy (playing) on their iPads to learn at the moment"* due to their *"novelty value*".

Elsbeth Years 5 and 6 Science

Elsbeth has 7 years teaching experience and has been a member of staff at the participant school since completing her teaching qualifications. In this school, as part of the staffing allocation determined by the Headmaster, a specialist Science teacher from the Science Faculty shares the teaching of the Science curriculum with the class teacher in Years 5 and 6. This facilitates the middle school model of the school, whereby specialist teachers of Years 7 to 12 also teach specialist lessons in the Primary school. As part of her teaching allocation, Elsbeth teaches Science to two Year 5 and one Year 6 mixed achievement classes, as well as a combined Years 5 and 6 extension class. These classes focus upon the content and skills identified in syllabus documents for the stage level, while the extension class is provided with content above stage level.

Elsbeth (as the specialist teacher) teaches both theory and practical lessons one period per week (50 minutes) in the Science laboratory, whereas the class teacher is responsible for the remaining theoretical components of the unit of study, taught one period per week in the home classroom.

Elsbeth's Year 5 Science class comprises 18 students, 10 males and 8 females, aged 10 to 11 years old. Her Year 6 Science class comprises 26 students, 15 males and 11 females, aged 11 to 12 years old. In Year 6, two students are International students, (from Malaysia and Myanmar), who have English as an additional language. Another student identifies as Aboriginal. Within the two classes are a significant number of students with identified literacy learning difficulties who have received extra literacy support during their school years. In addition, there are several students with disabilities, such as Autism Spectrum Disorder. Elsbeth describes each of the classes as being enthusiastic about Science, saying:

> *"They just want to be there.... they're really keen. Out of control behavioural wise, a lot of them, but they're really keen which is exciting. I don't want to lose that; I'd*

rather have that enthusiasm than have them sitting there all neat… because that's not, to me, learning."

Elsbeth is mindful of the varying learning and social needs her students have, going on to say:

"I try to teach where I think the kids are at and where they want to learn and how they want to learn without probably even thinking about it, sort of a, I don't know, kinaesthetic mode…. you know you've only got a small pocket of time in which you're actually teaching them something, so it is just maximising the time I suppose."

Frank Year 7 Science

Frank has 21 years teaching experience and has been a member of staff at the participant school for two years. He teaches several classes, including one of three Year 7 Science classes. The class comprises 29 students, 10 males and 19 females, aged between 12 to 13 years of age. This is larger than most classes, due to a larger Year 7 cohort than other year groups within the school. In this class, there are several students with learning difficulties and identified disabilities, including Intellectual Delay, Autism Spectrum Disorder and Language Delay. A teacher aide has been allocated to support these students in English, Science and Mathematics. Frank is mindful of the specific literacy needs of the students and acknowledges the importance of literacy as a means of engaging them in Science:

"For this Year 7 group – because there's such a wide range of abilities… we've got some kids in there who are very, very good in terms of their literacy skills and their own organisational skills as well, right down to a particular lad who is diagnosed on the Autism Spectrum and finds things really difficult……I try to extend the higher ability kids as well; not to pull them back. I think, educationally, that's not right either but yes, to give a wide range of activities and a wide range of things that kids can do. The questions I might ask the higher ability kids are extension questions whereas the lower ability kids it might be the simple, basic stuff. They still feel that they're contributing to the class and they're not feeling under pressure, that 'I don't really know that higher order stuff'. That's what I try to do."

Gail Year 8 Science

Gail has 3 years teaching experience and has been a member of staff at the participant school since completing her teaching qualifications. She teaches several Science classes, including one of three Year 8 Science classes. The class comprises 22 students, 11 males and 11 females, aged between 13 to 14 years of age. One student is Chinese speaking and has English as an additional language. Three students have literacy learning difficulties and have received extra literacy support through their school years. At the time of our initial interview, Gail had just taken responsibility for the class, and was *"still in the process of getting to know the students."* She was concerned that many of her students were *"unsettled… and maybe half the class need to be taught everything from scratch."* As the year progressed, she commented that some of her students are always asking questions and *"like to challenge me a fair bit"* on the content that is being presented, as they *"have always got something they want to know."* Gail was also cognisant of the special learning needs of some of her students, and scaffolds written work for them, emphasising key words especially, *"so, if anything, they remember the key words which hopefully can jolt some sort of memory."*

Case 5: Elsbeth – Years 5 and 6 Science

Comprehension as exploring scientifically

Elsbeth believes comprehension in Science to be contextual and process focussed, where her students can create meaning of the content though their active participation in the skills and concepts explored*:*

> *"Comprehension is gaining the students' basic understanding of Science in context and where it's meaningful to them……. learning new terms and being able to apply them in different contexts."*

Her perspective reflects two aspects of her beliefs and understandings of comprehension. Firstly, Elsbeth believes comprehension to be a generic literacy skill, taught in English, thus privileging the knower codes. It is an adjunct to the skills, concepts and understandings required, whereby students bring their comprehension skills to Science, rather than it being part of the programme of instruction. Elsbeth's

focus is upon *"the processes … the skills, more than the comprehension."* In reflecting upon this position, Elsbeth raises concerns about her perceived lack of knowledge of comprehension and comprehension instruction as it relates to Science, stating: *"I don't know if I'm going to give you the 'English' answer."* She worries that her students *"do not do much reading and writing, like 'clozed' passages."* She emphasises, "*there is always a worksheet"* for the students to complete, viewing this as a comprehension task. Elsbeth considers comprehension to be generic literacy skills and strategies her students bring to Science, which have been taught in other curriculum domains, such as English, and then are utilised as needed.

Conversely, the data reveal Elsbeth's belief of the importance of comprehension in Science, viewing it as *"totally"* central to learning Science, as *"it's the basis for all our teaching in Science really."* Her analogy of Science and comprehension,

> *"it's like trying to create a body without a skeleton I suppose. You need that support of understanding before you can go into enriched learning"*,

highlights the importance Elsbeth places upon comprehension. Interestingly, when asked about using and teaching specific comprehension strategies in her practice, Elsbeth states that she has *"never thought about"* comprehension strategies in her practice. She states:

> *"I try and put together or deliver the message in a way that I think they can handle it best. I mean, I don't ever dumb things down. I certainly make sure that they know the correct way of doing and reading things, but I've never actually thought about it… I'm probably doing a range of things without realising it."*

Comprehension instruction in terms of building 'scientific literacy' is an important facet of how Elsbeth views her teaching role in Science. Foregrounding the knower codes, her priority is to engage the students in Science as a subject and to,

"teach them (the students) to become independent thinkers and learners and teach them to become critical thinkers. I think that's probably the essence behind most of what I try and do."

Elsbeth states that up to a third of her lessons involve comprehension instruction. In supporting her viewpoint, Elsbeth focuses upon the worksheets she provides to the students in each lesson, explaining: *"30-40% of a lesson is based on what we've got in that worksheet."* She explains:

"... it's always important in Science to read directions and know what they're handling, but as far as testing their ability to comprehend, it's more of an "I demonstrate it, then they go and replicate it". That's more the understanding rather than the reading - writing comprehension. So, learning by doing."

Her understandings and beliefs of comprehension are disciplinary specific. The worksheets provided in the observed lessons were procedural tasks to support the experiment the students may need to complete and to develop conceptual understandings of the content:

"It brings them down to a point as to the seriousness of what we're doing; it's not just the fun and play. They see it as fun and play but it's, "This is what we're here for, this is what we're learning about, this is the worksheet you need to finish... these are the directions we need to come back to".

Elsbeth is clear in her view on those comprehension strategies she believes to be the most important in Science*: "The predicting, the problem solving is probably involved in just about every science lesson."* Elsbeth considers that these strategies aid in the development of the students' problem-solving skills:

"So, while it might be repetitive, it's still used... the context changes and the kids just get the basics for the problem solving, the predicting what's going to happen if... how would you change something... what would you change if you wanted to make your experiment last?"

Elsbeth identifies vocabulary as an important strategy used in her practice, primarily for efficiency. She comments on several occasions where she is constrained by time and is concerned about how she will be able to teach the syllabus content in the timeframe she has. This is especially so as the students need to walk a considerable distance from their classroom to the Science room and usually arrived after the timetabled lesson time for each observation. The data reveal that Elsbeth uses vocabulary as a comprehension strategy in her pedagogy. In a lesson observed, Elsbeth provided the vocabulary to be learned and the corresponding meanings to the students. She explains:

> *"I feel that that probably delivers the information to them as quickly as possible because I really feel very time constrained, because it's only a 45-minute lesson to them; they're usually ten minutes late. I think vocab, they will always get something written … even for testing or whatever later on, at least I know they've got it."*

Elsbeth was observed consistently using the specific terminology of the content to support learning. She questioned her students about their observations and encouraged them to question her and themselves to aid their understanding of the syllabus content in Science:

> *"I'm not the only person who can give information to them, so I like to get them to not always seek an answer from me but to work out and solve through little steps, their own questions that they might be asking."*

The data do not reveal explicit instruction to the students on how to construct a 'scientific question' or specific strategies to aid the students' comprehension of the concepts and content being taught. The data reveal Elsbeth modelling comprehension strategies contextually in her lessons, such as vocabulary, predicting, activating prior knowledge and questioning. She believes that this pedagogical approach will facilitate the learning of these skills by her students and aligns with her focus on 'science' knowledge as content. This then affords the students opportunities to demonstrate their understanding and therefore their comprehension of the content, and,

"to build on the basic knowledge that they know so they've got the basic understanding… My idea is to make science fun; if science is fun, they're learning but, you know, make sure that they get something in writing of what they've done and why we've done it and what it means to them. It just puts things in context for them. I don't want them to sit and listen – I want them to listen a little bit then go and do."

The Lessons

Elsbeth teaches both Years 5 and Year 6 Science and was therefore observed across six fifty-minute lesson periods at times nominated by her (three Year 5 lessons and three Year 6 lessons). The duration of each lesson varied between thirty-five to fifty minutes, due to the late arrival of students from their classroom to the Science laboratory, school farm or other 'housekeeping' matters. For the purposes of this descriptive observation, and to provide a balanced interpretation of the lessons observed, three lessons from across the stage, rather than separate year groups, will provide the data in this interpretive summary. This is because the lessons observed were similar in content and addressed the same outcomes. Each lesson had a theoretical and practical component. Figure 7.5 illustrates the sequence of lessons observed.

The focus of Lessons One and Two was part of a unit of study titled, *Change Detectives: States of Matter*, where students investigated the properties of solids (Year 5) and liquids (Year 6) under different conditions. Lesson Three was the introductory lesson of a unit of study titled, *Chicken Eggs: Farm to Table*. In Lesson Three, I observed both classes participating in identical lessons. For these lessons, the 'classroom' was the school farm, specifically the poultry shed. To provide the reader with an insight into the teacher and student activity across the duration of the lessons, each has been outlined in greater detail in Appendix L. Furthermore, a descriptive summary of Lesson Two will provide a detailed analysis of comprehension events as they occurred. This lesson has been selected because it provides evidence of Elsbeth's position and interpretation of comprehension and comprehension instruction in her practice.

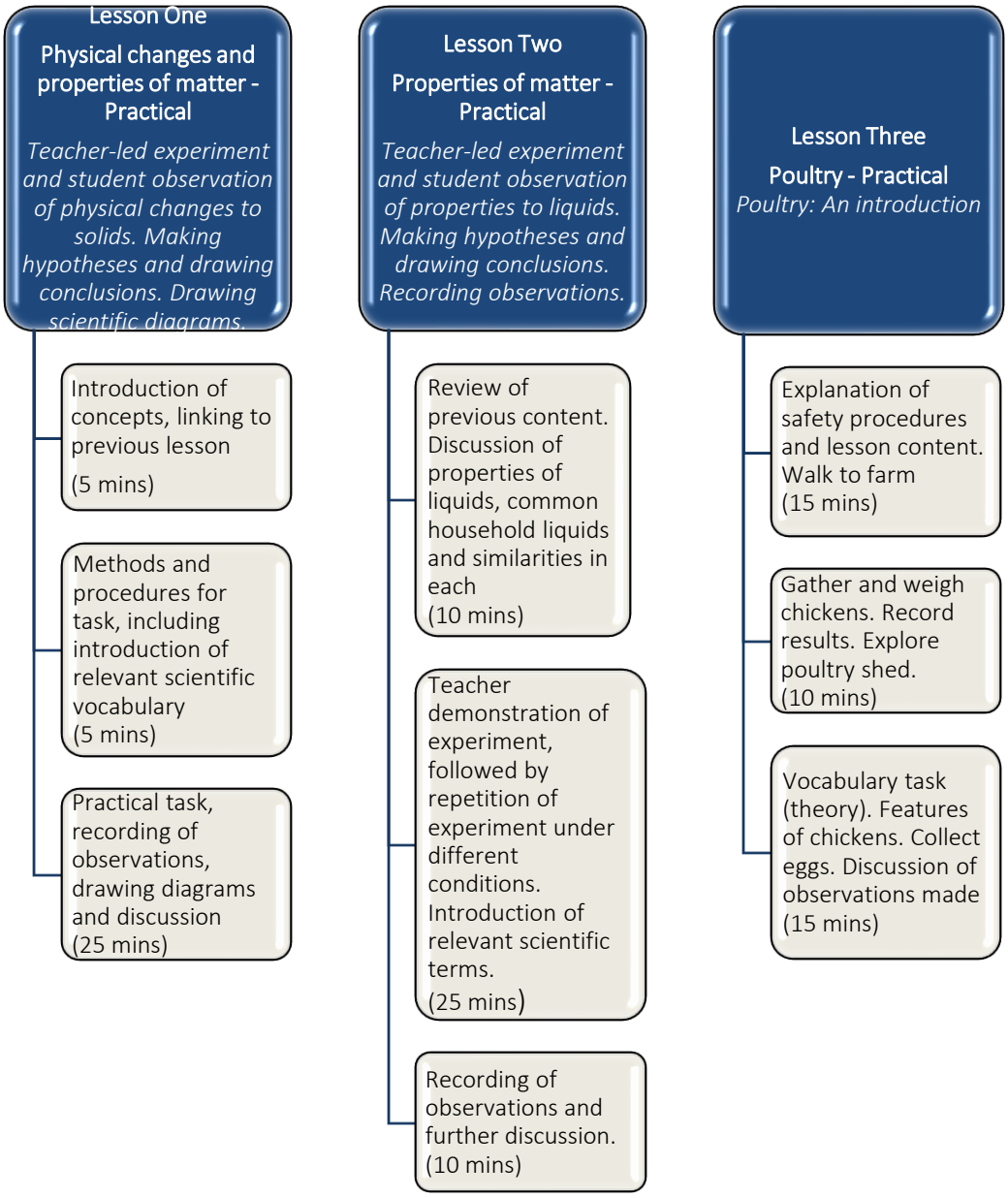


Figure 7.5: The sequence of lessons observed in Years 5 and 6 Science

Duration	Teacher activity	Student activity	Resources
5 mins	Revision of concept - properties of solids, and introduction of concept of properties of liquids.	Respond with questions and comments, glue worksheet in workbook activity as they do.	Student worksheet Student workbook
5 mins	Demonstration to students of examples of liquids, prompting them to make connections to everyday items they know of. She explains the scientific vocabulary used in the lesson, in the context of the demonstration.	Respond to questions and record examples of liquids in the workbooks	Student worksheet
10 mins	Explanation of the experiment, asking students questions and clarifying understandings of the scientific terms used	Observe the experiment with the teacher. They ask her questions as needed	Experiment materials – aluminium board, oil, honey, detergent, ice, pipette, safety glasses and aprons
15 mins	Demonstration of experiment (measuring rate of flow and viscosity of different liquids), encouraging student participation	Participate in experiment as instructed by teacher.	Experiment materials – aluminium board, oil, honey, detergent, ice, pipette, safety glasses and aprons
10 mins	Continued questioning of students about their observations. Reminds the students to record their observations	Respond to questions. Record observations by drawing in their workbooks	Student workbook

Table 7.1: Year 6 Science - Overview of teacher and student engagement in Lesson Two *Properties of liquids*

Lesson Two – Properties of liquids

Lesson Two, which is outlined in Table 7.1, is the third lesson in the unit of study, *Change Detectives: States of Matter*. The students are in Year 6. This unit of study focuses upon outcomes from the *Science and Technology K- 6: Syllabus and Support Document* (2000), specifically PPS3.4 (Physical Phenomena) and INVS3.7 (Investigating).

The lesson occurs in the Science laboratory. Elsbeth begins the lesson by briefly revisiting content from the previous lesson. She questions the students about their understanding of the properties of solids, prior to introducing the lesson content on the properties of liquids. The introduction to the lesson may be viewed using the principles of the semantic codes, where strengthening and weakening of the semantic codes become visible. A transcript of the analysis is located in Appendix M.

To gauge the students' understanding and prior knowledge (SD⇧), she asks for *"a definition of a liquid"* (Turn 1). The students respond, identifying features using common terms, such as *"you can pour… takes the shape of the container"* (SG⇧) and specialised language, such as *"definite volume"* (SD⇧). A student reads a definition from a text provided to the students (Turn 9). At this point, Elsbeth questions the student, to ascertain the level of understanding beyond the text. Asking, "*Can we hold liquid?"*, the student is uncertain and does not answer the question and responds instead by naming a liquid. Elsbeth provides further detail to the question (Turn 14), before accepting the student's example of a liquid (SD⇧).

Elsbeth later explains, *"the most important thing about a liquid… it will take the shape of its container"* (SD⇩), using common language and a visual demonstration to support the students' understanding (Turn 17). She asks the students for *"examples of liquids in containers"* (SG⇧) (Turn 19), but the responses provided by the students do not follow the trajectory Elsbeth has planned. In a quick exchange of sixty seconds (Turn 20-34), the students focus upon the container, rather than the liquid, providing suggestions that are beyond the scope of the original question, including rivers, billabongs, arteries, and veins (SD⇧). Elsbeth facilitates the students sharing their ideas, as this fits with her pedagogical beliefs of student learning. The discourse ends when Elsbeth asks the students to complete a worksheet (Turn 41) to recall the types of liquids they may have at home, and the similarities observed (SG⇧). Elsbeth links the everyday items to the scientific concepts the students are required to understand, by using the items identified by the students to demonstrate the specific properties liquids possess (SG⇧). Prior to the next phase of the lesson, another student asks about nitrogen as a common

liquid (SD⇧). Elsbeth provides an explanation (SD⇧), using a 'real-life' example of a plumber in a high-rise building and conversational language to aid student understanding (Turn 48). Figure 7.6 is a visual representation of the teaching and learning sequence.

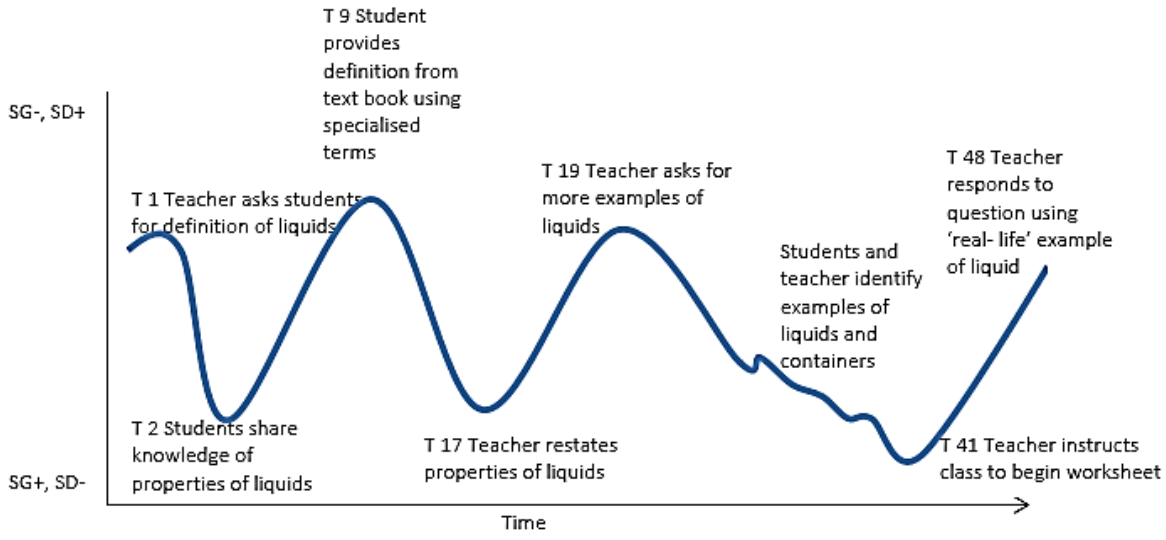


Figure 7.6: Semantic wave in teaching and learning about properties of liquids in Year 6 Science

As she begins the experiment demonstration, Elsbeth overtly uses several comprehension strategies as part of the pedagogy enacted, such as making predictions, activating prior knowledge and making connections. The data reveal her use of the requisite metalanguage or scientific vocabulary for what is observed in the experiment and the equipment used, using terms such as meniscus, viscosity and pipette. This provides an example of strengthening semantic gravity (SG⇧), where Elsbeth uses and reinforces the terminology with the students as they ask and answer questions. Elsbeth explains concepts in context, then applies and reinforces the concept in increasingly abstract examples. For example, she explains the term 'meniscus' to the students in a manner that is engaging and age appropriate, maintaining the scientific purpose (Turns 72 - 76):

> *"It is on that line... when water and every other liquid besides mercury, sits in a special way in a container. If you're looking at the side level, the water actually sits*

down, and it hugs the sides of the beaker… that's surface tension but this is a meniscus here."

During the introduction to the experiment, Elsbeth prompts the students to make predictions, *"which is what scientists do"*, reminding them to *"think scientifically"* and encouraging them to draw on what has been previously learned (prior knowledge) (SD⇧):

"…. we know that liquids flow but not all of them flow at the same rate. So today we're going to look at the flow of water, oil, detergent and honey. Now, you're going to make a prediction, which is what scientists do, and you're going to write in your book the order of the four."

This lesson is one where the students are actively involved, calling out predictions and observations confidently. The demonstration itself is a conversation with the students, and they crowd around Elsbeth as she begins the experiment, as seen in Figure 7.7:

"I'll just explain to you what we're going to do. I'll get a pipette for the water. Now, scientific thinking guys. Does it matter how much we pour on each?"

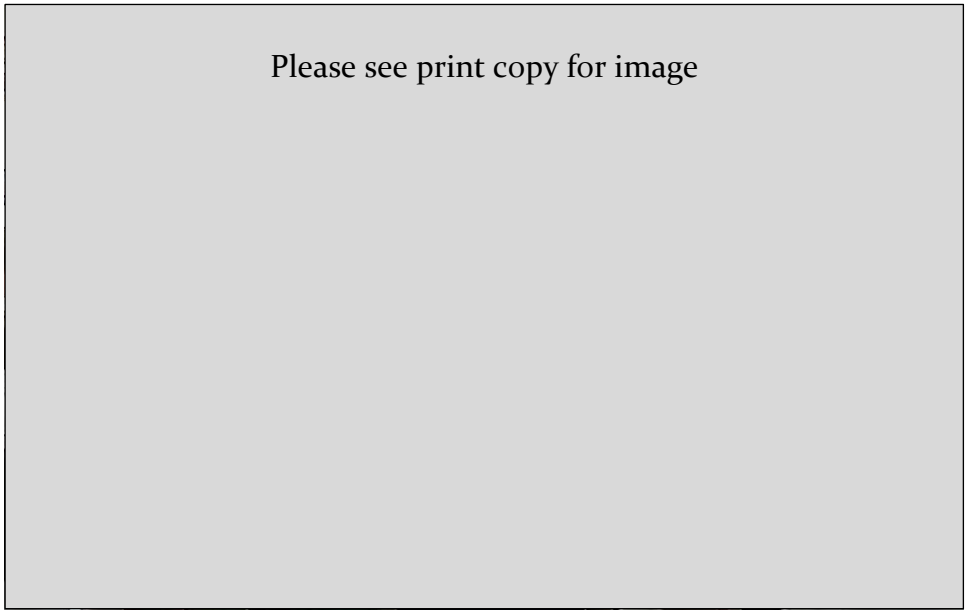


Figure 7.7: Students participating in an experiment about properties of liquids in Year 6 Science

The students respond without hesitation, with remarks such as, *"Yes, because if we pour more water it will flow different to honey."* Elsbeth supports the students' understandings with comments such as, *"I like the concept. So, we need to make sure everything's exactly the same."* Questions asked, for example, *"The only change is? … the liquid type"* are contextually framed to gauge the levels of understanding students have, linking what they have observed in one experiment to what is observed in the next experiment: *"so in any scientific investigation, everything stays the same, so even the height of the ramp has to stay the same."*

The findings show that questioning is a feature of Elsbeth's practice as she conducts practical demonstrations, consistently checking students' thinking, and asking and re-asking questions to aid and clarify their understandings of the concepts being taught. She revisits their predictions and asks for more as the parameters of the experiment are changed, encouraging them to draw on their prior learning:

> *"Do you think we can change the rate at which those liquids go down? …. What can we change to make those liquids flow differently or faster? …. What did you learn about particles and movement and temperature? …. What does temperature do to particles?"*

The students' responses demonstrate their growing understandings of the concepts, which are reinforced by Elsbeth. For example:

> *"… (student) said if we lifted the board up here it would go faster. Yes, it would. So, if we increase the temperature of the liquids, if we increase the amount, if we change the angle, there's three ways that we can make them go faster … (student) was saying if we add water to most of these things it would make them go faster. Now we're talking about the word viscosity. Viscosity is how thick or how thin a liquid is. Have you heard the word viscosity used when they're talking about motor oils?"*

The data reveal Elsbeth's implicit use of comprehension strategies within this lesson. This aligns with her beliefs, as she does not consider her practice to include instruction

in comprehension strategies, nor does she 'do' comprehension. Observed was Elsbeth's instruction of disciplinary literacies when conversing with her students. She consistently questioned them, thus affording them opportunities to synthesise their knowledge into new understandings. Throughout the exchange, Elsbeth maintained a focus upon the science concepts she was required to teach from the syllabus:

> *"So, what can we conclude then? We've made our prediction; we've done our experiment. What can we conclude about it? The properties of liquids and rate of flow? What can you say, what can we say? We did an experiment, now what can we tell somebody… the science?"*

Interpretive summary of teacher practice and comprehension instruction

Elsbeth's understanding and beliefs of comprehension are reflected in her practice. She considers that meaning in Science is created by her students through their engagement in contextual and process-focussed tasks. This then affords opportunities for her students to explore and learn about the syllabus concepts.

In each of the teaching episodes observed, Elsbeth engages the students through practical tasks, interweaving aspects of syllabus content as she converses with students. She scaffolds student learning by asking and responding to questions. In addition, she uses the requisite scientific language, explaining the terminology contextually as the need arises. In her practice, Elsbeth draws on her own experiences as a learner, stating that her pedagogical approach to teaching Science is *"very much hands-on."* She elaborates, explaining:

> *"how I learn is by doing. I'm really stuck if I can't do hands-on work with some of the theory. I probably use my hands a lot, but I find it hard to explain how things work if the kids can't visually see it happening or touch and feel. You know, I think kids need that these days. (I use) visuals and auditory. I mean they're very much an auditory, switched on generation. But you know, they can only listen for so long; they want to be active and they want to be touching and feeling and doing stuff."*

The data reveal Elsbeth's implicit use of some comprehension strategies. Examples observed include *questioning, predicting,* and *connecting* content to the students' experiences and *vocabulary* development. She does not refer to these strategies in her instruction with the students. Nor does she provide them with explicit knowledge of how these strategies may support the students' learning and generalisation of concepts. Elsbeth acknowledges that she does not have a good understanding of the comprehension strategies discussed in the research literature, validating her thinking by stating:

> *"If I don't understand what the strategies are and if they don't have that much meaning but I'm doing it, do I really need to know what they're called and what I'm doing? We get so bogged down in time and content that you don't even think about trying to teach all that sort of stuff."*

Elsbeth's understandings of comprehension reveal the importance of the disciplinary literacies of Science when teaching the curriculum content. The Science inquiry outcomes of the curriculum afford teachers opportunities to include discipline-specific literacy skills in their lessons. Elsbeth states she needs to *"get through the content"*, highlighting the need to address the Knowledge and Understanding outcomes of the curriculum, rather than the inquiry outcomes. Elsbeth does not perceive that she has the available time to pursue literacy or comprehension instruction in the context of her practice. Upon consideration of the comprehension strategies Elsbeth perceives she teaches or uses in her practice, her response relates to her perception of herself as a teacher of Science, rather than a teacher of literacy:

> *"I always hand out a worksheet, so the kids get an understanding of the scientific method of doing things... Other comprehension, we don't get really time to read and then discuss anything... because they're so hyped up they want to do Science."*

This response sits within the parameters of her view of comprehension, providing what she considers to be the 'English answer' to literacy tasks in her Science classroom. However, as an observer, the data reveal that both she and her students are utilising comprehension strategies throughout the lessons observed. These are aspects that

Elsbeth does not observe herself, commenting, *"I don't always hear that because I hear just the noise."* The data provide episodes of students in conversations with each other, using the scientific terms Elsbeth had modelled, making predictions and discussing conclusions; which Elsbeth considered, *"ideal because that's very much engaged, exactly what I want."* She clarified this point further, emphasising:

> *"My job is to get them to think; think scientifically and want to think, ask questions, want to ask "How's this? Why this?" I never mind getting off track. I want them to tell me what they want to know."*

Elsbeth places great value on the conversations that occur between herself and her students, identifying them as collaborative opportunities to further develop the students' comprehension of the concepts and content being taught. "*I think a lot happens as we're walking to the poultry shed. The kids are wanting to know this, know that and clarify their understanding."* She considers her pedagogical approach to be student-led, commenting, *"social understanding is far more important than being able to pass exams."* She considers that understanding of the content occurs primarily at,

> *"the beginning of the lesson and at the end of the lessons. At the beginning, we explain what we're going to do and at the end I try – it doesn't always happen –to explain why we've done it and sum up the lesson so that, you know, if the kids have missed something in the middle at least they've seen the beginning and they understand at the end."*

The findings reveal Elsbeth's understandings and perspectives between the teaching comprehension strategies and testing comprehension with written tasks. She considers written work and answers to written questions as evidence of comprehension instruction in her classes, often mentioning her concern about having content written down. Similar perspectives have been noted in the research literature, notably Durkin (1978) and Ness (2009, 2011). Her philosophy is of a student-led pedagogy, and she prefers teaching in a way that focuses upon building understanding rather than written content. She places great importance upon the discussions that happen in her classes, where she takes the opportunity with the students,

> *"just to talk about something scientific – we've drawn a graph, what does it mean, what can we predict and then just summing up and then just questioning."*

Elsbeth measures student understanding primarily through assessment as learning. For example, her observations of tasks completed in worksheets given each lesson are used because they provide opportunities for students to *"show understanding."* Rather than using more formal measurement processes such as examinations and assessments (these are the responsibility of the class teacher), Elsbeth prefers to observe the students and *"how they work scientifically"*, where she can then,

> *"gauge their enthusiasm and get an idea of those ones that are super passionate, the ones that are generally pretty good and the ones that tend to hang on the outside; maybe they're not just into it."*

Case 6: Frank – Year 7 Science

Comprehension as scientific vocabulary

Frank's understandings and beliefs of comprehension are premised on two competing viewpoints. Firstly, he considers comprehension to be text-based and activity focused, "*where the kids can read a particular passage and get answers to questions. That, I think is a traditional thought of what comprehension is."* He identifies this perspective as a *"basic understanding"* or *"traditional"* viewpoint of comprehension and acknowledges *"most teachers would say –it's more than that."* Frank holds a disciplinary literacy understanding of comprehension where meaning is constructed and created through engagement with the content presented, explaining:

> *"It's being able to engage students in a dialogue and from that dialogue, then you're expressing your information, whether it's content or whatever and then getting feedback from them in whatever way that is, whether it's a verbal thing or whether it's something that you might write questions up on the board, but in my classroom, it's more me delivering some information and then getting confirmation back from them about what they've learned or what a particular concept might involve. It's not just the written form; I think it's more how much they understand."*

Tensions exist in Frank's perception of his role in comprehension instruction as a Science teacher. From a disciplinary literacy viewpoint, comprehension instruction is "*absolutely, without a doubt'* part of his teaching role in Science, Frank going on to explain:

> *"I don't know that you can do it without it. Because for some parts of Science it is basic recall and for some parts of Science it is getting them to infer; inference is quite important in the scientific world – they need to think outside of the square and think about what is happening. Everything's sort of inter-related."*

Conversely, Frank has claimed that comprehension instruction plays no part in his teaching practice, as he *"would never use that as a specific technique in teaching."* His viewpoint is grounded in a *"what I (he) would perceive as traditional comprehension activities"*, where the teacher or 'textbook' imparts information for students to respond to, for which they then demonstrate the acquired knowledge back to the teacher through written answers. Comprehension instruction is, he states,

> *"giving them a lot of information and asking some questions about it – that's not necessarily how I can get the information across effectively. They're the sorts of lessons I leave if I'm not there and then I go back and say, "What did you learn from that reading and from those questions?"*

These differences in opinion may be explained by Frank's interpretation of comprehension instruction:

> *"Comprehension instruction, I guess is giving students a basis of some information and getting them either to recall that information back or to get them to process that information.... not necessarily direct recall but having a thought and a thinking process behind before they answer a question."*

This perception, in part, is supported by his understanding of the syllabus guidelines. The scientific inquiry strands of the curriculum do not specifically identify comprehension to be skills and strategies, but as learning processes, as implied through the terminology used; for example, *posing questions* and *evaluating arguments*. As with

the other Science teachers in this inquiry, each consider the content for instruction to be found in the knowledge and understandings outcomes. Frank's perspective of comprehension foregrounds the knower codes, where comprehension instruction is the provision of content knowledge and information, which students use to process concepts and recall information. It does not involve teaching the students the strategies identified in the research literature, such as questioning, as *"they already demonstrate that understanding."* Frank maintains his assumption that the students already possess the requisite comprehension skills and strategies needed "to construct an understanding of how scientific knowledge is produced; to explore, analyse and communicate scientific information, concepts and ideas; and to plan, conduct and communicate investigations" (Australian Curriculum Assessment and Reporting Authority, 2014). He is clear in his stance on those comprehension strategies he believes to be the most important in Science, namely vocabulary, "*because if they don't have the vocab they can't link things together",* and prediction,

> "*because quite often in a practical situation where you're writing up your procedure, you are getting them to predict, you are making them do a hypothesis prior to them doing the experiment themselves."*

The data reveal that Frank models comprehension strategies contextually in his lessons, such as the importance of scientific vocabulary, making connections with prior learning and questioning. No explicit instruction was observed where Frank referred to specific strategies to support conceptual or content knowledge. Frank acknowledges the varied ways in which students will demonstrate their understandings and knowledge about the content taught. He views the

> "*feedback which they (the students) give as part of their folio, where the Year 7's have a collection of their work samples which are assessed as a part of their assessment criteria and assessment schedule",*

as an important measure of the students' understanding, as *"I'm getting feedback about their knowledge and what they know through that."*

In addition, questions are asked between peers and to the teacher. Frank explains:

> *"Quite a lot of the students also use a questioning technique to gain clarification of instruction or gain clarification of what they're supposed to be doing or what they should be seeing. They use as much questioning and asking me for responses as I probably do of them, particularly in small groups."*

Furthermore, Frank considers more formal evidence, such as written examinations, "*where they're given an extended response"*, as a measure of the students' deeper understandings of the content taught.

The Lessons

I observed Frank across three, fifty-minute lesson periods, at times nominated by him. The lessons varied in duration between thirty-five to forty-five minutes, due to late arrivals and class 'housekeeping' matters. The lessons each had a theoretical component, with two lessons including a practical component also. The focus of Lesson One, a practical lesson, and Lesson Two, a theory lesson, was the unit of study, *Cells*, exploring cells 'as the building blocks of life'. Lesson Three was the culminating lesson in a unit of study investigating *Forces* and included a practical and theoretical component. Figure 7.8 illustrates the sequence of lessons observed. To provide the reader with an insight into the teacher and student activity across the duration of the lessons, each has been outlined in greater detail in Appendix L. Furthermore, a descriptive summary of Lesson Two will provide a detailed analysis of comprehension events as they occurred. This lesson has been selected as it provides evidence of Frank's position and interpretation of comprehension and comprehension instruction in his practice.

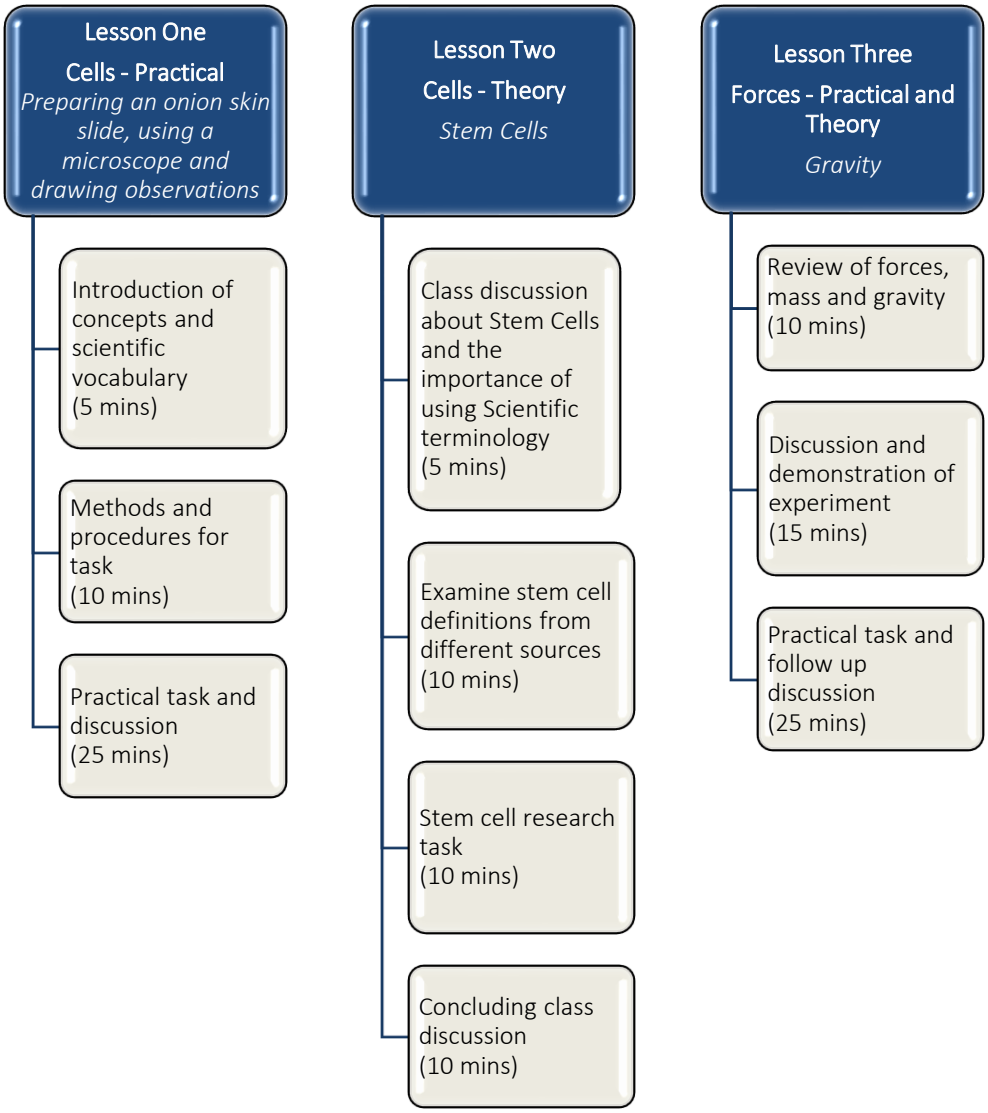


Figure 7.8: The sequence of lessons observed in Year 7 Science

Teacher and student engagement in Year 7 Science

Duration	Teacher activity	Student activity	Resources
5 mins	Ask the question 'what is a stem cell?' and engage in discussion with the students	Discuss understandings of cells and stem cells.	
10 mins	Provide students with several definitions of stem cells from different sources, highlighting the need to understand the scientific vocabulary and the reliability of sources used	Read definitions as directed. Contribute comments and share understandings, asking questions to clarify	Student note book *Cells* booklet iPad https://en.wikipedia.org/wiki/Stem_cell www.stemcellresearchfacts.org
10 mins	Ask the students to write a definition of a stem cell, based upon the information provided in the lesson, iPad research and their prior knowledge	Write a definition of a stem cell. They ask the teacher questions as needed	Student note book *Cells* booklet iPad
10 mins	Lead a discussion on the ethical implications of stem cells, stem cell research and cloning	Students contribute to the discussion	*Cells* booklet Textbook *Science Focus 1* pp.108-109

Table 7.2: Year 7 Science - Overview of teacher and student engagement in Lesson Two *Stem cells*

Lesson Two - Stem cells

Lesson Two, which is outlined in Table 7.2, is a continuation of the unit of study *Cells*, taught in Lesson One. Discourse between Frank and his students reveals how the semantic codes are at play within the lesson. Throughout the lesson, semantic gravity and semantic density strengthens and weakens in response to Frank's questioning and comments made by the students. A visual representation of the lesson can be seen in Figure 7.9. Appendix M provides a detailed elaboration of the teaching and learning sequence explained below.

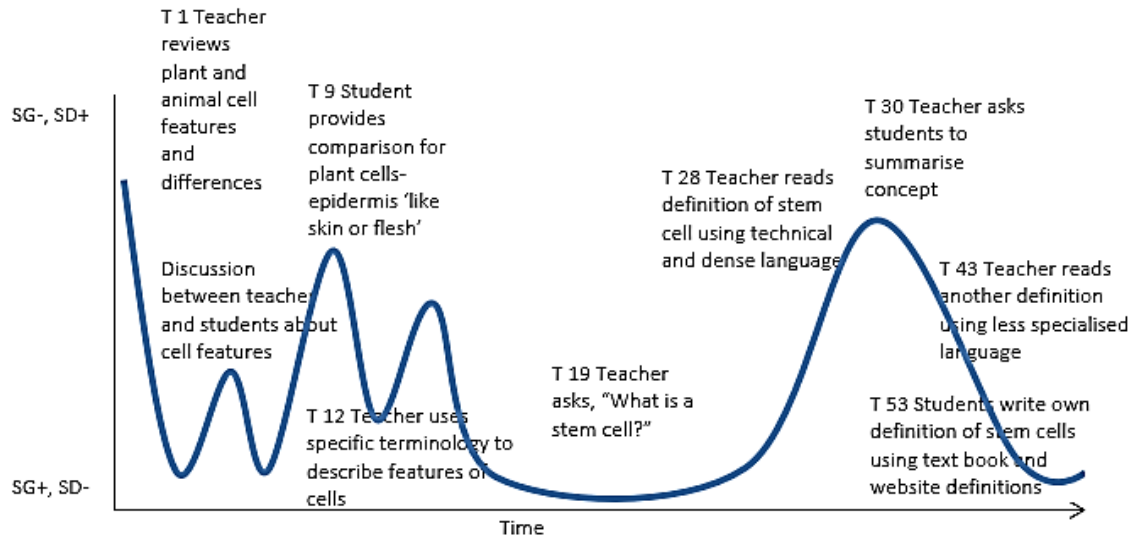


Figure 7.9: Semantic wave in teaching and learning about stem cells in Year 7 Science

The lesson begins with specialised content knowledge introduced and reviewed, with opportunities arising to enable the students to further generalise their understandings. The lesson focuses upon stem cells, where Frank initially scaffolds the students (SD⇩) to make connections with previously learned content about cells (Turn 1):

> *"We've looked at cells, we've looked at animal cells and we've looked at plant cells and we should be able to tell the difference between plant and animal cells. How might we identify the difference between a plant cell and an animal cell?"*

A discussion ensues, indicating strengthening sematic gravity, with a variety of students responding with learned facts (SG⇧): "*It's a different type of shape. A plant cell has a cell wall. To protect……inside it"* (Turn 7). Frank explores and elaborates upon their understandings. Evident in this discussion is Frank's continued use and explanation of the specific scientific vocabulary students must know (SG⇧):

> *"As we know, most animals have a way of having structural integrity. What does that mean?... Plant cells need a cell wall for that structural integrity, things that can then make plants grow really tall... and are only held together by these things that basically make up these cell walls, which is a particular sugar called cellulose."* (Turn 8)

As the discussion continues, Frank prompts the students to clarify their understandings by encouraging them to ask questions. One student asks, *"So technically when you touch a plant it's like flesh…they don't have a skin or something?"* (Turn 9), and makes connections to the previously learned content about cells in the onion skin experiment from Lesson One (SD⇧). In addition to reviewing content taught previously in the unit of work, Frank elaborates upon specific terminology or 'knowledge' (Turn 12), to contextually teach new content (SD⇧):

> *"They have a skin; they call it an epidermis and that's the thing that we had a look at when we had a look at our onion skin cells, remember".*

The elaborations made by Frank, rather than by the students, are opportunities for him to consolidate the concepts with his students. Frank continues, using the discussion to provide a contextual background for the new content of 'stem cells' (SG⇧):

> *"What we're going to look at today is a thing called a "stem cell" and a stem cell is not necessarily a plant cell from a plant stem but something else. Has anybody got an idea of what a stem cell is?"*

The student responses, *"A cell from the stem? …. From the roots or something?"*, indicate their level of understanding of the content at this point in the unit of study. Frank uses these understandings (Turn 24) to further elaborate and introduce a new concept (SG⇧):

> *"… it's kind of from a stem but where's the stem from? It's not from a plant. Stem cells are in fact animal cells. Has anybody heard of the term stem cell?"*

During the lesson, Frank was observed implementing several comprehension strategies to deepen the students' understanding of the content. These strategies include making connections to prior learning, vocabulary knowledge, questioning and summarising. The students were provided with two short passages about stem cells (Appendix N), which Frank read aloud to the students while simultaneously being displayed on the interactive whiteboard (Figure 7.10).

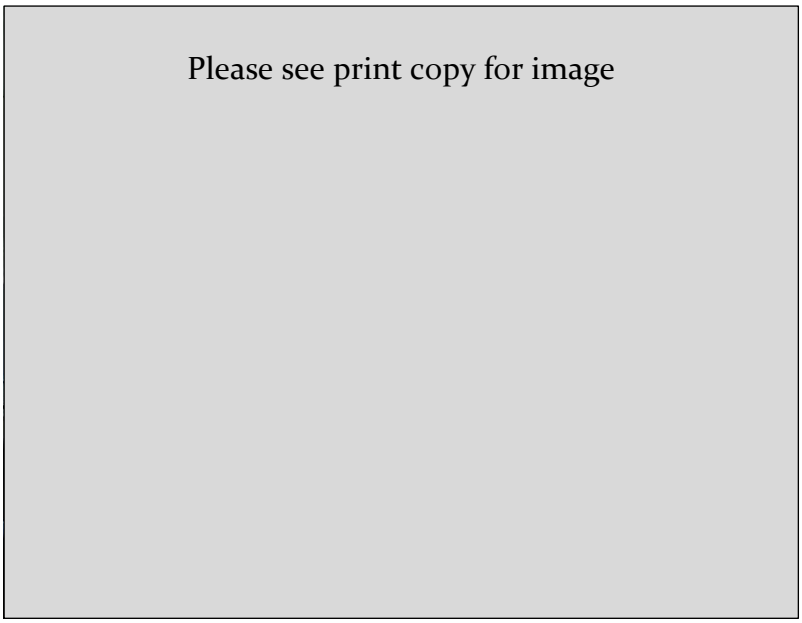


Figure 7.10: Investigating stem cells in Year 7 Science

The first passage (Turn 28) is dense with scientific terms and lacks visual supports such as diagrams or images to aid understanding (SD⇧). Following from this, and without discussion, he immediately asks the students to summarise this passage. The students' responses at this point include,

> "*We tried to write it down, but you were reading too fast…I've no idea…it wasn't in English…. are you going to actually tell us?… a stem cell is?…. really, what is it?*"

The students had some prior knowledge of the content and understood how to construct a summary but appeared to be unsure what to do. The technical terms had confused them. Frank had not provided instruction about how to summarise the passage and had purposefully not elaborated upon the terminology and the text. The purpose of the exercise was to assist students in identifying the importance of understanding the scientific terminology to comprehend the concepts. Further into the lesson (Turn 41) Frank explained,

> "*My point is that some of the information which I read to you is a little bit difficult to understand because they use words that possibly even I don't necessarily really understand. So, we need to break it down into little bits and pieces.*"

Frank explains to his students the importance of understanding the scientific terminology of the content and concepts being taught. He reinforces to the students that understanding the vocabulary of the content is important. That is, in this lesson, understanding the scientific terms surrounding cells, assists learning the required knowledge to deepen their comprehension of topic. Frank considers the vocabulary is,

> *"part of the curriculum they're required to know… they need to know some of that science vocab and glossary of terms as well – it's a fairly integral part of teaching that part of the syllabus."*

He also reminds students that the source of the information is important, especially when considering online sources. He goes on to read the second passage from a website Frank tells the students he considers to be *"more reputable"* (a science-based website) than the previous one (Wikipedia). The language used in the text, while technical, is less dense. Frank facilitates a discussion about the content, with the responses from the students markedly different from earlier in the lesson, indicating their growing understanding of the topic, once the vocabulary is explained contextually,

> *"I think it's a blood cell…. I think it's probably more used as a blood cell…. for damaged tissue…. it's made into a different type of cell…. an unspecialised cell."*

Frank responds to each of the comments, elaborating upon what is said to broaden the students' knowledge of the content, rather than deeper questioning at this stage (SG⇧). He noted that the students *"were processing that information and developing their own definition and I guess they were getting feedback from me too."* To consolidate the understandings made, Frank asks the students to write a summary (SG⇧), prompting them,

> *"…from our first definition which is a little bit harder to understand, from this one which we've got up on our board, plus that little bit of conversation that we had, can we come up with a definition of what a stem cell is? At worst, all you need to do is copy that first paragraph. But if you can put it in your own words that would be better."*

The final part of the lesson sees the discussion turn to the topic of 'stem cell research', 'cloning' and its positive and negative implications. Frank recaps the lesson and assigns the final task, where students are asked to answer several questions in their booklets, using the text book *Science Focus 1* (2005 pp.108-109) as a contributing source of information. Questions include, 'What future possibilities can stem cell research offer?' and 'Can you perceive any problems with stem cell research?' Each of these questions requires the students to move beyond a literal interpretation of the textbook, and to apply knowledge learned in their responses (SD ⇧). Examples of the students' responses to the written questions can be found in Appendix O. As in previous discussions observed in this class, Frank initiates the discussion by questioning the students: *"So, just a show of hands - how can we use the possibilities of stem cells?"*. The student responses are brief, *"for smokers... disabilities.... quadriplegics and paraplegics.... people that have been in serious fires"*, however, they demonstrate emerging understandings of the content. Each is elaborated upon throughout the discussion, providing the background knowledge to support student understandings. Based upon the feedback he receives and the written responses from students, Frank gauges the students' level of understanding of the content to be at a literal level. Deeper understandings of the content, he believes, will become evident,

> *"later in an exam situation where they're given an extended response, or extension activities in class where they are having that deeper understanding, or in smaller groups where they say, "So okay, this is the situation – what would happen if..."*. *I would turn it back onto them and say, "What do you think will happen if..." - that then would give me a deeper understanding of whether they know the content and the theories and stuff behind it."*

Interpretive summary of teacher practice and comprehension instruction

Frank views comprehension as an integral component to learning Science. His understandings and beliefs of comprehension and comprehension instruction in his practice are founded upon two competing viewpoints. Firstly, Frank holds a *"traditional"* view of comprehension, involving passage reading and question answering. As an alternative viewpoint, Frank considers that comprehension in Science requires his

students to construct and create meaning as they engage with the content presented in each lesson.

Throughout each of the teaching episodes, Frank was observed engaging the students in both theoretical and practical teaching and learning experiences to acquire the knowledge and understandings of the syllabus content. Student learning was scaffolded by asking questions, using the relevant metalanguage to contextually explain the concepts, and through extensive teacher-led discussion in each of the lessons observed. From Frank's perspective, comprehension instruction is giving students the knowledge and information required to process content and recall information. He uses a student-led pedagogical approach with those students who understand the content; whereas, with students with literacy difficulties, he takes a more direct or teacher-led approach.

The data reveal Frank's implicit use of the comprehension strategies of questioning, vocabulary, activating prior knowledge and connecting in his practice. He was not observed referring to these strategies specifically with the students or providing explicit instruction in how to use these strategies to bring about deeper understandings or generalisations of concepts. Frank believes that deeper understandings of content are achieved through using discussion with his students. Frank was observed contextualising the metalanguage as a means by which the students will develop their understanding of the content:

> *"I really think their understanding comes from discussion. I'm not the type of person that just writes information up on the board and expect kids (1) to write it down and (2) then to understand it, because I don't know that they do. If I put information up on the board, then more than likely after one or two sentences of writing, I'll step back from the board and be with the group of kids and explain what I've written on the board and then might add extra examples to what I've written up on the board."*

In each of the lessons observed, discussion was instigated and led by Frank, with little student input or deep questioning from them. When asked questions about the topic of

study, the students respond with brief answers, which Frank further elaborates upon. This aligns with Frank's perceptions of his practice. He views questioning as a strategy which informs him of the students' understandings, as,

> *"if they got the content that I was trying to deliver and then they're asking questions related to that, then that's kind of looking for a deeper understanding, not just parroting back the stuff that I told them."*

The data reveal the importance Frank places upon the specific vocabulary the students must learn in Science. Vocabulary as a comprehension strategy is deemed by Frank as,

> *"a fairly integral part of teaching the syllabus. Apart from the fact that it is part of the curriculum that they need to know those vocab words, they need to know the concept, they need to know the word, before they can put it into practice and before they can label a diagram or whatever."*

In each lesson observed, Frank was consistently using the requisite vocabulary with his students and expecting the students to do the same.

Case 7: Gail – Year 8 Science

Comprehension as speaking scientifically

Gail's understandings and beliefs of comprehension in the curriculum domain of Science are based upon the notion that comprehension and literacy are one and the same thing, commenting, *"I don't think they're (comprehension and literacy) different at all."* She considers comprehension in Science as vital to building scientific literacy, stating that the most important aspect of comprehension in Science is *"definitely the literacy."* Conversely, Gail views comprehension as content dependent and taught only as needed to students requiring extra support as "*more of a specific thing than a class-wide thing"*, rather than as an opportunity to build meaning to aid the learning of content. She expresses concern that her understanding of comprehension in the context of Science "*is not as good as it should be"*, explaining, *"I think that's mainly because it's so content heavy that the kids struggle to understand things before we move on."* The 'time pressure' to complete content at the expense of understanding is a common theme

emerging amongst the Years 7 and 8 teachers and will be further explored in Chapter 8. She states, *"comprehension doesn't mean the same to every person"*, and therefore her students comprehend the content in accordance to their own abilities and learning styles.

Gail's perspectives and interpretations of comprehension differ in some ways to other teachers in this study. Her focus is upon literacy 'as' comprehension, whereas others have identified making meaning as the integral component of comprehension in their curriculum domain. Like each of the teachers, she is adamant that comprehension and comprehension instruction is important and central to her role as a Science teacher. She states that comprehension is "*definitely not a background afterthought; it's probably first and foremost"*, with comprehension instruction being vital to the building of scientific literacy.

The requisite vocabulary of the syllabus content, and "ongoing opportunities to develop their use of the specific language and terminology of science to communicate their knowledge, understanding and skills" (Board of Studies NSW, 2003b p.17), is the aspect of comprehension which Gail identifies as the most important for student understanding, as she perceives that this is what comprehending Science is. The basis for this understanding may stem from the syllabus documents. *Science: Years 7 – 10 Syllabus* (Board of Studies NSW, 2003b) acknowledges that the responsibility for teaching literacy rests with all secondary teachers, and identifies that each learning area creates its own literacy demands for students. Gail's interpretation of this statement supports her viewpoint of disciplinary literacy and comprehension as being the same thing, where she identifies the most important aspect of comprehension instruction as being,

> *"definitely the scientific literacy. Needing to grasp a whole new language, learning that certain words may have different meanings. Once they (the students) get the literacy down pat, everything else is quite easy… I think if they can't grasp the vocabulary, that's enough to set off a domino effect where they start to struggle… they need to get that vocabulary*."

Gail identifies several comprehension strategies she uses in her practice to build student understanding, such as summarising and questioning,

> *"varying the techniques, making sure there's something that all the kids can do. All within the same topic, we might do summarising from the textbook, the next day I might get them to answer some questions or they might do a 'prac' but all in the same context, so each child has the opportunity to learn something, because everyone comprehends in a different way."*

Observations of Gail's practice reveal the modelling of comprehension strategies contextually and implicitly in her lessons, such as making connections, predicting and activating prior knowledge. No explicit instruction of comprehension strategies was observed to support student conceptual or content knowledge. She prefers to use contextual opportunities to teach comprehension strategies in theoretical lessons, such as the glossary, explaining:

> *"we do it as we go. If I see something that I think they're going to need to know, I'll say, "Okay, turn to your glossaries, write this word in, and write this meaning in". I think it just sinks in better that way."*

In practical lessons, *"there's not much comprehension you can do though when you've got a double period of a prac to do."* Her viewpoint here arises from a belief that comprehension is a text-based activity, rather than one where understandings build from what is also seen, heard and experienced. Gail identifies "*the vocab, the literacy*" as the predominant comprehension strategy she specifically teaches her students. She is cognisant that understanding the vocabulary and terms in Science affords the students opportunities to develop their scientific literacy, "*because if they haven't got a basic understanding of scientific literacy, that's when they start to fall behind.*" Her position privileges the knowledge codes, where the content learned, particularly the vocabulary, is of the greatest value, as "*a sentence is not hard to understand; it only becomes hard if you don't understand one word*." To achieve this goal, Gail emphasises the building and use of a glossary of terms by her students:

"The glossary, that's a new thing, I don't know any of the other science teachers that do that. That was something I've started from scratch… it helps them (the students) study because they're pulling out words that they otherwise wouldn't have looked at and it gives those who may have struggled with the concept a second glance."

As noted with other Years 7 and 8 teachers in this inquiry, Gail's pedagogy foregrounds the knower codes towards the comprehension knowledge and skills her students have in her class. She states that her students already possess the comprehension strategies they require and therefore need no further instruction. She does acknowledge that, for some students, *"I have to explain the actual concept of what we're doing to"*; although the data reveal that this is more likely to be for organisational matters than for instructional purposes.

Gail acknowledges that students will demonstrate their understanding of the content taught in a variety of ways. She considers that students are applying comprehension strategies in their learning when less questions arise in class about organisational matters and the students begin to increase their use of the requisite vocabulary:

"*They start to ask less and less what it is they're supposed to be doing, and those key words start to turn up in their books and prac reports and in their exams, or they come into class and might say, "Miss, guess what I remember" and they'll repeat it back to me."*

She places great importance on peer-supported learning to indicate the students' understanding of content and concepts of the syllabus:

"*They're very quick to ask each other what something means; if they need a bit of help, I'll push them together and make sure they're talking to each other."*

In addition to peer-supported learning, Gail considers that most of the understanding of content and ideas in her lessons *"is set up with the theory lessons"*, which is then "*reinforced and established during practice tasks… as getting your hands in there and*

doing it is the best way to remember it." Referring to the notes that students generate in class, Gail considers these as evidence of student understanding, as she

> *"can often tell whether they understand or not by looking at their notes because they start off strong and it trails off very messy because they don't understand, they don't care."*

To assist the students in their learning, she goes on to say,

> *"I often get them to not copy word for word but write it in their own words or summarise it in dot points. I've got some students that prefer flow charts or diagrams."*

Furthermore, Gail considers more formal evidence, such as written examinations, as a means of measuring the student's deeper understandings of content.

The Lessons

I observed Gail across three, fifty-minute lesson periods, at times nominated by her. Each lesson observed was from a different unit of study. The lessons each had a theoretical component, with one lesson only including a practical component. Lesson One was a theoretical investigation of the heat transfer process of conduction, convection and radiation, as part of the unit of study, *Air and Atmosphere.* Lesson Two examined metals, non-metals and semi-metals of the Periodic Table as part of the unit of study, *Elementary My Dear*; whereas Lesson Three was a theoretical and practical lesson where students made wet cell batteries as part of the unit of study, *Electricity: The Spark*. Figure 7.11 illustrates the sequence of lessons observed.

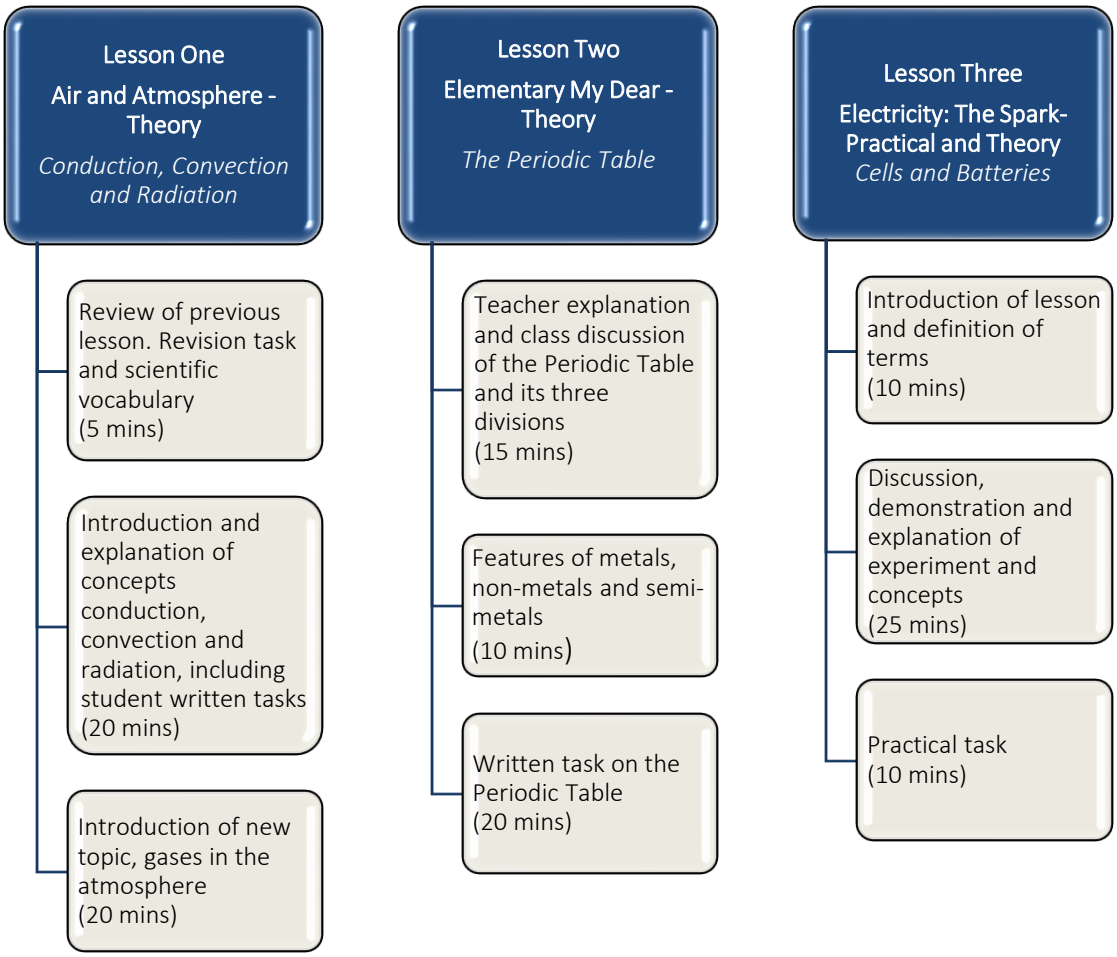


Figure 7.11: The sequence of lessons observed in Year 8 Science

To provide the reader with an insight into the teacher and student activity across the duration of the lessons, each has been outlined in greater detail in Appendix L. Furthermore, a descriptive summary of Lesson One will provide a detailed analysis of comprehension events as they occurred. This lesson has been selected as it provides evidence of Gail's position and interpretation of comprehension and comprehension instruction in her practice.

Duration	Teacher activity	Student activity	Resources
7 mins	Review student knowledge of scientists and their contribution to the topic	Respond with comments, referring to the workbook activity as they do.	Student workbook
20 mins	Introduce concepts of heat transfer in conduction, convection and radiation, explaining the scientific vocabulary as the students complete the workbook tasks	Respond to questions Students respond to questions using some scientific vocabulary and complete the workbook tasks as instructed	Student workbook
20 mins	Introduction of a new concept - gases in the atmosphere Instruct students to complete a written task using the textbook as a reference	Questions asked as needed Record responses to a 'cloze' passage	Student workbook

Table 7.3: Year 8 Science - Overview of teacher and student engagement in Lesson One *Conduction, convection and radiation*

Lesson One – Conduction, convection and radiation

Lesson One, which is outlined in Table 7.3, comprises three separate components. Gail first reviews a written question and answer task on historical aspects of understanding air pressure and important scientists. The content is derived from a textbook, *Science Search 2* (Laidler, 2005), and was completed by the students in the previous lesson with a substitute teacher. The format of the task is similar to the 'traditional comprehension' tasks which Frank (Year 7 Science) has referred to as suitable to leave for a substitute teacher. The instructional sequence for the initial part of the lesson may be viewed using the principles of the semantic codes. Each question asked from the textbook chapter is aimed at increasing the students' understanding of the historical development of air pressure concepts. The questions demonstrate strong semantic density and provide little context for the students. Their responses are literal, with strong semantic gravity. The initial questions asked are literal, asking the students *"to identify four scientists and one invention and tell us a little bit about what they did or what they do."* Gail asks questions about each scientist, such as, *"Galileo. Who can tell me what he did?"* The

students' responses, "*He was the first person to weigh the atom"*, were factual responses, and no elaboration beyond the textbook was sought by Gail. An example of the students' responses is located in Appendix O.

The continuation of the lesson introduces the concepts of heat transfer. Figure 7.12 is a visual representation of part of the instructional discourse in this part of the lesson. A transcript of the analysis is located in Appendix M. Gail questions the students (Turn 1) to determine their existing understanding of the concept of conduction (SD⇧). The students respond using the specialised content language, which is reinforced by Gail. This is an important aspect of student understanding for Gail, as she views understanding the vocabulary as a conduit to understanding the scientific concepts being studied. She further explains heat transfer and conduction using terms contextually (SG⇧) such as atoms, particles and vibrate (Turn 9).

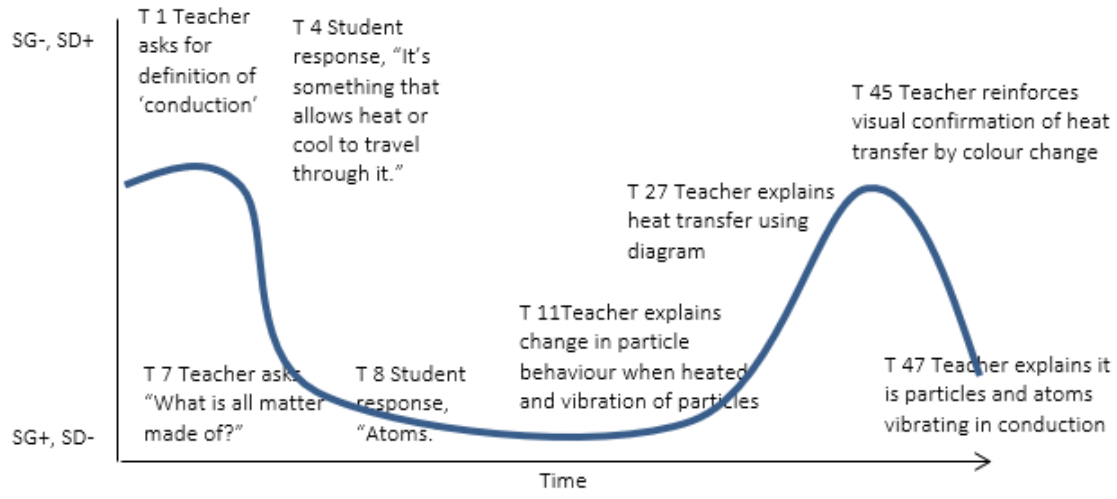


Figure 7.12: Semantic wave in teaching and learning about conduction in Year 8 Science

As new content is introduced, Gail uses visual prompts from the workbook and diagrams drawn on the whiteboard to aid student understandings, encouraging them to ask questions as needed to clarify their understandings, as seen in Figure 7.13.

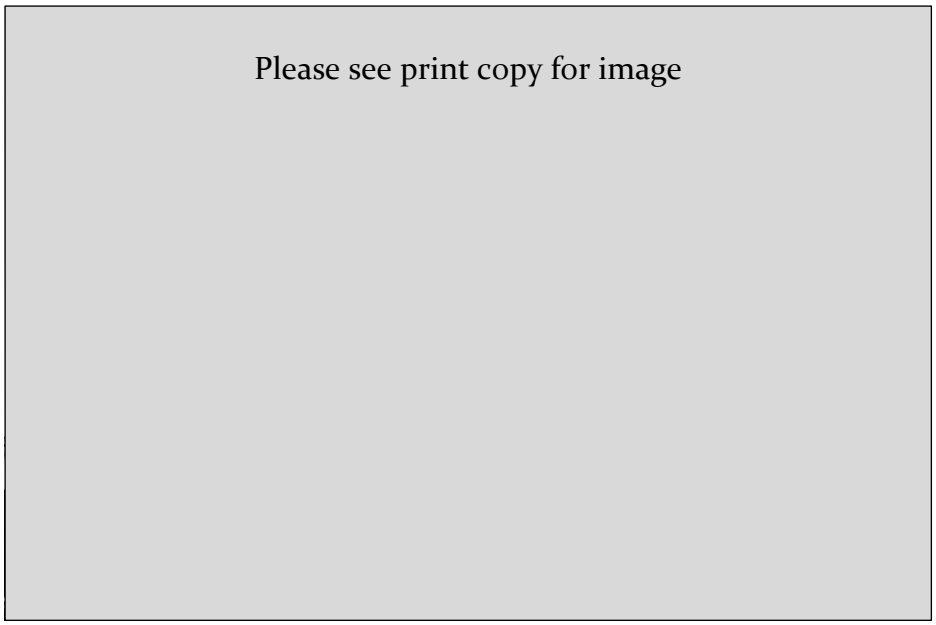


Figure 7.13: Understanding heat transfer in Year 8 Science

The data reveal Gail's use of the scientific vocabulary she wants the students to know and understand, for example, 'conduction', 'atoms', 'particles', 'radiation' and 'convection'. She explains the terms using examples, and in the context of the diagrams she models for the students to draw in their books (Appendix O).

An interesting observation is the language used by Gail as she responds to the students' questions. As stated, she values vocabulary as scientific literacy. While no explicit or overt instruction was evident in the use of this vocabulary as a strategy for deeper understandings, her students were observed using the technical terms, commenting that *"we need to be scientific"* (Turn 15). In the lesson, Gail uses a combination of technical terms, for example, *"The heat is heating up the rod…there are particles in there"*, and conversational language as she draws a diagram (Turn 27), for example, *"… the hotter they get, and that guy might bump into this guy and they'll start vibrating as well."* The use of the conversational language could be considered to be a strategy to repack the concept in terms her students could relate to.

Some students ask questions which are directly related to the content and demonstrate their prior knowledge of the vocabulary and concepts from a similar unit of study in Year 7 (Turn 20). For example:

> *"Is this why when you have like a pan on the stove and the handles get hot? …. You said they vibrate? So, you can actually see them vibrating? …… Are they molecules? So, the atoms are vibrating?"*

Other students asked procedural questions, typically about the drawing of diagrams rather than content-based queries. In this part of the lesson, Gail imparts content knowledge, elaborating on the students' questions to further their understandings. This is supported in the data, where student diagrams and notes of the concept are copied directly from the whiteboard. She comments to the students (Turn 35):

> *"You can either write the description or you can draw it in – however, it's best for you to understand it."*

As the body of the lesson continues, Gail introduces the concepts of convection and radiation. Using a similar pedagogy to that for teaching convection, Gail uses discussion and diagrams to support student understanding and identifying differences between each form of heat transfer.

The final component of the lesson is the introduction of a new concept, of gases in the atmosphere. The students to turn to the next page of the workbook, a 'cloze' passage' (Appendix O), which Gail uses as the impetus for introducing the relevant concepts and terms about gases in the atmosphere.

The data show that Gail is the provider of the knowledge at this initial stage of the syllabus program. Many questions asked by both Gail and the students are literal and fact based, requiring no inference or use of prior knowledge by the students, with answers provided by Gail rather than the students. While Gail does question the students throughout the lesson, their responses are one or two words in length and show limited understanding of the concepts being taught. The questions asked and

answered remain literal and fact based. Gail's interpretation of the teaching of comprehension strategies in the lesson focuses upon the written task, with her commenting,

> *"a lot of it was a comprehension task where they had to actually go to the textbook and fill in the blanks… that doesn't come without them asking questions and clarifying it… By me questioning them, I can judge where I need to go for future lessons, and by them questioning me, they, hopefully, get the clarification they need."*

Differences between the understandings Gail has about what comprehension is and how it is taught within her lessons have emerged in the data. Her perception of the 'cloze' passage as teaching comprehension is a commonly held belief identified in the research literature, whereas tasks such as these assess comprehension rather than teach comprehension (Durkin, 1978, Ness, 2009, 2011).

Gail demonstrates a disciplinary literacy approach to comprehension, identifying the literacy skills required by students to support their understanding of the Science. Each of the comprehension strategies identified by Gail (vocabulary, questioning) in this lesson were not explicitly taught to the students but modelled by Gail contextually. Gail identified the importance of using questioning as a strategy with her students, as

> *"you just don't know where the students are, you don't know if they've absorbed anything. They might understand the concept, but they might want to know a little bit more and, unless you question them, that won't come out because a lot of them are quite shy."*

Interpretive summary of teacher practice and comprehension instruction

Gail understands comprehension in Science to be scientific literacy, with an emphasis upon vocabulary. In her practice, she focuses extensively upon the teaching of the requisite metalanguage of Science concepts. This, she believes will build and reinforce student understandings, stating,

> *"I can't teach what I want to teach until I am sure they understand these brand new scientific words that they need to understand. I think I've mentioned before, scientific literacy is a completely different topic… and I just can't even think about teaching my lesson if they don't understand."*

Throughout each of the teaching episodes, Gail engages the students primarily in theoretical teaching and learning experiences to acquire the knowledge and understandings of the syllabus content. She maintains that her pedagogical approach is student-led, stressing that the pathways of discussion in her classroom are guided by her students: "*I let them guide me in the lesson; they tell me what they need and that's where I go."* In the lessons observed, Gail used a predominately teacher-led approach to instruction. Information provided by Gail is copied from PowerPoint presentations into workbooks by the students, with little questioning or discussion by them. She explains the difference between the pedagogical practices observed and her understanding of comprehension instruction in relation to her pedagogical beliefs as a response to student needs on the day. She states, *"there's no such thing as choosing a pedagogy and sticking with it. I need to be very flexible."* She elaborates on this point, explaining,

> "*I guess every day is different and when giving instruction, you've got to think on your feet, you've got to be flexible; you will change how you planned on teaching that lesson. Your class might come in one day and they're switched on, they're wired, they're ready to go, they understand straight away, their comprehension is top of their game and you can go on and teach a more in-depth lesson. Their comprehension depends on the day and the time of day, and that dictates how you will teach a lesson."*

The data reveal Gail's implicit use of the comprehension strategies of questioning and vocabulary in her practice, but she does not refer to these specifically with the students. Nor does she provide explicit instruction in how to use these strategies to bring about deeper understandings or generalisations of concepts. As noted with other Years 7 and 8 teachers, there is a focus upon learning content for examinations to achieve high

marks rather than for enduring understandings of the concepts. To this end, Gail uses a glossary to build the student's vocabulary, as she states,

> *"it's the glossary that's giving them more value, because when it comes to exams, they need to know some key words and that's where they're getting their marks from."*

This point of view conflicts with her beliefs on measuring student understanding, where she prefers to measure student understanding through,

> *"teacher questioning and interactions in the classroom. Even though I think exams are great for assessment of learning, I'm not a big fan of using them to gauge a student's knowledge because you can't prove everything you know in 50 minutes; students often need a much longer time."*

Gail uses questioning contextually as a comprehension strategy as she presents content to the students. The questions asked by her are factual, drawing directly on content knowledge. In each of the lessons observed, there was extensive teacher talk, and discussion. Classroom discussion was observed, with Gail leading and instigating the focus and direction. Student input and questioning varied in the lessons, ranging from minimal to extensive. When asked questions about the topic of study, the students' responses were brief, which were further elaborated upon by Gail.

Comparing teacher practices in Year 5 to Year 8 Science

The Science teachers interpreted comprehension in the Science curriculum from a disciplinary perspective, viewing scientific literacy as the skills and strategies needed to understand Science, in the context of the curriculum content. Interestingly, each expected their students to have a prior understanding of generic comprehension strategies, which were learned elsewhere. Therefore, comprehension strategy instruction was not recognised by the teachers as part of their practice. The pedagogies enacted by each teacher to achieve the curriculum outcomes revealed these perspectives. Elsbeth's (Year 5 and 6) approach to teaching scientific literacy and

therefore building student understandings of curriculum concepts, was to provide her students with practical opportunities to explore and discuss scientific phenomena. Her use of different instructional environments added to the students' practical experiences and understandings of Science. Frank (Year 7) engaged his students in discussion about Science concepts and scaffolded their application of scientific vocabulary in practical and theoretical contexts. Furthermore, he explicitly taught the vocabulary and metalanguage of Science to build his students' understandings of scientific concepts. In contrast to Elsbeth and Frank, Gail held the view of comprehension 'being' scientific literacy, rather than a component of it. She emphasised the importance of understanding the scientific metalanguage, and as such, she too engaged her students in discussions using the vocabulary during practical and theoretical classes.

Summary

This chapter has explored comprehension and pedagogy from the perspective of three Science teachers. A contextual overview to the school's teaching and learning spaces for Science, and the teachers' classes, introduced the chapter. Classroom observations, teacher interviews and student work samples have informed detailed accounts of each teacher's practice. An interpretive summary in the context of the participant teacher's understandings of comprehension, scientific literacy and the curriculum concluded each case. Legitimation Code Theory, specifically the dimensions of Specialisation and Semantics, provided a theoretical frame to analyse the data. The strengthening or weakening of the specialisation codes provided a lens to interpret the teachers' understandings of curriculum and comprehension in Science, while the pedagogical practices enacted by the teachers were interpreted through the lens of the semantic codes. The data revealed the perspectives of comprehension and comprehension instruction in each teacher's practice relative to their understandings of comprehension in the curriculum, scientific literacy and disciplinary literacies. Together with the findings from the preceding chapter, 'The English Teachers', this chapter, 'The Science Teachers', informs the discussion to answer the research questions in Chapter 8.

Chapter 8 Comprehension: Generic strategies or disciplinary practices?

Introduction

This inquiry has explored the beliefs and the understandings of comprehension and the pedagogical practices of seven teachers in the curriculum domains of English and Science, through the lens of Legitimation Code Theory. Collective case study as the method of inquiry saw the researcher immersed in the teachers' practice over a period of twelve months. The inquiry addressed three key research questions:

1. What do teachers of English and Science in the middle years of schooling understand comprehension to be?
2. What are the pedagogical practices of English and Science teachers in the middle years of schooling when teaching comprehension in their subject area?
3. What is the relationship between teachers' beliefs and knowledge of comprehension and their practices in the teaching of comprehension?

The literature shows comprehension to be an active process undertaken to construct meaning from texts read, viewed or heard (Buehl, 2013, Duke et al., 2011, Farrall, 2012, Freebody, 2011, Gambrell et al., 2002, Kintsch & Rawson, 2008, Pearson, 2010, Sadler, 2011, Snow, 2002). Furthermore, comprehension strategies such as *making predictions, monitoring reading and understanding, questioning, inferring, identifying the main ideas, summarising, evaluating* and *synthesising* (Block & Duffy, 2008) are identified in the research as instructional processes teachers may use to support student learning. However, these generic strategies do not address the complexity of teaching comprehension from a disciplinary perspective. Instead, the strategies simplify comprehension to a series of instructional processes without a contextual basis. This then reduces comprehension to a level where deeper understanding of the disciplinary knowledge is not required. In the classrooms observed in this inquiry, the students were expected to read and comprehend disciplinary texts and demonstrate their understanding in discipline-specific ways (Freebody, 2010, Freebody et al., 2013, Moje,

2008, Shanahan & Shanahan, 2008, Unsworth, 2002). Furthermore, the practices of the participant teachers revealed the importance of disciplinarity or 'ways of knowing' the discipline (Christie & Maton, 2011, Clarence & McKenna, 2017, Freebody & Muspratt, 2007, Gillis, 2014, Luckett, 2012, Maton, 2011, Moje, 2010, Wilson et al., 2014) when articulating their understandings of comprehension. In other words, the disciplinary knowledge, and its literacies, were important in guiding the pedagogical choices made by the inquiry teachers in their classroom.

The analysis has considered representations of comprehension and the enactment of disciplinary knowledge in the English and Science syllabus. The epistemic-pedagogic device (Maton, 2014, Maton, 2016) provided a frame to consider comprehension and its relationship to discipline-specific knowledge practices. The specialisation codes afforded an explanation of curriculum and comprehension knowledge circulating within the arena of the epistemic-pedagogic device. Expert knowledge from the production field, such as scientific or literary knowledge, is recontextualised by the education regulatory authorities into official school syllabus documents. These documents include the disciplinary knowledge to be learned, alongside broad statements of expected levels of achievement at different stages of schooling. Comprehension and ways of understanding are identified in the syllabus as desired attitudes and aptitudes of learners in the discipline. In other words, comprehension within the syllabus supports the instruction of disciplinary knowledge (ER⇧ SR⇩) but is considered as a disposition or a 'way of knowing' the discipline (ER⇩ SR⇧). The official school syllabus is recontextualised again by schools into scopes and sequences for each curriculum area. Further recontextualisation occurs with the creation of commercial resources for use in the classroom; for example, the science textbooks used by the participant teachers in Years 7 and 8 Science or the comprehension resource purchased for use by the Years 5 and 6 English teachers in this inquiry. The school scopes and sequences are then reproduced by the classroom teachers as units of study, using the resources made available.

The inquiry has revealed specific examples of the organising principles (the legitimation codes), expressed through the data (observations, interviews and artefacts), about specific objects of study, such as teacher beliefs of comprehension as knowledge (Maton & Doran, 2017). The critique of the English and Science curriculum in Chapter 5 has highlighted challenges for the inquiry teachers in determining what comprehension is in the curriculum and how comprehension is represented and enacted in the disciplines. In Chapters 6 and 7, an analysis of the inquiry teachers' understanding of the curriculum expectations and comprehension in their disciplines has described how the organising principles of the specialisation codes have informed the pedagogical decisions made by the teachers. The analysis has identified curriculum knowledge as legitimate knowledge (knowledge codes) in the inquiry teachers' practice. Teacher and curriculum expectations of student learning of discipline knowledge, disciplinary literacies and comprehension are revealed as learner dispositions (knower codes) in English and Science. The organising principles of the semantic codes have facilitated the analysis of specific examples of comprehension pedagogies in teaching episodes, revealing how curriculum interpretations and disciplinary literacies and knowledge are enacted in the classroom discourse. This was observed where a secondary English teacher explained a literary device, such as juxtaposition. The language used by the teacher was known by the students and easily understood (e.g. compare, contrast). Together with specific examples from the text (strengthening semantic gravity), the teacher restated the term using specialised language (e.g. juxtaposition) with another text example (strengthening semantic density). In other words, the teacher used the general term, 'compare and contrast', which had been learned previously. He then used this knowledge to provide a lexical connection for the students when explaining the meaning of a disciplinary specific term, 'juxtaposition'. The teaching and learning sequence did not include generic comprehension strategies, but instead used the text and an image as a contextual basis to support learning. That is, this teacher used his understanding of the disciplinary literacies to support student understanding.

The disconnect between how teachers understand comprehension and how it presents within the discipline is the result of its invisibility within the curriculum itself.

Comprehension is invisible knowledge. It permeates each curriculum and discipline with assumed understandings. The curricula state the importance of deep learning and understanding. That is, the curricula considers their disciplinary knowledge as a foundation for future learning, affording opportunities for learners to build relationships between what is learned and the significance of this knowledge in society (BOSTES NSW, 2012c). It becomes difficult to expect comprehension instruction by teachers when it does not appear as an object of knowledge in the curriculum. When comprehension is viewed from this perspective, the disciplinary literacies of the curriculum domain come to the fore, thus informing the disciplinary practices enacted. This chapter concludes with a discussion on reconceptualising comprehension in curriculum and practice. The complexity of comprehension as a construct, and its usefulness as a term in the disciplines, are considered.

The epistemic-pedagogic device and comprehension

The mindset the participating teachers hold for comprehension and its instruction is explained through an examination of the syllabus through the lens of the epistemic-pedagogic device (Maton, 2014). The official school syllabus is constructed within the recontextualisation field of the epistemic-pedagogic device, drawing on multiple sources of expert disciplinary knowledge in its creation; for example, Physics, Chemistry and Biology in the Sciences; or Literary and Linguistic knowledge in English. The official syllabus is recontextualised again as school curriculums or programs and commercial resources, to be reproduced as units of study by the teachers.

Identifying where comprehension knowledge fits into the arena created by the epistemic-pedagogic device as legitimate knowledge is complex. Comprehension is referred to the outcomes for learning in the English and Science syllabus but is not explicitly identified as curriculum content. The discipline knowledge of the curriculum is, as expected, explicitly stated as the content for instruction. In practice, the teachers must justify to regulatory authorities that the content has been taught and provide evidence of learning, such as student work samples, course marks and documentary evidence. Therefore, the priority for these teachers is to teach the curriculum

knowledge, as this is what will be assessed for understanding. The disciplinary literacies of the curriculum which support the acquisition of curriculum content are not articulated in the syllabus. In other words, how comprehension instruction will occur in the curriculum domains is not explained. For example, the English syllabus includes the outcome statement, in Years 5 and 6 students are to,

> 'use an integrated range of skills, strategies and knowledge to read, view and comprehend a wide range of texts in different media and technologies (EN3-3A)' (BOSTES NSW, 2012b), or in Year 8, 'use comprehension strategies to interpret and evaluate texts by reflecting on the validity of content and the credibility of sources, including finding evidence in the text for the author's point of view (ACELY 1734)' (Australian Curriculum Assessment and Reporting Authority, 2015a).

In Science, the comprehension outcomes are included in the Scientific Inquiry outcomes. In Years 5 and 6, students are to,

> 'compare data with predictions and use as evidence in developing explanations (ACSIS218)' (Australian Curriculum Assessment and Reporting Authority, 2015f), and in Years 7 and 8, 'identify questions and problems that can be tested or researched and makes predictions based on scientific knowledge (SC4-4WS)' (BOSTES NSW, 2012c).

Each statement clearly represents an intention to develop comprehension knowledge in the discipline; but within the syllabus documents, the elaborations provided refer to the students' actions and not the teaching strategies teachers may enact. The disciplinary comprehension knowledge required to support student learning is alluded to but not clearly stated in the curriculum. To this end, the participant teachers have made use of the pedagogical strategies embedded in their disciplinary understandings of the curriculum. That is, the disciplinarity of their curriculum domain has informed the teaching strategies engaged to support student learning. For example, Colin and Deidre (Years 7 and 8 English) emphasised the importance of teaching literary techniques in literature studies, and the demonstration of literary techniques in the

student's written responses. In Years 5 and 6 Science, Elsbeth explained how questioning her students to make predictions in the lesson on the *properties of liquids* was an example of scientific literacy in action. In each case, the teachers have explained their understandings of comprehension from a disciplinary perspective, using their own knowledge of the discipline and interpretations of the curriculum to inform the comprehension practices enacted. In other words, the practices enacted by the teachers are in response to the curriculum requirements and informed by their disciplinary understandings.

The General Capabilities (Australian Curriculum Assessment and Reporting Authority, 2013a) which accompany the curricula state that all teachers are teachers of literacy. However, this position is not supported by the syllabus outcomes of each curriculum. The literature review acknowledged that teachers may be unaware of the specific knowledge and instructional practices required for comprehension instruction in the disciplines. Furthermore, literacy practices, such as comprehension, are perceived as a collection of generic strategies and the province of the primary or early years teachers (Concannon-Gibney & Murphy, 2012, Fang, 2012, Goldman et al., 2016, Smagorinsky, 2015). It is difficult for specialist teachers to be teachers of literacy as stated in the General Capabilities and the National Literacy Learning Progressions (Australian Curriculum Assessment and Reporting Authority, 2018), if disciplinary literacies are ignored in curricula and official support documents. The object of knowledge remains the content, and the attributes the students bring to the content to demonstrate their understanding. When viewed through the lens of the specialisation codes, in such a construction of comprehension, the result of the prioritising of curriculum content by teachers in the middle years is the interpretation of comprehension as a learner disposition, rather than specialised knowledge to be taught.

Building upon the epistemic-pedagogic device (Maton, 2014), comprehension is represented as legitimate knowledge between the fields as a separate entity, circulating in the arena alongside the curriculum knowledge (Figure 8.1). The difficulty in determining its legitimacy lies within the syllabus for each curriculum domain.

Common to each syllabus is the prioritising of discipline knowledge for the domain (knowledge codes) and the dispositions students will demonstrate to successfully engage with the curriculum (knower codes).

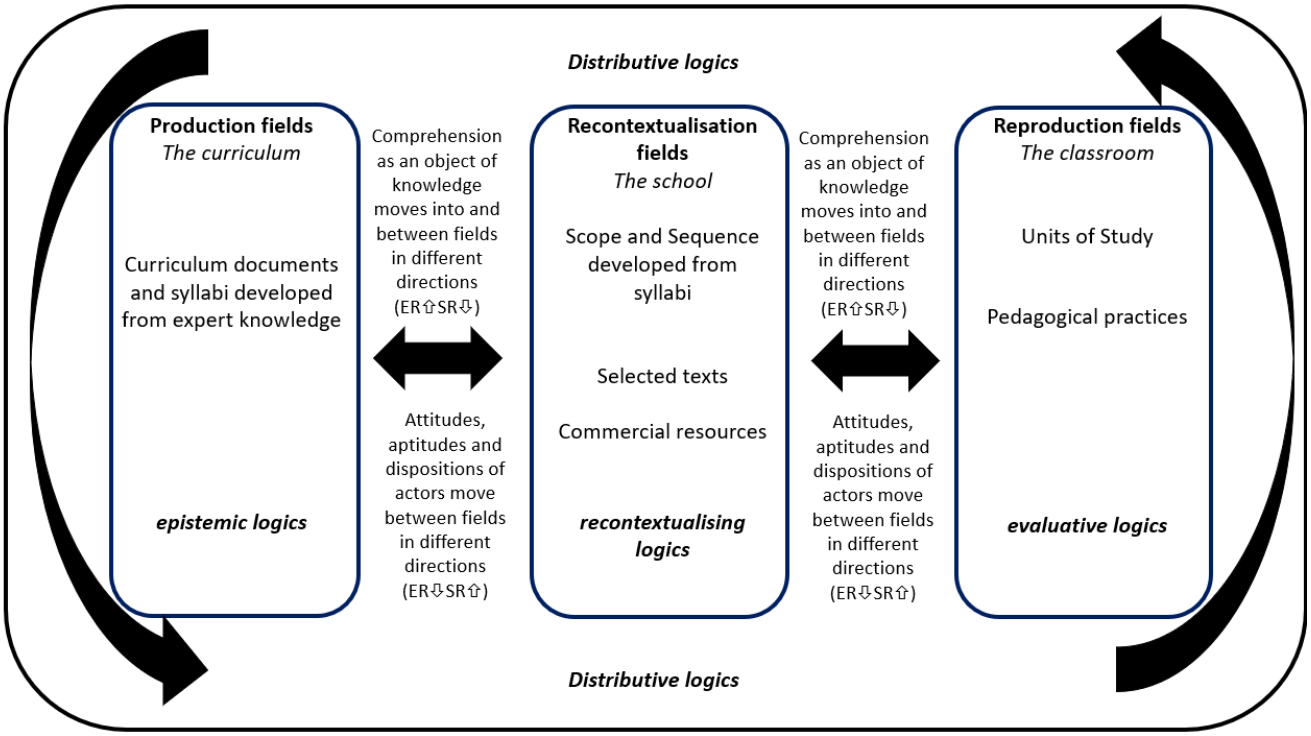


Figure 8.1: The epistemic-pedagogic device incorporating curriculum and comprehension knowledge (based upon Maton, 2014 p.51)

Let's take this further. The modelling of the epistemic-pedagogic device shows how knowledge circulates across and between fields in the arena. The curriculum documents used in schools are created in the recontextualising field and represent the curriculum knowledge that must be implemented in schools. Bernstein (2000) argues that curriculum knowledge is different to disciplinary knowledge. That is, while curriculum knowledge is drawn from the production field, deeper knowledge of the discipline is required to provide effective instruction in the reproduction field. When considering the disciplinary literacies of the curriculum, the teachers' interpretation of comprehension requirements of the curriculum becomes problematic. The strategies or processes for teaching curriculum and comprehension knowledge are not revealed in the syllabus. Therefore, the pedagogy enacted in the reproduction field is in response to the teacher's interpretation of the content knowledge and the curriculum. As such, the

literacy practices enacted by these teachers are grounded in their disciplinary knowledge of curriculum content. For example, Abbey (Year 5 English) interpreted the curriculum outcome, *uses a comprehensive range of skills and strategies appropriate to the type of text being read RS3.6* (Board of Studies NSW, 1998), as an outcome requiring explicit and scaffolded instruction in generic comprehension strategies (comprehension as knowledge ER⇧ SR⇩). While teaching these strategies, she incorporated disciplinary content, such as a study of the text *Shatterbelt*, to provide a contextual basis for her students to practice their newly learned skills. In Year 7 English, Colin also used his disciplinary understandings of comprehension as literary techniques (comprehension as a learner disposition ER⇩ SR⇧) in his interpretation of the curriculum outcome, *effectively uses a widening range of processes, skills, strategies and knowledge for responding to and composing texts in different media and technologies EN4-2A* (BOSTES NSW, 2012b). As students studied the text, *'Boy: Tales of Childhood'*, Colin explicitly taught the literary techniques that would support his students' understanding of the text and ways in which they could use these techniques as a conduit to construct oral and written responses to the text.

The disciplinary literacies and meaning-making practices of curriculum disciplines (Goldman et al., 2016) become clearer in the reproduction field. Figure 8.2 shows a reconceptualisation of the epistemic-pedagogic device to demonstrate how the recontextualising and reproduction fields concerning comprehension in a school context are connected through the distributive logics. The complexity of the recontextualisation field, where curriculum is developed and recontextualised again as school scopes and sequences, is revealed. Comprehension as knowledge (ER⇧ SR⇩) circulates in the arena, as do the learner dispositions (ER⇩ SR⇧). However, in this conceptualisation, the disciplinary literacies that support teaching and learning move between and into each field. In addition, the 'ways of knowing', or the disciplinarity of the curriculum domain, also move between and into the fields.

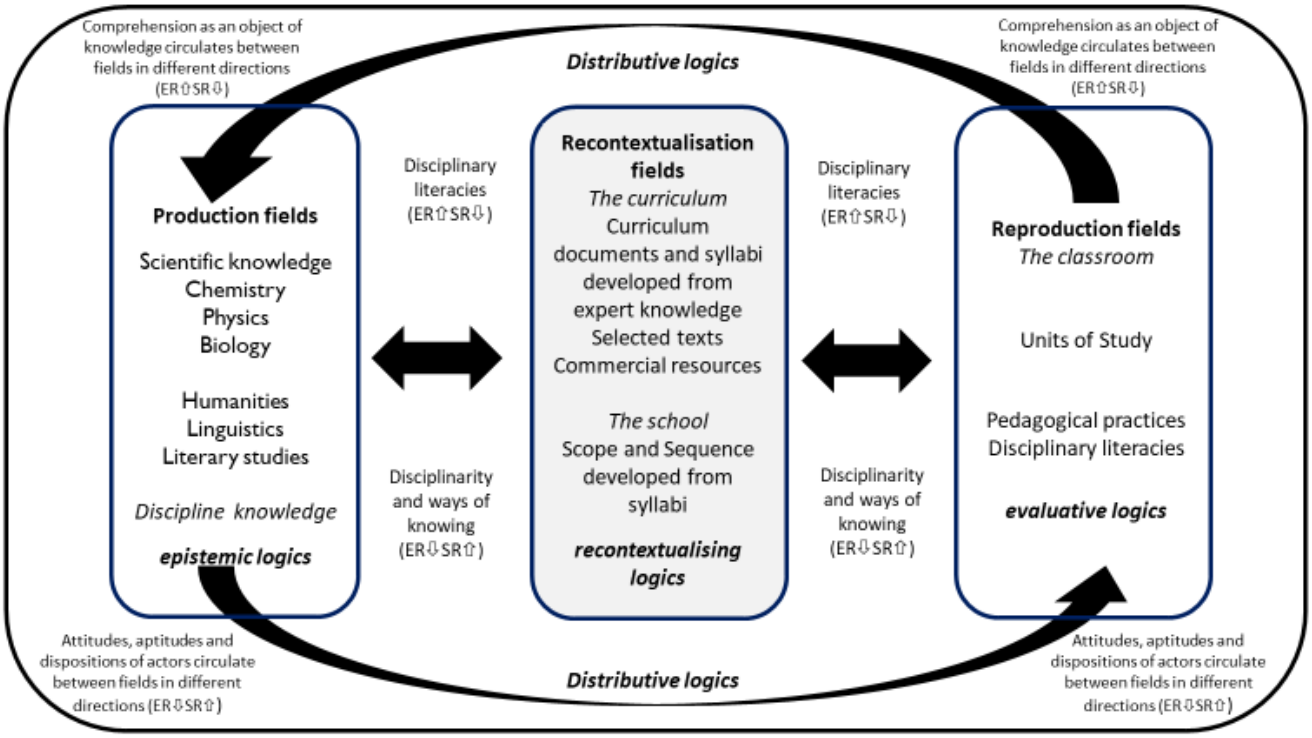


Figure 8.2: A reconceptualisation of the epistemic-pedagogic device incorporating disciplinary literacies and disciplinarity (based upon Maton, 2014 p.51)

What do teachers of English and Science in the middle years of schooling understand comprehension to be?

Comprehension is understood from two perspectives by the teachers in the inquiry, that is: comprehension from a disciplinary perspective, where the discipline informs the literacy practices enacted; which takes precedence in importance over the second perspective, the generic strategies and skills previously learned (Allender & Freebody, 2016, Christie, 1998, Fang, 2012, Freebody, 2010, Goldman et al., 2016, Zygouris-Coe, 2012). The first perspective takes a disciplinary view of comprehension. That is, the skills and strategies used to understand curriculum content are relevant to the discipline and may differ across disciplines; for example, scientific literacy or literary techniques used by the participant teachers. The second view of comprehension is as a set of generic strategies and skills, which have been learned outside of the disciplines and are restricted to assessment-like tasks or the early years schooling; for example, specific instruction in making predictions, activating prior knowledge, identifying the main idea, inference, visualising and summarising.

Interpretations of teacher understandings of comprehension

Interpretations of curriculum knowledge and comprehension in the curriculum are shaped by the disciplinary understandings and prior experiences of comprehension and literacy held by teachers in this inquiry. Comprehension is a contextual opportunity for further learning, responsive to the relevant disciplinary literacies and curriculum requirements. Teachers, in planning and presenting curriculum content to students, must navigate the "literacy demands that are a distinctive expression of each curriculum domain" (Freebody et al., 2013 p.305). That is, they must look beyond literacy strategies such as those taught in the early years of school and consider the discipline-specific knowledge and its inherent literacies. The English and Science syllabus expectations allude to such distinctive expressions, with comprehension and literacy skills embedded within the syllabus. In English, comprehension is referred to as processes and strategies to bring meaning to and extract meaning from texts (Australian Curriculum Assessment and Reporting Authority, 2015a, BOSTES NSW, 2012b); whereas in Science (Australian Curriculum Assessment and Reporting Authority, 2015d, BOSTES NSW, 2012c), the Science Inquiry strands facilitate scientific literacy. Such disciplinary perspectives are not viewed as comprehension in the curriculum, but as an integral component of teaching and learning in the curriculum domain. Fang states, "What counts as text and literacy varies considerably across disciplines" (2014 p.444); and the teachers' beliefs and understandings reflect this position. The English and Science syllabus outcomes are content knowledge outcomes. Curriculum instruction and evaluation is paramount, where content must be taught and known by the students and be available to be assessed, primarily in examinations and written tasks.

Collectively, the teachers in this study have identified comprehension from a disciplinary perspective as being an important aspect of their practice, understanding it to be the process students undertake to gain meaning from the syllabus content. While the teachers have stated the value and importance they place on comprehension to learning, they found it difficult to articulate their understanding of comprehension in their curriculum domain. Figure 8.3 is a representation of the common interpretations of comprehension held by the inquiry teachers.

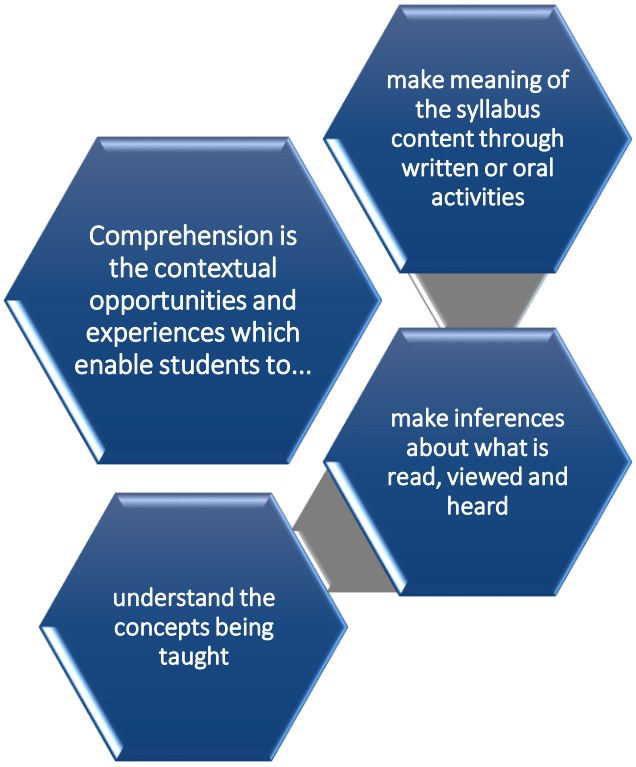


Figure 8.3: Common understandings of comprehension in English and Science

The participant teachers have been afforded different opportunities to learn about and reflect upon the concept of comprehension in their professional preparation and subsequent learning. Each teacher has drawn upon their own experiences of teacher training and professional learning opportunities to explain their understandings of comprehension. Their experiences in learning about comprehension in their specialist areas have differed. The secondary specialist teachers have commented that comprehension was not part of their pre-service teacher training. Ongoing professional learning in the school for these teachers has focussed upon curriculum matters. This contrasts with the experiences of the primary teachers, where there was an emphasis on literacy instruction in their teacher training and ongoing professional learning in literacy (Appendix H). Hall (2005) and Love (2009) have emphasised the importance of building teacher pedagogical knowledge of literacy practices in the disciplines, particularly in teaching training courses. Abbey (Year 5 English) completed her teacher training degree in the year prior to the inquiry and had been immersed in comprehension and its instruction as part of her degree. Conversely, Colin's (Year 7 English) pre-service teacher training did not include units of study on comprehension

or its instruction. He holds a disciplinary perspective on comprehension, based on his interpretation of the English curriculum and university experiences, and considers teaching literary techniques as comprehension instruction, as well as understanding text forms and features. Similarly, the Science teachers stated that they were not aware of comprehension strategies and their instruction, as it did not form part of their pre-service training. All three teachers consistently acknowledged the disciplinary approaches of scientific literacy to support student learning.

The *traditional* form of comprehension instruction is described by some of the participant teachers as a set of question and answer tasks based on a text, to be 'done' as a worksheet or when a substitute teacher is on the class. This interpretation suggests comprehension as a behaviour or soft skill (e.g. critical thinking) previously learned and held by the students to access knowledge in each discipline (Allender & Freebody, 2016, Christie, 1998, Freebody, 2010, Zygouris-Coe, 2012). Furthermore, each specialist teacher has emphasised time constraints in completing all aspects of the syllabus in the required timeframe, leaving no instructional time for comprehension instruction. Such perspectives are typical of the perception, identified in the research literature, wherein literacy or comprehension instruction is viewed as an extra component to the syllabus and disciplinary literacies are overlooked (Goldman, 2012, Poulsen & Avramidis, 2003, Tang, 2015).

The secondary specialist teachers in this inquiry view comprehension with a broad lens of disciplinary understanding. By contrast, the primary teachers have included comprehension strategy instruction as an integral component of the Years 5 and 6 English units of study. These skills and strategies are then incorporated to support literacy and knowledge learning in other disciplines, such as History or Geography. Comprehension to the participant teachers is making meaning of disciplinary knowledge using the language of the discipline and specific strategies to build conceptual knowledge and understandings in that discipline. The teachers recognise that the generic skills, such as *questioning, identifying main ideas and making predictions* (Block & Duffy, 2008), taught to students in the primary school years are not sufficient

to sustain their learning of complex disciplinary knowledge taught in specialist subjects (Allender & Freebody, 2016, Shanahan & Shanahan, 2012). Each teacher has placed a strong emphasis on teaching students the disciplinary literacies of the curriculum domain. This has included understanding text structures and inquiry processes and, importantly, the nature of disciplinary specific discourse and metalanguage (Goldman et al., 2016).

Comprehension as instruction within the teachers' curriculum domain

The teachers in this study consider comprehension to be a crucial conduit for students to engage in understanding syllabus content. It is highly valued and central to understanding. This viewpoint is an interesting one, as it ignores comprehension instruction as knowledge of strategies and skills and focuses upon comprehension as a disciplinary construct to support learning. Comprehension skills and strategies are viewed as desirable learner dispositions, taught elsewhere, in the early years of school. The Science and Years 7 and 8 English teachers consider these as learner dispositions of the students, thus privileging the knower codes in their curriculum domain. For these teachers, comprehension is two strands, based on its appropriateness to the learning context. Such a position on comprehension instruction, *"depends on what you think comprehension is."* Neither position incorporates instruction in comprehension, but instead uses learning tasks that are contextual and of a disciplinary nature, such as vocabulary and discussion, or generic, such as question answering using passages of text. Of value are the key disciplinary literacies, such as student understanding of metalanguage, text structures and existing disciplinary knowledge.

By contrast, the teachers of Years 5 and 6 English in this study have identified comprehension as an instructional component of the English curriculum, where *"good comprehension instruction brings about good comprehension."* The skills and strategies, as we have seen, are utilised by both students and teachers contextually across each of the curriculum domains, but explicitly taught in English. *"More than reading words"*, comprehension and its instruction is pivotal in enabling students to access knowledge across the curriculum domains. It provides the *"tools for learning across the curriculum,*

building foundations and capabilities." For these teachers, strategic instruction and knowledge of the generic skills and strategies for comprehension is part of their practice.

Interestingly, the participant Science teachers consistently emphasised the importance of teaching scientific literacy. They considered scientific literacy to be knowledge of the language of science, where understanding the metalanguage is a foundation skill for success in school Science. Scientific literacy has multiple and often conflicting meanings. Reference has been made to scientific literacy being the skills required to understand scientific terms, and to read and write scientifically. Some consider it to be an understanding of the practices of science, while other interpretations refer to the disciplinary ideas, concepts and practices inherent to science instruction (Pearson et al., 2010, Houseal et al., 2016). Furthermore, scientific literacy is understood to be how scientific knowledge is used to acquire new knowledge, explain scientific phenomena, and make evidence-based conclusions (Goldman et al., 2016, Grant & Lapp, 2011, Hicks et al., 2017, OECD). To each of the Science teachers, scientific literacy provides the basis of comprehension and disciplinary understanding in school Science.

Comprehension as instruction across the curriculum domains

It cannot be denied that each of the teachers in the inquiry considered comprehension to be an integral component of learning. They state it is a process which *"can't hurt… aids learning…builds capabilities…is a tool for learning and supports students to navigate texts and write responses."* Contrasting perspectives on comprehension instruction bear a relationship to the curriculum domain and the age group taught. Years 5 and 6 English teachers view comprehension and its instruction holistically, teaching strategies in English with a co-curricular focus. This differs to the Years 7 and 8 English teachers: here, a greater emphasis is upon assessment of the content and preparation of skills, such as written responses for future learning and high stakes examinations. The literacy strategies enacted are disciplinary in focus and include the development of understanding of writer techniques and literary devices to support understanding. The Science teachers state that comprehension supports understanding to build knowledge

for future learning. This is revealed through continued instruction of Scientific literacy strategies, although these strategies are not labelled as comprehension.

With the exception of the Years 5 and 6 English teachers, none of the teachers consciously taught comprehension strategies (Block & Duffy, 2008) as knowledge to students. Comprehension was viewed as an isolated or non-contextual task, not a strategy to be learned in the disciplines. Elsbeth (Years 5 and 6 Science) and Deidre (Year 8 English) considered comprehension as a *"primary school matter"* to be taught by the primary class teacher. Frank (Year 7 Science) viewed comprehension as a passage of text and questions, stating, *"I don't teach like that."* Similarly, Gail (Year 8 Science) viewed comprehension instruction as something that was useful only to students who were struggling with their learning.

By contrast, the Years 5 and 6 English teachers made conscious decisions to explicitly teach comprehension strategies to their students. Both Abbey (Year 5) and Benita (Year 6) stated that comprehension needs to be taught, but that *"the strategies are not the definitive aspect of comprehension."* Rather, they are an array of transferable *"tools which the students can select from"* to be applied contextually. This, they say, supports the students to become independent learners, enabling them to select and use the appropriate strategy to meet their needs.

A visible connection for these teachers between comprehension instruction, the syllabus and the content to be taught, was not evident. Comprehension outcomes are included in the English and Science syllabuses, using terms other than comprehension. In Science, the inquiry skills outcomes represent the comprehension skills and strategies to be taught. In English, terminology such as *respond, interpret, analyse, evaluate and explain* is representative of the comprehension outcomes. The terminology used indicates the actions the students must take to understand the content. The curriculum does not elaborate on how teachers may teach these actions.

The findings show that each of the teachers in this study is a strong advocate for literacy in their discipline, consistently highlighting its value and importance. The importance of understanding the subject's metalanguage as a crucial skill to enable students' understanding of content is acknowledged by each teacher. In the lessons observed in both disciplines, the teachers consistently referred to and used the relevant metalanguage to aid student learning. Despite this general agreement, participants varied in their accounts of how students acquire deep content understandings. In Years 5 and 6 English, the teachers understood this to be part of comprehension instruction. The other teachers did not, stating the vocabulary is part of the curriculum and must be taught. The Science teachers did not articulate a connection between comprehension and scientific literacy. Nor did the Years 7 and 8 English teachers identify connections between instruction in writing techniques or literary devices as comprehension instruction. This is not to say that a connection does not exist. As such, the pedagogies enacted aided learning, but the teachers did not deem this to be comprehension instruction but part of knowing how to understand and learn the content. Moreover, the disciplinary perspectives of comprehension held by these teachers are beyond the stated expectations of the syllabus. In other words, the participant teachers' understanding of the disciplinarity, or 'ways of knowing' the discipline, informed the literacy practices selected and enacted.

Code shifts

The positioning of the teachers' understanding of comprehension is domain- and grade-specific. Using the specialisation codes, changes in strength between the object of knowledge (epistemic relations ER) and the practices and the subject (social relations SR) signify a code shift or a change in the 'rules of the game' (Maton, 2014, 2016). Comprehension is a learning focus in the early years of school. According to the participant teachers, it forms part of the 'primary way' of teaching; that is, a knowledge-based approach to develop the skills of learning. In early reading instruction, comprehension is often text-based, with texts selected by the teacher to reflect curriculum units of study. As students move on from 'learning to read', comprehension becomes more complex as students 'read to learn' using increasingly specialised texts in

late primary and early secondary school. As students move into secondary school, content knowledge and the attributes of the learner, together with their ability to make meaning from the content, become increasingly important. Once a student is in secondary school, they need to become a different kind of learner, demonstrating more abstract understandings and assumptions of knowledge. They need to learn 'how to do' each subject and identify the valued learner dispositions and criteria for success. This has been referred to as disciplinarity, or the ways of understanding knowledge in a discipline (Christie & Maton, 2011, Clarence & McKenna, 2017, Maton, 2011).

The findings of the inquiry show how each discipline recognises the dispositions of the 'right kind of knower', who can access the discipline's legitimate knowledge according its rules of the game. For example, the English teachers in this inquiry value attributes such as strong writing and examination skills. The Science teachers consider the students' use and understanding of science terminology a strong learner disposition. Teacher views of curriculum priorities and the attributes of learners shift as students transition from primary to secondary school. Comprehension knowledge as legitimate knowledge weakens as the learner dispositions for comprehension strengthen (ER⇩ SR⇧), foregrounding the knower codes. Such a code shift in the disciplinary expectations for comprehension becomes clearer as students move through the years of schooling.

What are the pedagogical practices of English and Science teachers in the middle years of schooling when teaching comprehension in their subject area?

Maton's epistemic-pedagogic device (2010, 2014) provided a lens to examine the pedagogical practices enacted by the teachers in the inquiry, where knowledge is said to be transformed, transmitted and acquired (Bernstein, 1990, 2000) in the English and Science classroom. The specialisation codes provided a frame to explore aspects of disciplinary knowledge and knower dispositions. In addition, the semantic codes (Maton, 2013, 2014) brought a contextual understanding to the forms of knowledge generated and facilitated the exploration of the disciplinary practices teachers enact to foster understandings of content and concepts in their students. Of interest are

discipline-specific practices within the curriculum domains, as well as common practices across the domains.

Pedagogical practices for comprehension instruction

The pedagogical practices enacted by the teachers in comprehension instruction varied between disciplines and across years of schooling. Furthermore, the data analysis revealed disparities between what the teachers understood comprehension to be and how comprehension was enacted in their practice. The teachers of Science and Years 7 and 8 English maintained a disciplinary approach to comprehension instruction. As discussed earlier in this chapter, much importance was accorded to comprehension, but not its instruction. Conversely, the teachers of Years 5 and 6 English explicitly taught comprehension strategies.

Comprehension instruction is not part of the lexicon of the disciplines and lacks a common language across the curriculum domains. Instruction in comprehension is not at the forefront of these teachers' mind as they teach the content, with all but the Years 5 and 6 English teachers stating that they do not teach comprehension. Deidre commented, *"I didn't think about the strategies I should use, I just check in with the students."* The Science teachers referred to worksheets and textbooks as comprehension instruction. Elsbeth commented, *"we don't do comprehension"*; while Gail mentioned, after one of her lessons, *"Comprehension strategies. That's a hard lesson to get different strategies into."* In addition, the Science and Years 7 and 8 English teachers considered that comprehension strategies were assumed knowledge and therefore required no further instruction. Both Elsbeth and Colin commented on the value of knowing the generic comprehension strategies in their practice, stating, *"If they don't have that much meaning but I'm doing it, do I really need to know what they're called?"*

The position taken by the teachers is in keeping with a view of comprehension being generic skills previously taught. Conversely, Abbey and Benita (Years 5 and 6 English) incorporated the terms used in classroom comprehension instruction, for example making predictions, using prior knowledge and questioning, across the curriculum, and

prompted the students to use their knowledge of strategies, as this was not yet 'automatic' for them.

An interesting point emerging from the data is the contrast between what teachers understood comprehension and comprehension instruction to be, and what was observed in their practice. Each of the teachers included disciplinary comprehension instruction in the lessons I observed, primarily questioning and vocabulary instruction. The strategies being undertaken were tacit, and the focus was on what to learn, not how to learn. Looking through the lens of the semantic codes, the discourse of the lessons observed showed strengthening semantic gravity (SG⇧ SD⇩) for much of the lessons. While content knowledge was unpacked and repacked, comprehension skills and strategies were not. Limited movement did occur up the semantic wave, but the discourse remained contextually syllabus content dependent. Generalisations of understanding concepts were not clearly observed. Such practices are exemplified where writing longer responses and focusing on higher marks through written tasks were highly valued.

Interestingly, the teachers have highlighted classroom discussions as an indicator to gauge student learning. Moreover, each acknowledged the value of classroom discussion in informing them of student understanding of content at the point of instruction. Classroom talk and discussions afforded opportunities to build conceptual foundations for later learning. Points raised between teachers and students were disciplinary specific, suggesting that these teachers consider such actions as disciplinary literacies rather than comprehension strategies and skills. In Year 5 Science, as the class walked to the school farm for the initial lesson of *Poultry: An introduction*, the teacher and students engaged in a discussion about the student's prior understandings of farming and rearing poultry. As ideas were exchanged, the teacher determined the extent of existing knowledge and future learning needs. In Year 7 Science, classroom talk during practical experiments in cell biology saw the teacher rephrase questions, explain terminology in context, and elaborate on responses to support comprehension. The exchange of ideas provided evidence to the teacher of the depth of student

understanding of the concepts. Similarly, in Year 8 English, classroom discussion facilitated the sharing of ideas of themes in the text, *A Midsummer Night's Dream*. Such pedagogies reveal the disciplinary nature of comprehension instruction not revealed in the syllabus. The curriculum knowledge was explored in a manner aligned with the teacher's' perspective of comprehension in the discipline.

Discipline-specific practices

Previous discussion has explored how understandings of comprehension are shaped by the teachers' prior experience and the curriculum domain. Discipline-specific practices for comprehension instruction have emerged from the data, as have common practices. These are seen in Figure 8.4.

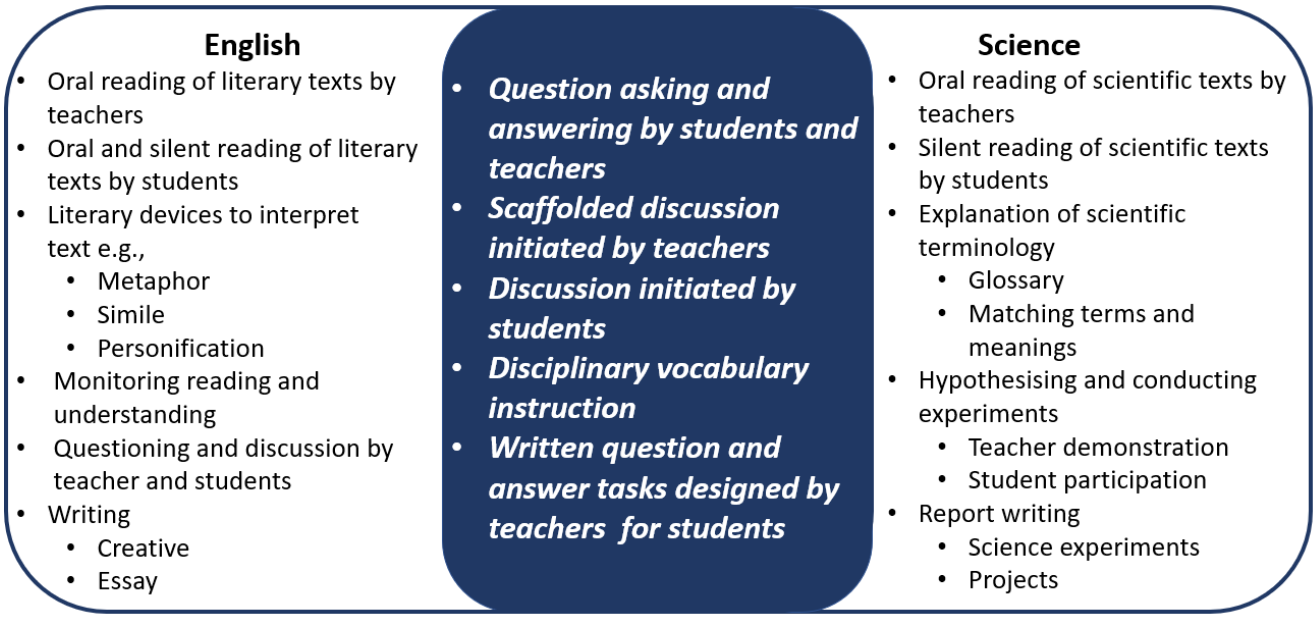


Figure 8.4: Discipline-specific and common practices in comprehension instruction in English and Science

Each of the teachers used pedagogical strategies such as questioning and scaffolded discussions. They drew attention to the metalanguage of the content as they explained the content to the students. Differences in pedagogical strategies between the disciplines were evident and contextually relevant to the domain. While both English and Science use writing as a literacy practice, each has a specific purpose in the curriculum domain. In Years 7 and 8 English, the teachers used literary devices to

support understanding of the text being studied, such as explanations and examples of metaphor, simile and descriptive language. In Science, the specific metalanguage of the syllabus content was explained to students. This was then extended into written tasks to demonstrate student understanding, such as creative writing in English, or experiment reports in Science. Such pedagogies are indicative of a disciplinary approach to comprehension. That is, these teachers enact practices using their knowledge of the discipline to build knowledge over time (Christie & Maton, 2011, Maton, 2011).

Oral reading as a tacit comprehension aid occurred in each of the English classes, with differing impact. In Years 5 and 6, this was a shared and collaborative learning experience, where multiple readings of the text supported comprehension of the concepts. In contrast to the primary oral reading experience, in Years 7 and 8 English there was one accepted interpretation of the text, where students who held the desired learner attributes answered pre-determined questions.

The Science teachers' pedagogical practices were similar in each case, and similar in pedagogical approach to Abbey and Benita (Years 5 and 6 English). The students were engaged in collaborative discussions with the class teacher, with questions being asked and answered between teacher and student. Understanding the relevant terminology was a priority, and many opportunities emerged to explain contextually the meaning of the metalanguage. In practical lessons, the students worked at stations in small groups and the teacher moved between each group. Differences were noted when the lessons were theory based. Elsbeth and Gail (Years 5, 6 and 8) engaged in discussion, but consistently emphasised the need to complete worksheets and record notes from the whiteboard. Frank (Year 7) was somewhat more relaxed, and while he ensured notes were completed, there appeared to be less urgency in his manner. Each teacher engaged in disciplinary literacy practices to support comprehension and to identify evidence of learning. In these teachers' context, and as seen also in secondary English, the written tasks are the product of the comprehension process, and it is this that teachers consider evidence of learning. An example of 'knowledge blindness' (Georgiou, 2016, Maton, 2014), the perception of comprehension as generic skills and text-based questions,

ignores disciplinary practices as legitimate evidence of comprehension knowledge and its instruction.

What is the relationship between teachers' beliefs and understandings of comprehension and their practices in the teaching of comprehension?

This question explored the relationship between teacher understandings and beliefs about the teaching of comprehension in the curriculum domains of English and Science and the pedagogical practices teachers enact in their practice. The specialisation codes provided a lens to view the connections between teacher beliefs and understandings and the pedagogical choices made by teachers.

The findings show that the Science and secondary English teachers are less familiar with generic comprehension strategies and their instruction than the Years 5 and 6 English teachers. Elsbeth (Years 5 and 6 Science) stated that she focused upon teaching her students how to become independent and critical thinkers. Gail (Year 8 Science) identified the need to build scientific literacy skills in her students. However, neither teacher considered these practices to be comprehension. Frank (Year 7 Science) and Deidre (Year 8 English) did not consider it necessary to teach how to comprehend, as it was a skill the students should already have; thus privileging the knower codes. Conversely, Abbey and Benita (Years 5 and Year 6 English) readily identified different comprehension strategies taught. These teachers were using a commercial resource at the time to teach comprehension strategies to their students, incorporating the strategies into the class teaching and learning program.

Comprehension instruction using discipline-specific strategies provided students with tools to aid their learning and understanding across the curriculum domains. Understandings of the essential disciplinary knowledge and the practices that best facilitated the construction of meaning informed the pedagogical decisions made by the participant teachers (Goldman et al., 2016, Misulis, 2009). That is, the teachers enacted comprehension pedagogies that aligned with their understandings of the discipline and the syllabus requirements. In addition, the configuration of classroom spaces

contributed to the pedagogies enacted (Rands & Gansemer-Topf, 2017). The Years 7 and 8 classrooms were less conducive to collaboration than the primary classrooms or Science laboratories. The pedagogical strategies used by the teachers included small group and whole class instruction, practical tasks and experiments, and collaborative learning. The Science and Years 5 and 6 English teachers primarily used collaborative tasks, small group work and practical tasks. The Years 7 and 8 English teachers tended to use whole class instruction, and teacher-led learning.

Reconceptualising comprehension

In determining what comprehension is, the curriculum itself creates uncertainty. Comprehension, in its current construction in school curricula, resembles a set of learner characteristics or dispositions rather than legitimate knowledge. It is consistently referred to but remains hidden. The dilemma for teachers is two-fold. Firstly, conflicting understandings of what comprehension means and its instruction in the disciplines are problematic. As seen in this inquiry, the teachers have provided a broad explanation of comprehension as understanding the curriculum content, but what this looks like and how it is taught in their discipline are not clear.

Secondly, the lack of a common language for comprehension and its instruction creates confusion. Across the curriculum domains, different terms are used to signify the construct of comprehension. Science refers to scientific literacy and inquiry as comprehension. In English, the language encompasses skills and strategies to analyse, evaluate, respond and interpret. The syllabus documents do not provide a tangible 'hook' for teachers to grasp when seeking guidance for comprehension in their discipline. Comprehension is making meaning and understanding content knowledge, but the terms used in the syllabus 'dance around' the concept with no clear guidance or pathway. The syllabus outcomes in English and Science include language such as 'use comprehension strategies to interpret, analyse, synthesise and evaluate' (BOSTES NSW, 2012b) or to 'investigate, make judgements, evaluate and draw conclusions' (BOSTES NSW, 2012c), without clearly stating that the aim of the outcomes is to comprehend. In this construction, the disciplinary literacy understandings required for success come to

the fore, and it is these which inform the pedagogical strategies enacted by the teachers. Comprehend is a broad term, not based in the curriculum knowledge but working alongside as a disposition, whereby the students must identify the 'rules of the game' to access and demonstrate understanding of the syllabus content knowledge.

The findings of this inquiry have revealed knowledge blindness in the curriculum, where "knowledge has been reduced to knowing" (Maton, 2014 p.3). The privileging of one form of knowledge over another reduces opportunities for different types of knowledge to complement learning. Disciplinary comprehension is a key component to the acquisition of curriculum knowledge. Freebody (2010) states that the generic comprehension skills learned in the early years of school are not sufficient to support the understanding of the increasingly complex and abstract concepts of middle and senior school. The discipline-specific practices for comprehension build from the non-specific skills and strategies learned in the early years of school. Middle school teachers must identify the comprehension strategies that are best suited to build discipline knowledge and teach these within the curriculum as legitimate knowledge.

The experiences of the teachers in this inquiry highlight a disconnect between comprehension, curriculum, pedagogy and students' needs. These teachers did not refer to the syllabus when seeking to explain their understandings of comprehension. It was found that the teachers were drawing their knowledge of comprehension from other sources, such as their disciplinary knowledge and their prior experiences as learners, to account for their practices. Importantly, the inquiry revealed that the disciplinary literacies enacted by the teachers are effective to successfully support teaching and learning in the classroom. The participant teachers have a deeper knowledge of their subject than that provided in a syllabus, including a wide and varied repertoire of teaching practices, and support students to gain the specialised skills of the curriculum domain (Flynn, 2007, Hall & Harding, 2003, Shanahan & Shanahan, 2015, Topping & Ferguson, 2005).

In reconceptualising comprehension, the usefulness of comprehension as a term in its current conceptualisation must be addressed. The literature describes comprehension as the process of simultaneously extracting and constructing meaning from the text presented (written, digital, visual and listening texts) through the interaction of the participant's context, knowledge and experiences of the topic and text form (Buehl, 2013, Freebody, 2011, Snow, 2002). Comprehension as a term has emerged from the early years of literacy instruction in English or Language Arts. Its adequacy, however, in other disciplines and later stages of learning, such as middle school, is questionable. The literature identifies common features, namely the ability to make meaning or create understandings. Teachers and curriculum writers deem these features to be equally applicable across disciplines and stages of learning. However, the ways in which meaning is constructed differs for disciplines and stages of learning. The teachers in this inquiry have commented that broad definitions of comprehension are not of practical significance to them in their practice. They hold an alternate view, wherein comprehension is a disciplinary concept, with its own disciplinary literacies to support understanding.

Disciplinary literacies are driven by the discipline itself. The reasoning and inquiry practices, discourse and vocabulary emerging from the discipline determine the legitimate knowledge of the discipline. Understandings of science content require instruction in scientific inquiry, which includes understanding science knowledge to explain, evaluate and interpret scientific phenomena and data. For example, to develop an understanding of *conducting energy* as part of the Year 8 Science unit of study, *Electricity: The Spark*, an explanation of the different types of cells that conduct energy, such as dry cells and photovoltaic cells, was required, prior to the practical task of building a single wet cell to power a small light bulb.

Comprehension in the disciplines is broader in its scope than a collection of generic strategies. Disciplinarity, that is, the capacity to build knowledge within the disciplines over time (Christie & Maton, 2011, Maton, 2011, Clarence & McKenna, 2017), is the way of knowing in the disciplines and moves beyond the disciplinary literacies. In this

inquiry disciplinarity embraces both comprehension as knowledge and the learner attributes that bring about successful understanding.

The teachers in the inquiry have consistently referred to assisting students to understand the content by demonstrating and teaching them the ways of knowing 'how to do' their subject. As Elsbeth so aptly stated, *"I want to make them little scientists."* The teachers have created understandings for their students through their pedagogical practices. They have successfully explained, modelled, questioned and made learning happen in their classrooms. The pedagogical strategies enacted are supporting comprehension in a disciplinary sense that meets the content knowledge requirements, in the context of their own understandings and beliefs about comprehension.

Comprehension surrounds teachers' practice but remains invisible in the syllabus. I suggest that comprehension is more of an iterative relationship in the disciplines; that is, the building of disciplinary comprehension skills and strategies over time that support the learning and understanding of discipline knowledge.; not a set of generic strategies but a selection of' 'ways of knowing' for advanced literacy relevant to each discipline and stage of learning. The 'ways of knowing' are not stated in the syllabus but represented in the learning outcomes which students must achieve and teachers must teach. The outcomes contain the metalanguage of the discipline. For example, English students,

> "effectively use a widening range of processes, skills, strategies and knowledge for responding to and composing texts in different media and technologies" (EN4-2A BOSTES NSW, 2012b) to "explain issues and ideas from a variety of sources, analysing supporting evidence and implied meaning..... selecting specific details from texts to develop their own response, recognising that texts reflect different viewpoints" (Australian Curriculum Assessment and Reporting Authority, 2015h).

Similarly, in Science, the syllabus outcomes provide a scaffold for learning content knowledge through the inquiry outcomes. For example, students,

> "process and analyse data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusions" (SC4-7WS BOSTES NSW, 2012c) to "communicate their ideas, methods and findings using scientific language and appropriate representations" (Australian Curriculum Assessment and Reporting Authority, 2015h).

The syllabus outcomes have guided the teachers to select the appropriate content knowledge, but not necessarily the relevant strategy, for teaching the curriculum concept. To build a repertoire of strategies for teaching understanding, the disciplinary literacies of the curriculum domain, together with the generic comprehension strategies learned in the early primary years of schooling, have been used as a foundation for the participant teachers to develop a 'toolkit' for understanding the nuances of disciplinary literacies. In other words, the generic comprehension skills learned by students in primary school have not been overlooked by the participant teachers but have provided them with a conceptual basis of comprehension instruction in the disciplines. For example, in Year 8 English, knowing the literary techniques used by Shakespeare in '*Much Ado About Nothing'* has supported student understandings of the themes of love and jealousy in the play, drawing on comprehension strategies such as inference. In Year 5 Science, knowing how to make a hypothesis in an experiment investigating the *properties of solids* has demonstrated prediction strategies. The strategies and disciplinary literacies enacted are informed by the ways of knowing for the discipline.

Comprehension is knowledge. It is the knowledge about the ways of knowing curriculum content and strategies to support the understanding of concepts to build new understandings. In other words, comprehension is more than making meaning and a set of strategies. In a such a reconceptualisation of comprehension, making meaning is discipline focused, using as a foundation the early skills learned and applying them contextually to support understanding.

Implications of the inquiry

The understandings of comprehension, its interpretation in the curriculum and the pedagogies enacted by the teachers in the inquiry, have implications for curriculum policy, and for continuing professional learning.

Curriculum policy

The official curriculum used by schools and teachers in this inquiry have been developed by regulatory authorities, beyond the school context. Of relevance to this inquiry are the NSW English and Science syllabuses. Each syllabus identifies 'making meaning' as a core purpose in the rationale. What this means in the school and classroom context, and instruction in how to achieve this purpose is not articulated in the outcomes or content descriptions, leading to conflicting interpretations of comprehension in the discipline and the disciplinary meanings of the terms used within and across curriculum domains. In its current form, the curriculum provides an outline of disciplinary knowledge students need to learn over time. That is, it is a document outlining what students must do and learn to successfully achieve the curriculum outcomes at each stage of schooling. Missing in the curriculum documents are clear descriptions of the actions teachers must take to teach the disciplinary literacies of the curriculum to their students. That is, how teachers will facilitate learning and comprehension for their students. As revealed in this inquiry, the enacted pedagogies observed are grounded in the teachers' disciplinary understandings of comprehension. This can bring to the surface misconceptions of the comprehension skills and strategies students are expected to have acquired at various stages of schooling.

The lack of clarity of what comprehension means in the curriculum and the pedagogies which support its instruction in the disciplines have implications broader than this inquiry. The official curriculum schools implement is recontextualised at a school level before being reproduced by teachers as a unit of study. However, it is in the production field, where curriculum is created from expert disciplinary knowledge that clearer explanations of comprehension and its pedagogies are necessary. That is, the disciplinarity or 'ways of knowing' the discipline knowledge must be the foundation of

the literacy and comprehension outcomes in the syllabus. The official school curriculum should be more than content to be taught and assessed by teachers and known by students over time. It should provide guidance to schools and teachers of the disciplinarity of the curriculum domain, in learning how to understand the discipline and its literacies to construct new understandings. The construct of comprehension in the context of the discipline should be clearly revealed in the curriculum. That is, the disciplinary practices that drive the literacy of the discipline, should be articulated. When such a position is considered from a comprehension perspective in the middle years of schooling, it is imperative that clearer disciplinary guidelines and suggestions for comprehension and its instruction become explicit and discipline focused, rather than implicit and generic in the curriculum.

Professional learning

The findings of this inquiry have revealed the teachers have experienced limited opportunities to build their knowledge of comprehension and its instruction in their discipline. These teachers have acknowledged that comprehension has not been a component of their teacher training, nor a focus for further professional learning. This has resulted in these teachers being unsure of what comprehension is in their discipline, the understandings of comprehension students may bring to the discipline, but more so, how to teach comprehension in the middle years. The teachers have identified they are unsure of the generic comprehension strategies and the disciplinary comprehension skills of their subject.

It is imperative that further opportunities for middle years teachers to develop their understandings of comprehension and its instruction in their disciplines are made available. Such professional learning should be inclusive of initial teacher education courses and existing teachers. Importantly, the professional learning should consider two perspectives. Firstly, the disciplinarity of the subject should be central, to build on existing understandings of disciplinary knowledge, pedagogies and comprehension held by teachers. Secondly, the professional learning should be timely, ongoing and relevant to the teachers' practice, to allow teachers to reflect on their learning, and apply what

they have learned to their practice over time. Attention to professional learning in disciplinary comprehension has the potential to increase the capacity of teachers to engage in discipline specific comprehension practices.

Summary

The significance of the study

This study has identified comprehension is a complex construct rather than a definition. It explores comprehension beyond the representations of teacher understandings and practice in Durkin's (1978) study. When comprehension is reduced to a set of generic strategies (Block & Duffy, 2008, Durkin, 1978), it becomes nothing more than text-based question and answering tasks to assess learning. Moreover, consideration of the pedagogies best suited to the discipline may be overlooked, leading to superficial understandings, rather than deep and transferable knowledge. Pedagogical practices, informed by the 'ways of knowing' in the disciplines, move beyond the generic comprehension strategies enacted in classrooms, building knowledge through disciplinary-specific processes.

This inquiry has allowed the reader to walk in the discipline specialist's shoes. It has afforded a 'bird's eye view' into the primary and secondary school context. Examining events closely during daily teaching has revealed the different interpretations of comprehension between teachers and across curriculum domains and stages of learning. Of consequence is the value of the participant teachers' discipline-specific beliefs and understandings of comprehension when making pedagogical choices and interpreting curriculum knowledge. Comprehension is discipline specific and is represented in different ways according to disciplinary needs; but it is not a construct that is learned through osmosis. The assumption of prior instruction in comprehension having occurred in the early years of schooling, and the belief that students understand, and therefore can apply, the generic comprehension strategies contextually, ignores the disciplinary literacies required by students to successfully navigate and understand disciplinary knowledge. As such, the school curriculum must specifically address the disciplinary literacies of the syllabus, beyond the positioning of comprehension as a

general capability. In its current position, comprehension is reduced to a soft skill, with little or no differentiation of its instruction across the disciplines or stages of schooling. Comprehension is a set of practices that teachers, as discipline experts, guide their students through to build competence in the discipline.

The inquiry reconceptualises comprehension. It has identified comprehension to be more than a set of generic strategies. It is the interplay of foundation comprehension skills and disciplinary knowledge, where the legitimate knowledge of the discipline and the attributes of the right kind of knower bring about understanding. That is, comprehension is driven by the discipline and therefore requires instruction grounded in the disciplinary knowledge and its literacies.

The findings of the inquiry reveal a broader definition of comprehension than exists in the literature. Simplistically, comprehension is meaning making. In the reality of teaching and learning in these teachers' classrooms, it is complex. Comprehension encompasses discipline knowledge and strategies to support student learning. Further research is warranted to identify the disciplinary literacies of comprehension and how these interact with the disciplinarity or 'ways of knowing' in the discipline.

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Appendices

Appendix A

Participant information and consent forms

CONSENT FORM FOR TEACHER PARTICIPANTS

RESEARCH TITLE: A contrastive study of comprehension pedagogy in middle years English and Science classrooms

RESEARCHER: Susan Byers

I have been given information about *A contrastive study of comprehension pedagogy in middle years English and Science classrooms* and discussed the research project with Susan Byers who is conducting this research as part of a Doctor of Education supervised by Dr Lisa Kervin and Dr Pauline Jones in the Faculty of Education at the University of Wollongong.

I understand that the risks to me are minimal in this study and have read the information sheet. I have had an opportunity to ask Susan Byers any questions I may have about the research and my participation.

I understand that my participation in this research is voluntary, I am free to decline to participate and I am free to withdraw from the research at any time. My decision not to participate or my withdrawal of consent will not affect my treatment in my workplace in any way.

If I have any enquiries about the research, I can contact Susan Byers, Dr Lisa Kervin on 4221 3968, or Dr Pauline Jones on 42213322. If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 3386 or email rso-ethics@uow.edu.au .

By signing below I am indicating my consent to (please tick):

- ☐ Participating in a series of audio-recorded interviews on my teaching practice.
- ☐ Having three classroom lessons video recorded at a time suitable to me.
- ☐ Having copies made of my teaching programme, teaching notes and student work samples for data analysis purposes.

I understand that the data collected from my participation will be used for a thesis, and possibly journal articles and conference proceedings and I consent for it to be used in that manner.

Signed *Date*

..../...../.....

Name (please print)

.....

UNIVERSITY OF WOLLONGONG

PARTICIPATION INFORMATION SHEET FOR TEACHERS

TITLE: A contrastive study of comprehension pedagogy in middle years English and Science classrooms

PURPOSE OF THE RESEARCH:

This is an invitation to participate in a study conducted by researchers at the University of Wollongong. The purpose of the research is to explore teacher understandings of comprehension in English and Science, in order to understand how these understandings of comprehension influence teacher practice in English and Science middle years classrooms.

INVESTIGATORS:

Susan Byers	Dr Lisa Kervin	Dr Pauline Jones
Doctor of Education student	Senior Lecturer	Senior Lecturer
Faculty of Education	Faculty of Education	Faculty of Education
	02 4221 3968	02 42213322
sjb664@uowmail.edu.au	lkervin@uow.edu.au	paulinej@uow.edu.au

METHOD & DEMANDS ON PARTICIPANTS:

If you choose to be included you will be asked to participate in a series of five 30 minute interviews over a twelve month period. The interviews will be audio taped to identify your understandings of comprehension within your subject area and your perceptions of this understanding upon literacy outcomes of your students. Possible discussion questions may include:

Prior to observations

- What is your understanding of comprehension within your subject area (English/Science) in the context of the students you currently teach?
- What comprehension strategies do you specifically teach in English/Science?
- Why do you choose to teach those particular strategies?
- How much time in your lessons do you devote to comprehension instruction?
- What evidence do you observe of students applying the comprehension strategies taught?

Post lesson observation

- What comprehension strategies did you teach in the lesson observed?
- Why did you choose this/those particular strategy/strategies?
- What evidence did the students show to indicate their ability to implement the comprehension strategies taught in the lesson?
- Are students using the strategies taught in other lessons?

Conclusion of study

- What do you perceive to be the relationship between comprehension instruction in your subject area and the pedagogy used in your classroom?
- Do you consider comprehension instruction as part of your teaching role in your subject area? Why/why not?

We also request your permission to observe and video your classroom teaching for 50 minutes once per term over three terms. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. Refusal to participate in the study will not affect your relationship within your workplace.

POSSIBLE RISKS, INCONVENIENCES & DISCOMFORTS:

Apart from your time for the interviews and observing your teaching over a period of twelve months, we can foresee no risks for you.

FUNDING & BENEFITS OF THE RESEARCH:

Findings from the study will be published in a thesis to meet the requirements of the Doctor of Education degree at the University of Wollongong, and possibly published in educational journals and conference proceedings. Confidentiality is assured and the school, you and the students will not be identified in any part of the research.

ETHICS REVIEW & COMPLAINTS:

This study has been reviewed by the Human Research Ethics Committee, Social Sciences) of the University of Wollongong, reference no. HE12/191. If you have any concerns or complaints regarding the way this research has been conducted you can contact the UOW Ethics Officer on 02 4221 3386 or email rso-ethics@uow.edu.au .

Thank you for your interest in this study.

UNIVERSITY OF WOLLONGONG

PARTICIPATION INFORMATION SHEET FOR CHILDREN

Dear Student

This is an invitation for you to participate in a study conducted by researchers at the University of Wollongong. The purpose of the research is to explore how your teacher's understandings of comprehension influence how you learn and understand content in your English and/or Science class.

INVESTIGATORS:

Susan Byers	Dr Lisa Kervin	Dr Pauline Jones
Doctor of Education student	Senior Lecturer	Senior Lecturer
Faculty of Education	Faculty of Education	Faculty of Education
	02 4221 3968	02 42213322
sjb664@uowmail.edu.au	lkervin@uow.edu.au	paulinej@uow.edu.au

WHAT WE WOULD LIKE YOU TO DO:

If selected from your class group, we would like to collect some examples of your work (work samples) to analyse. We will collect one or two work samples each term over three school terms. They will be photocopied and the originals returned to you as soon as possible.

Apart from collecting some examples of your work, we can foresee no inconvenience for you.

Your involvement in this study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that has been gathered to that point.

FUNDING & BENEFITS OF THE RESEARCH:

Findings from the study will be published in a thesis to meet the requirements of the Doctor of Education degree at the University of Wollongong, and possibly published in educational journals and conference proceedings. Confidentiality is assured and the school, you and the teachers will not be identified in any part of the research.

ETHICS REVIEW & COMPLAINTS:

If you have any concerns or complaints regarding the way the research or about the way this research has been conducted, you can tell your teacher or parents or contact the University Ethics Officer on 02 4221 3386 or email rso-ethics@uow.edu.au

Thank you for your interest in this study.

UNIVERSITY OF WOLLONGONG

CONSENT FORM FOR CHILDREN

RESEARCH TITLE: A contrastive study of comprehension pedagogy in middle years English and Science classrooms

RESEARCHER: Susan Byers

CONTACT: sjb664@uowmail.edu.au

I have read the Participant Information Sheet about *A contrastive study of comprehension pedagogy in middle years English and Science classrooms* and had the opportunity to ask the researcher any further questions I may have had. I understand that my participation in this research is voluntary and I am free to withdraw from the study at any time without affecting my treatment at school in any way.

I understand that the risks to me are minimal in this study and have read the information sheet and asked any questions I may have about the risks. I understand that my participation will be providing samples of my class work. My voice and image may be recorded also when my teacher is being videoed. My name will not be used to identify my comments or my class work in the study.

If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, University of Wollongong on 4221 3386 or email rso-ethics@uow.edu.au

By signing below I am indicating my consent to (please tick):

- ☐ Having copies made of my class work for data analysis purposes
- ☐ Having my voice and image recorded

I understand that the data collected from my participation will be used for a thesis, and possibly journal articles and conference proceedings and I consent for it to be used in that manner.

I give permission for my child _____(*please insert your child's name*)

to participate in this research titled **A contrastive study of comprehension pedagogy in middle years English and Science classrooms**

Parent/ Guardian Signature _____
Name (*please print*) _____
Date _____
Child's signature _____

Appendix B

Interview questions

Initial Interview

1. What is your understanding of comprehension in your subject area in the context of the students you teach?
2. Are there any comprehension strategies you specifically use in your lessons?
3. What is the reason for choosing these strategies?
4. Do you teach these strategies or do the students already demonstrate an understanding?
5. What evidence do you see in student work that they are applying or using comprehension strategies as they participate in lessons?
6. Are there any comprehension strategies you specifically teach in your lessons?
7. What is the reason for teaching these strategies?
8. Do you allocate any time in your lessons to specific comprehension strategy instruction or do you take opportunities as they arise contextually?
9. How much time do you allocate to comprehension strategy instruction in a typical lesson?

Final Interview

1. What do you perceive to be the relationship between comprehension instruction in your subject area and the pedagogy used in your classroom?
2. Do you consider comprehension instruction as part of your teaching role in your subject area? Why/why not?
3. Where do you believe comprehension instruction sits within the context of your subject area?
4. Do you believe specific comprehension instruction will add to students' understandings of the content they must learn in English/Science? Why/why not?
5. What strategies do you observe in your students that aid them in understanding the content of the subject?
6. What specific practices do you use to assist students who are having difficulty understanding the content in your subject area?
7. Where do you consider the most understanding of content and ideas occurs in your classes? (discussion, writing, exams)
8. How do you measure student understanding of content in your subject area? Is there any other way you find effective?

Post observation questions - observation 1

1. What comprehension strategies did you teach in the lesson observed?
2. Why did you choose this/those particular strategy/strategies?
3. What evidence did the students show to indicate their ability to implement the comprehension strategies taught in the lesson?
4. Are students using the strategies taught in other lessons?

Post observation questions - observation 2

1. What comprehension strategies did you use in your lesson?
2. Is there any particular reason for using these strategies in the lesson?
3. Do you consider these strategies specific to your subject?
4. Were the students using any comprehension strategies in the lesson? Which ones were evident?
5. What evidence was there of students using comprehension strategies in the lesson?
6. Do you consider it necessary to teach specific comprehension strategies in your class? Why-why not?
7. What do you consider the most effective way of students demonstrating their knowledge of the content taught in class to you?

Post observation questions - observation 3

1. Thinking about the lesson observed, what comprehension strategies do you think you were using to assist the students understand the content?
2. What comprehension strategies do you think the students were using?
3. How do students demonstrate their understanding of the content in the lesson?
4. Do you think there is a deeper understanding of the content?
5. What strategies do you use to assist the students develop deep understandings of the content?
6. What do you consider the most important aspect of comprehension in your subject area?
7. Are there any particular comprehension strategies you consider of greater benefit to your subject area?

Appendix C

Examples of scope and sequence

Stage 4 English

Stage 4 English

	Year	Spring Term 2012 (Oct, Nov, Dec) 7.5 weeks – No Year 7		Summer Term 2013 (Feb, Mar, Apr) 10 weeks	Autumn Term 2013 (May, June) 10 weeks	Winter Term 2013 (July, Aug, Sep) 9 weeks
New academic Year	7		New Calendar Year	**Topic 1:** ***Picture Books*** **- 5 wks** Focus: visual literacy • Understanding visual literacy (technique and effect) • Skills in visual representation **Outcomes:** **Topic 2:** ***Writing the News*** **5 wks** Focus skill: **Outcomes:**	**Topic 2:** ***Introduction to Shakespeare*** **- 10 wks** **Outcomes:**	**Topic 3:** ***Understanding Film*** **– 9 wks** **Outcomes:**
	8	**Topic 1:** ***Poetry for pleasure*** **– 8 wks** **Outcomes: 1, 4, 6, 10, 11** Focus: Language Analysis • Understanding themes and ideas • Identification of techniques and their effect on meaning • Learning and identifying conventions and techniques of poetry	New Calendar Year	**Topic 2:** ***Persuade me! – The Art of Persuasion*** **- 10 wks** **Outcomes: 1, 3, 4, 5, 6, 7, 9, 11** Focus: Persuasive Language, Advertising and Media Manipulation • Persuasive writing • Visual literacy and language • Analysis of media text types	**Topic 3:** ***Genre Study*** **– 10 wks** **Outcomes: 4, 5, 6, 8, 11** Focus: Narrative Writing • Learning and identifying genre codes and conventions • Focus on creative writing skills	**Topic 4:** ***Shakespeare*** **– 10 wks** **Outcomes: 1, 3, 4, 5, 6, 10, 11** Focus: Drama and Performance • Understanding Shakespearean language • Learning and identifying dramatic conventions • Performance through practical application

Stage 4 Science

Stage 4

	YR	Spring Term 2012 (Oct, Nov, Dec) 7.5 weeks – No Year 7			Summer Term 2013 (Feb, Mar, Apr) 11 weeks	Autumn Term 2013 (May June) 8 weeks	Winter Term 2013 (July, Aug, Sept) 10 weeks
New Academic Year	7	Week		New Calender Year	Topic and Outcomes	Topic and Outcomes	Topic and Outcomes
		1	N/A		Unit 1. Being a Scientist **PFA** 4.2 a,e,g **S** 4.13-4.22 **V** 4.23	Unit 3. Separating Mixtures **PFA** 4.3 a-d **K** 4.7.5 a-d; 4.11 b; 4.12 a	Unit 5. Classification **PFA** 4.2 a, c-g **K** 4.8.2 a-b; 4.10 c **S** 4.13-4.22 **V** 4.25; 4.27
		2					
		3					
		4					
		5			Unit 2. What's the Matter **PFA** 4.2 a,c **K** 4.7.1 a-c; 4.7.2 a-d; 4.7.3 a-b; 4.12 a **S** 4.13-4.22 **V** 4.25	Unit 4. Cells **PFA** 4.5a-b **K** 4.8.1 a,bd; **S** 4.13-4.22 **V** 4.25; 4.26	Unit 6. Forces **PFA** 4.3 a **K** 4.6.2 a-b; 4.6.7 a-b; 4.6.9 a-b; 4.6.10 a; **S** 4.13-4.22 **V** 4.25; 4.26
		6					
		7					
		8					Unit 7. Earth & Space **PFA** 4.1 a-e **K** 4.9.1 a-d; 4.9.5 b; **S** 4.13-4.22 **V** 4.24-4.26
		9					
		10					

Appendix D

Action research

The impetus for the inquiry is an action research project exploring the understandings of comprehension of teachers and students in Years 5, 7 and 9 (ages 10 to 15 years old) in a NSW independent school. Titled, *'What counts as comprehension in teacher practice?'* the action research project has gathered data from interviews and questionnaires. It provides insights into teacher and student perceptions of what comprehension is in different curriculum domains in Years 5, 7 and 9. The data have informed the creation and implementation of strategic professional development seminars for a small group of interested teachers with the aim of introducing them to current ideas about comprehension and comprehension instruction, and providing practical, achievable strategies for use in the classroom. The scope of the project is represented in Figure 1.

The project investigates teacher and student understandings of comprehension in the middle school years, foregrounding the opportunity for an in-depth study of the understandings and beliefs of comprehension and curriculum as knowledge that teachers hold. The provision of teacher professional development was timely for the participant school, which, like all schools across Australia, was in the planning stages for the introduction of the Australian Curriculum. Contextually, the action research project sat well within the aims of the School Strategic Plan, addressing two key elements:

- Building the capacity for teachers to implement a cohesive school-wide approach to improving literacy;
- Encouraging a professional and collegial learning environment that fosters a culture of professional dialogue and sharing both within faculties and schools and across the whole school.

My interest in the action research project evolved through professional discussions with staff at the participating school about:

- the difficulties teachers had observed their students experience in understanding the 'deeper concepts' of content in the curriculum;
- the perceived lack of literacy strategies teachers possessed for teaching these concepts, within a crowded and content driven curriculum.

The general capabilities of the Australian Curriculum state that "literacy is not a separate component of the Australian Curriculum and does not contain new content" (ACARA, 2012 p. 9), yet these teachers expressed uncertainty about how to meet the literacy needs of their students, while still covering the required content of the syllabus. Specifically, confusion existed amongst teachers about where teaching comprehension was positioned as an instructional strategy within the teaching of content within their curriculum domain, and its place as part of the curriculum or academic discipline in middle years classrooms (Byers et al., 2012).

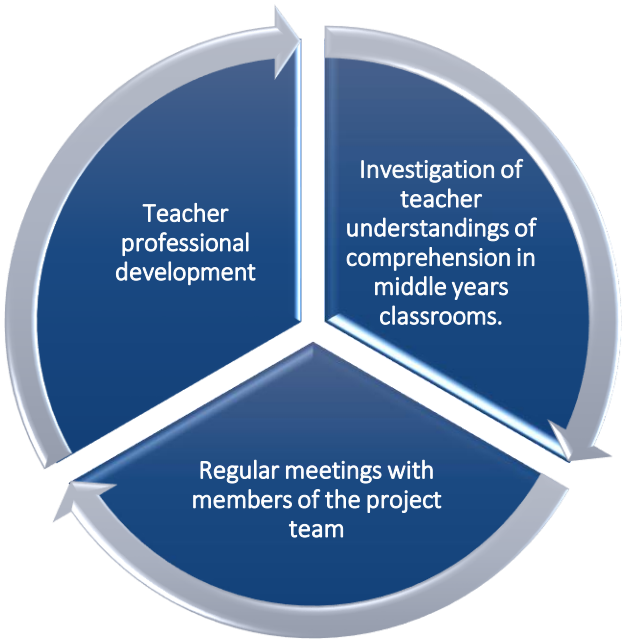


Figure 1: The scope of the school-based action research project

Setting the scene for future research

The findings of the project have foregrounded further research. Comments and responses elicited from teachers throughout the project, specifically regarding comprehension instruction across curriculum domains and what comprehension is within their practice, raised further questions beyond the scope of the initial action research project.

It is important at this stage to note the potential impact of the professional learning implemented in the project upon the teaching practices of some participants in the research inquiry, particularly the Science teachers. Members of the Science Faculty involved in the action research project were not participants in the later inquiry. Therefore, the impact of the prior professional learning upon teacher participants is considered to be limited in terms of the pedagogy and practices of the participants.

Action Research Design

Action research is a systematic inquiry undertaken by teachers within their own context to better understand the practices, instructional methods or processes that exist in their teaching environment (Johnson, 2012, Kemmis & McTaggert, 1988, Kemmis et al., 2014, Mertler, 2006). The project investigated teacher and student understandings of comprehension in the middle school years and was conducted within my workplace, with myself as a teacher–researcher. Beneficially, action research in the workplace context provided me with "special access to how social and educational life and work are conducted in local sites, by virtue of being an insider….therefore providing a special advantage to investigate practices that are enmeshed within the site" (Kemmis et al., 2014 p. 5).

Features of Participatory Action Research

Action research is a participatory process that provides opportunities for educators to reflect upon and improve practices to bring about change. Kemmis, McTaggert and Nixon (2014 p. 5) describe the specific features of participatory action research, all of which are evident in the project and are expanded upon below:

- Conditions are created to understand practices 'from within'. As stated earlier, this project was conducted by me as teacher-researcher in my workplace. This context provided valuable understandings of the school practices and their history, therefore allowing me to develop contextually suitable procedures to conduct the research.
- A shared language between participants emerges, as conversations and debate surrounding the area of investigation occur amongst those involved. This is particularly evident as the project was implemented, as teachers shared their own interpretations of their practice, and engaged with others using the terminology introduced during the project.
- The conditions for participation are wholly contextual within the participant's practice. Participants in this project were within their own teaching context, and therefore developed actions and interactions based upon their own particular circumstances.
- 'Communities of practice' develop within the research context. These professional learning communities benefit both teachers and students (Cantrell et al., 2009, Reed, 2009, May, 2007, Misulis, 2009, Poulsen & Avramidis, 2003). Embedded in the participant school context, strategic professional development opportunities provided practical and relevant strategies for teachers to enhance pedagogy and understandings of comprehension. Within this project, teacher participants discussed their professional practice with other participants and non-participants, but also shared their learning and professional journey beyond the research site. The project allowed for comprehension to be placed 'on the agenda' for discussion amongst school staff, becoming a forerunner for further professional development about comprehension within another sector of the school. Beyond the school, through presentations at network meetings and conferences by participants in the project, the impact of the project was shared, further broadening its scope to other professional learning communities.
- A transformation in the conduct and consequences of practice occurs as a response to the changing needs and circumstances that occur for the teacher participants and the school context. While Kemmis, McTaggert and Nixon (2014) discuss this aspect as a response to overcoming 'untoward consequences' of practice, such as irrational,

unsustainable or unjust behaviours, within this project, changes in practice occurred in response to the new learning gained through the professional learning workshops.

The action research process

The action research spiral of Kemmis and McTaggert (1988, 2014) provides for "qualitative, interpretive modes of enquiry and data collection" which, when teachers and teacher-researchers work together with an academic partner or 'critical friend', "has a view to teachers making judgements about how to improve their own practices" (Kemmis et al., 2014 p. 11). The cycle or spiral is recursive in nature (2014 p. 19), with each aspect contributing to an ongoing process. Each of these processes works collaboratively with the other to bring about changes in practice and knowledge within the area of investigation. In action research, planning, acting, observing and reflecting are "four fundamental aspects of the process" that create "a dynamic complementarity which links them into a cycle" (1988 p. 7). However, the process is not 'neat and tidy', with each stage often overlapping into the next. It is considered to be a "spiral of self-reflective cycles" (2014 p. 18), as shown in Figure 2, and which are elaborated upon below.

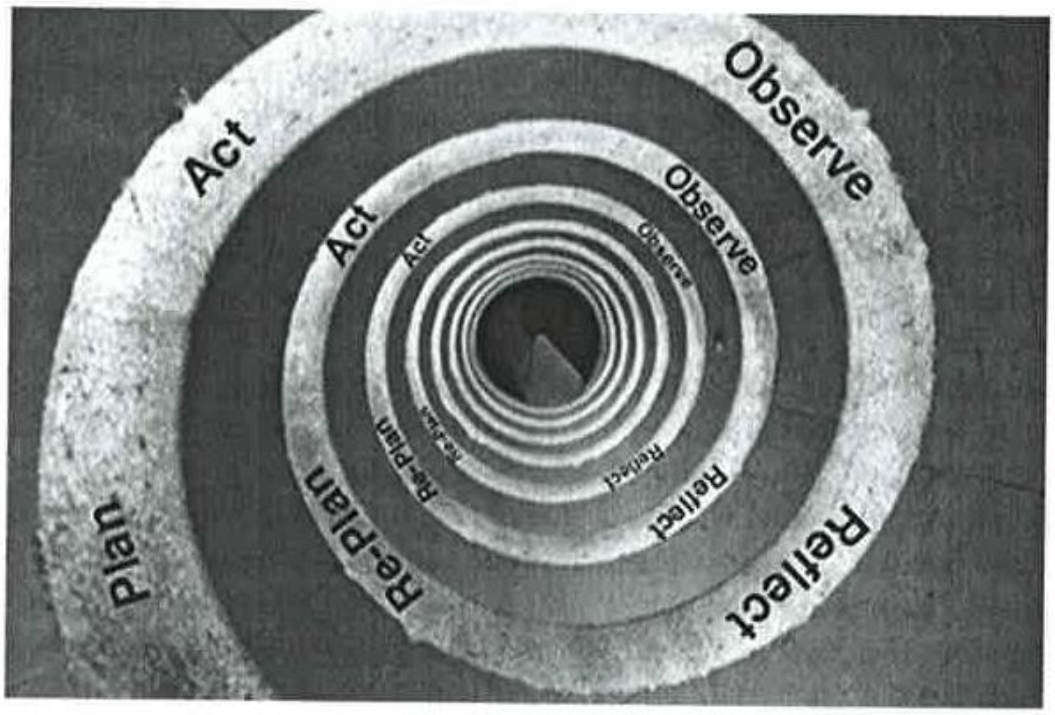


Figure 2: The Action Research Spiral (Kemmis et al., 2014 p. 19)

Planning

Planning in action research is forward looking and prospective to action, taking into account the need for flexibility and identifying potential constraints. With this in mind, the aim of the project was to identify what understandings already existed amongst the teacher participants about comprehension instruction within their curriculum domain, and then build upon this existing knowledge with teachers through professional learning, and the exploration of the consequent use of this new knowledge in their practice. This was achieved by identifying what knowledge already existed in this aspect of teacher practice and identifying the changes that could be achieved through the specific professional learning within the teachers' context.

Acting

Action in action research occurs in real time but is retrospectively guided by the planning process. It is flexible in nature, taking into account the circumstances surrounding it. As the professional learning was implemented in this project, teacher participants considered how the new learning would look in their classroom. This led to many discussions on the possible benefits and deficits of implementing changes to their practice, and the perceived impact such changes would have upon their students. Interestingly, it was during this phase that the greatest concern was voiced, and the greatest flexibility was needed. This was primarily due to teacher concerns of how to deliver the required syllabus content in the mandated time frame, while 'trying out' a new way of teaching, yet not being sure of what the outcome may be. It was therefore essential at this stage that "all involved in the (research) setting have a voice", but more so, ensuring that I as an ethical researcher, "act wisely and prudently….with all parties acknowledging that all outcomes cannot be known in advance" (Kemmis et al., 2014 p.14).

Observing

Observation allows for the documentation and recording of the action and its effects as it occurs. This phase of the cycle provides a basis for reflection as the researcher considers the consequences of any changes upon teaching practice that have been

observed. In this stage of the project, the impact of the initial professional learning about comprehension instruction upon teacher practice was observed. As the teachers applied the new knowledge gained from the initial professional learning workshops in their classrooms, they observed changes in students' learning, primarily in class discussions, where the teachers observed increased student engagement with the content. They were "more connected with the content," stated one teacher and "able to see the purpose for learning beyond exams." The focus for learning, stated another "was beyond the task." The teachers contributed this to a change in their practice, as they became "more conscious of comprehension strategies and their impact on learning." Importantly, the teachers noted that they were using a shared 'language of comprehension' in their practice and when engaging in discussions with colleagues.

Reflecting and replanning

Reflection in action research is retrospective, as it considers what has been observed and the changes (if any) that have occurred. It is imperative the processes put in place during the acting phase and the observation of the subsequent consequences of these processes are reflected upon, becoming the building blocks for the next stage of the project. This then forms a basis for future planning and the continuation of the action research cycle. Using the observations made following the initial professional learning workshops, the next professional learning sessions built upon the prior learning made and encompassed further knowledge and skill development about comprehension instruction.

Data collection and analysis

Using a teacher-as-researcher grant from the Australian Literacy Educators Association (ALEA), I developed and implemented a series of professional development seminars to introduce teachers to current ideas about comprehension, together with practical, achievable strategies to use in the classroom. It engaged teachers of Years 5, 7 and 9 across different faculties, and considered teacher and student perceptions of comprehension in different subject areas in Years 5, 7 and 9. Figure 3 shows the action research spiral and aspects of data collection. Data collected included:

- Questionnaire responses from students and teachers
- Semi-structured interviews
- Artefacts
- Teacher reflective journal.

Data have been analysed using a constant comparative method (Creswell, 2007, Gall et al., 2006) by categorising data into emerging and evolving themes. In the initial stages of the project, both teachers and students were surveyed to gauge their understanding and perceptions of comprehension instruction across subject areas. In response to the teacher understandings and perceptions of comprehension instruction in the focus year groups, middle school teachers from most faculties participated in an introductory professional development session about comprehension strategies and their application across curriculum areas in the middle school years. From this introductory seminar, a small group of teachers from three faculties (Primary, Science, and Personal Development, Health and Physical Education) then participated in a series of seminars that focused upon disciplinary literacy and specific comprehension strategy instruction. This was then trialled in their classrooms and reflected upon in future seminars. Concurrently, a project team of three middle school teachers met together on a regular basis throughout the year. At each meeting, teachers embraced the opportunity to discuss and reflect upon their ongoing learning about comprehension strategy instruction in their middle years classrooms, and the students' responses to the strategies implemented. Each meeting also provided time to analyse previous professional development seminars and prepare for each up-coming seminar.

Figure 3: Action research cycle based upon Kemmis and McTaggert (1988, 2014)

Participants

The project comprised three groups of teacher participants (Table 1). The single criterion for participation for teachers was a teaching load which included at least one Year 5, 7 or 9 class in any subject area for the duration of the project. Initially, an open invitation to participate in a short questionnaire was emailed to all teachers of Years 5, 7 and 9 (N=46) and their students (N=203). Although the students participated in the questionnaire, they did not participate any further. Their responses to the questionnaire informed some aspects of the professional development seminars. The three participant groups are detailed below:

- an action research team (N=3). Participants in this group were purposefully selected, as each had an interest in the project and expressed a desire to be involved. Initially, this team comprised five members, but due to personal reasons, two team members withdrew from the team as the project began, leaving three members. This group met on a regular basis throughout the project.
- a staff group where the project was introduced (N=40). Convenience sampling (Creswell, 2007, Gall et al., 2006, Merriam, 1998) was used to select participants in this group. Potential participants were selected based on their availability and suitability for the purpose of the inquiry, requiring them to meet a single criterion for participation - a teaching load which included at least one Year 5, 7 or 9 class in any subject area. This group met on one occasion. From this seminar a professional development group was formed.
- a professional development group (N=12) drawn from interested teachers of Years 5, 7 and 9. Purposeful sampling was used to select participants in this group. Each met the selection criteria, where the participant must teach a class in one or more of Years 5, 7 or 9. In addition, each participant expressed an interest in learning about comprehension instruction in their area of teaching. This group met on three occasions.

Year group	Teachers	Teacher participant Questionnaire	i Teacher participant Action Research team	ii Teacher participant Introductory seminar	iii Teacher participant Professional development group
Year 5	5	3	2	2	2
Years 7 and 9	41	10	1	38	10
Total	46	13 (28%)	3	40	12

Table 1: Teacher participants

Student Participants

Students in Years 5, 7 and 9 were invited to participate in a questionnaire about their understandings of comprehension prior to the teacher professional development sessions. Table 2 shows the number of students who met the criteria to participate and those who responded to the questionnaire. As stated previously, the students were not the focus of the inquiry, but their response to each question provided data to inform the professional development seminars.

Year group	Total students	Responses to questionnaire
Year 5	40	20 (50%)
Year 7	75	15 (20%)
Year 9	84	21 (25%)
Total students	203	56 (28%)

Table 2: Student participants and questionnaire responses in each year group

Preliminary findings from the project have been published in *Literacy Learning: The Middle Years* 20 (3), 18-27.

Data Collection Schedule

	Initial interview	Observation 1	Post observation discussion 1	Observation 2	Post observation discussion 2	Observation 3	Post observation discussion 3	Final interview
English 5	26/03/13	16/05/13	04/06/13	20/10/13	19/11/13*	05/11/13	19/11/13	02/12/13
English 6	05/03/13	10/05/13	03/06/13	19/11/13	09/12/13	26/11/13	09/12/13	09/12/13
English 7	16/05/13	04/06/13	21/06/13	15/08/13	28/08/13	29/08/13	19/09/13	27/11/13
English 8	04/06/13	08/08/13	21/08/13	22/08/13	26/08/13	28/08/13	18/09/13	04/12/13
Science 5	08/05/13	06/06/13	21/06/13	07/11/13	02/12/13*	21/11/13	02/12/13*	02/12/13*
Science 6	08/05/13	14/05/13	21/06/13	07/11/13	02/12/13	21/11/13	02/12/13	02/12/13
Science 7	04/06/13	07/06/13	19/06/13	17/07/13	28/08/13	29/08/13	18/09/13	29/11/13
Science 8	21/05/13	07/06/13	24/07/13	26/07/13	18/09/13*	30/08/13	18/09/13	29/11/13

*interview delayed due to teacher absence

N – Notes; A – Audio; TS – Transcript; V - Video; PWS – Programme/Work Sample;

	Initial interview			Observation 1			Post observation discussion 1			Observation 2			Post observation discussion 2			Observation 3			Post observation discussion 3			Final interview		
	N	A	TS	V	TS	PWS	N	A	TS	V	TS	PWS	N	A	TS	V	TS	PWS	N	A	TS	N	A	TS
English 5	✓	✓	✓	✓	✓	P	✓	✓	✓	✓		P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓	✓	✓
English 6	✓	✓	✓	✓	✓	P	✓	✓	✓	✓		P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓	✓	✓
English 7	✓	✓	✓	✓	✓	P	✓	✓	✓	✓		P	✓	✓	✓	✓		P	✓	✓	✓	✓	✓	✓
English 8	✓	✓	✓	✓		P	✓	✓	✓	✓		P	✓	✓	✓	✓		P	✓	✓	✓	✓	✓	✓
Science 5	✓	✓	✓	✓		P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓	✓	✓
Science 6	✓	✓	✓	✓		P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓	✓	✓
Science 7	✓	✓	✓	✓	✓	P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓	✓	✓
Science 8	✓	✓	✓	✓	✓	P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓		P/WS	✓	✓	✓	✓	✓	✓

Appendix F

Example of lesson observation notes

Time	Observations		Follow up	Comments
	Teacher Activity	Student Activity	Responses from post interview 1	
11.35	Hand out task. Refer students to screen Instruct students to read	Students look at passage	Why this passage? *The boys in my class. It would have piqued their interest; purely for that reason and because it was a good passage as well but it was interesting to those students who I knew struggle with just reading and answering questions.* Passage chosen to meet student interest. Is grade appropriate, if not too easy (text complexity).	No indication to the students about context of the passage, reason for reading. Teacher talks to students as she hands out text passage and question sheet. • Teacher highlights need to identify key words • Vocabulary - not pursued at this point • No expansion of these ideas by teacher – level of questioning is inferential – drawing on student experiences and understandings of what 'wheel away' might mean. • Teacher draws attention to the title "Wheel Away". Students make prediction about what text might be about. Teacher refers to term 'prediction'. Doesn't indicate that this is a strategy the students can use to increase their understanding and comprehension. • Teacher tells students that highlighted and circled words will be discussed at end of text (*why not at end of each paragraph – context lost?)*
	Read together and highlight key words	Students highlight key words individually	No discussion of keywords/vocab at this point *Well the next lesson we actually did following up on some of that was a vocabulary-building lesson. I suppose at that point in time I was making sure they understood what they were reading and then, knowing that my next lesson was vocabulary and vocab building.*	
	Student questioning	Students answer teacher questions		
	Teacher refers to heading – comments Make prediction about text Put picture in head	Students make predictions (check video for responses)	Metalanguage – Prediction *Yes, I gave them the title and then we'd think "Okay, well what do we think? From this title using your knowledge of information about wheel away, where are we going to go?"* Visualisation not mentioned *(VIDEO PLAYED) Okay, so there's a lot of visualisation work there…* *T I do that.* *I …then but you actually didn't mention it was visualisation.* *T No.* *I Is there a reason why you didn't?* *T That will be my downfall – I do it and without going… yes, maybe that's what we're doing…* *I So you are on automatic strategies.*	

Time	Observations		Follow up	Comments
	Teacher Activity	Student Activity	Responses from post interview 1	
			T Yes. I just… and I do that for everything because I'm a very chatty, handsy…I like them to get an idea in a picture but I probably don't use the word, the language.	
	Highlight key words Circle unsure words	Students Highlight key words Circle unsure words		
11.40	Teacher questions about paragraph read Who is involved? Literal level of questioning Focus on vocabulary – prompt students to circle unknown words	Students read aloud – take turns Students respond to questions Vocabulary – student identified		Questioning No evidence of inferential questioning at this point Literal level of questioning initially moving to some inferential. Questioning remains low level. Who, what, where Teacher makes inferences for the students rather than the students doing this, and answers the question (who is controlling the knowledge – think about semantic gravity and density) Literal question- what did the boys find? What is a pram? Teacher expands on students' response – what you put a baby in when they can't walk – T – like a stroller
11.43	Prompt visual imagery Teacher explains term, then finds image on internet	Student question (vocabulary) What is wicker?	Visual image *It was the wicker. They were just going "What, what", and the internet wasn't working very well that day.* *I Which gets me to the next part that you talked about; you explained what "wicker" was because the student question was "Well what is wicker?" Why did you go and spend all that time looking on the internet for the image and whatever? What was the purpose behind that?* *T I wanted them to understand what it was because, to me, understanding parts of a description…* *I Yes.* *T I'm a visual person so when I… I'll read something and I visualise it happening. It doesn't matter what*	Teacher explains what 'wicker pram' is to students and finds image on internet to show. No discussion about why this term is used in story. No prompts to students on how they could find the meaning themselves (who is controlling the knowledge?)

Time	Observations		Follow up	Comments
	Teacher Activity	Student Activity	Responses from post interview 1	
			it is, you know, and it makes a clearer understanding; you can see… so a wicker pram would have been different to a pram that we use now and I wanted them to see how the wicker pram would have been a better pram than I guess the buggy or whatever. That's what I was trying to get across to them as well and the fact that they do know what wicker is; they just didn't know in their head at that point in time. A wicker pram – it's not something you see….. *I like them to have visuals and I think if I define and go on with something like wicker they may then use that in their writing and expand their vocabulary as well too. I think taking the time to actually look at something and work on something helps in other areas of language too.*	
	Teacher highlights vocabulary on whiteboard as paragraph is read	Students read	Ask T – why do this (visual image for students?) Provide visual prompt for students	Teacher determines that students may not know some vocabulary so highlights on text on whiteboard. Comments that she likes the language in story after emphasising word 'investigates'
11.46	Recap story. Teacher connects to possible student experience	Students respond		Students (1) give literal retell of the story. Teacher then recaps for students. There is some connection to students' experience, but teacher is driving comprehension and retelling– no options yet for students to go 'deeper'
11.48	Three words circled. Talk to partner about words. Teacher moves from group to group to discuss	Students talk to each other	level of vocabulary understanding Words circled by students include; prototype treacherous rocks accelerated wicker outcrops manoeuvring yeth	Teacher works with some students regarding words that have been highlighted – focus on weaker students. Explains to some students how use text to understand words – teacher draws on student knowledge and gives answer if student doesn't know. Teacher tells student to

Time	Observations		Follow up	Comments
	Teacher Activity	Student Activity	Responses from post interview 1	
	(especially LS students)		Teacher uses strategy metalanguage in responses	*things. So he's got to be quite skilful at it…* - *I can really explain it…* I *Okay. That's all right. It's good to clarify that and ask questions isn't it?* - *Yes.*
11.50	Teacher uses strategy terminology- clarify, ask questions	No response from students (check video/transcript)	Check reasoning for teacher using terminology at this point on lesson and not prior	Use of terminology in teacher student discussions, but no explanation or recap of what these are Students don't respond with metalanguage
11.51	Visuals of wicker pram on screen	Students excited – discussion amongst each other to clarify predictions, understandings		No response by teacher about students' response to visuals. Opportunity not taken to use older term of wicker top and image to set context of story
11.52	Teacher gives question sheet to students. Refers to question types – main idea (how to find). Explicitly explains how to locate main idea	Students respond to how to find main idea	Use of strategy –review of strategy. Task is multiple choice – why?	Explains how to find main idea. Focuses on main idea being the most important part of the story. Teacher re-reads text. No discussion of story. Task is multiple choice – no discussion by teacher and students about each option. After there is an explanation of why the choice is the main idea. Teacher dismisses point made by student regarding the type of school (which could have led to further discussion)
11.58	Vocabulary question – teacher prompts students	Students respond and clarify answer	Teacher and students work through sheet together	Each question is worked though by teacher with students. Correct answer given and then move on. Limited time for students to process options. No explanation given of why the answer is correct. (downward escalator – semantic gravity)
11.59	Continued reading and discussion of question sheet	Students respond as needed by teacher		
12.00	Brief discussion of synonyms in text and questions	Students respond as needed by teacher	Student uses strategy terminology – does this happen often?	Teacher discusses inference with students – not term – answer not in text. Use of vocabulary to assist in inference – billy cart – modify. No explicit mention of synonyms and their use with inference. One

Time	Observations		Follow up	Comments
	Teacher Activity	Student Activity	Responses from post interview 1	
	Closed questions			student asked a question, another is called on to answer, then teacher answers question.
		Students elaborates thinking, mentions inference		
12.02	Reference to imagery/visualising in text	Students respond by reading relevant section		Question regarding imagery – compare images. Prompts imagery to students – doesn't link to comprehension though. Teacher provides her thoughts on the image created but no opportunities for the students to respond and give their ideas. Then moves straight into next question without any students commenting *holiday reading and hiking. What do you think? What do you think Ethan? Have you got any ideas?*
	Teacher comments on students' responses	Student responds and provide answers (Ethan)		One student is asked for response – and given answer. He gives a response, but explanation is requested by another student. Original student is overlooked
	Teacher asks students to elaborate reasoning for response (but not students who initially responded)		Why not ask student who responded to elaborate (E)?	
12.05	Grammar question –	Students give responses	No elaboration of why phrase is a simile – why this choice?	Students give answers such as metaphor, exaggeration. Correct response is simile. Simile is explained but no explanation asked for or provided for reason why the phrase in text is a simile. (27.0) Students told they will learn about it in another lesson (contextual opportunity lost).
12.08	Teacher prompt students to consider author intent and purpose	Students respond	Teacher does not elaborate why text is to entertain	When asking question about author intent, uses multiple choice options in question sheet, rather than a discussion about what it might be without prompts.

Time	Observations		Follow up	Comments
	Teacher Activity	Student Activity	Responses from post interview 1	
12.10	Summary Fact and opinion question Teacher seeks clarification of student answer	Students respond Students provide clarification of reasoning		For the question about the summary, teacher reads out the options, letter answer is given and move on. No discussion or explanation of what a summary is- in this passage was it the main idea or theme? Fact and opinion A lengthy discussion about fact and opinion, with students contributing ideas. As discussion progresses, a student asks if one response is the right answer. At end of discussion, straight into next task (has fact/opinion been unpacked and repacked here of just unpacked? Semantic wave?
12.13	Instructions for gluing in worksheet (follow straight on from fact and opinion discussion)	Students glue in worksheets		
			Thought …… Semantic wave – evidence of use of strategies being mentioned – some in-depth, explicit discussion of strategy	Was a lesson more of comprehension as assessment rather than comprehension being taught.

Participants	Paraphernalia	Processes
Year 6 students (23)	Digital projector	Question answering by students
Teacher (1)	Excerpt of text – *Wheel Away*	Teacher talk – students respond
	Magazine - *Orbit*	Some mention of strategy, but only one instance of strategy instruction
	Question sheet	
	Web page – images	Students

Text *Wheel Away*

- Narrative text – chronological sequence
- Simple punctuation – two sections of speech; full stops (22); commas (5)
- Sentences of varying length and complexity – simple sentences, compound sentences, complex sentences
- 349 words
- 23 sentences
- Average 15 words per sentence
- Average 1.4 syllables per word
    - Single syllable words – 252 (73%)
    - Two-syllable words – 65 (19%)
    - Multi-syllable words – 29 (8%)
    - Words repeated – 41%
- One example of figurative language – simile 'the runaway pram launched into the air like a space shuttle being launched from NASA'
- Comprehension questions multiple choice, with each focusing on a comprehension skill or strategy
- Low level questions – literal questions

Appendix G

Themes and categories

Themes and categories emerging from the data have been identified and coded within each case and across cases in the inquiry. Initially, key points were identified within twenty substantive categories (Table 1), prior to common points being identified and organised into themes using the research questions as guiding frames for analysis and discussion. Figure 1 shows the relationship between categories and emerging themes.

RQ/Code no.	Code	Description
1.1	What is comprehension?	Teacher definitions of comprehension
1.2	Where does comprehension instruction locate itself within a curriculum domain?	Teacher views of comprehension instruction as part of their curriculum domain
1.3	Most important aspects of comprehension in curriculum domain	Teacher views of what aspect of comprehension is important in their curriculum domain
1.4	Comprehension instruction as part of the teaching role	Comprehension instruction in primary school and secondary school and in different curriculum domains
1.5	Teaching comprehension strategies	Investigates the differences in teaching comprehension strategies in primary and secondary school and in different curriculum domains
1.6	Comprehension instruction adds to student understanding of content in the curriculum domain	Investigates the differences in teacher views that teaching comprehension strategies adds to student understandings of content
1.7	Understanding of content and ideas in the classroom	Investigates the pedagogy/classroom practices enacted by the teacher to aid the student understanding of content
1.8	Comprehension strategies specific to the curriculum domain	Investigate teacher perspectives of the comprehension strategies that are of greatest benefit to the curriculum domain
2.1	Comprehension strategies are intentionally taught in the curriculum domains	Investigates the comprehension strategies implicitly and explicitly taught across year groups and curriculum domains
2.2	Comprehension strategies used by teachers in their practice	Investigates the comprehension strategies implicitly and explicitly used by teachers across year groups and curriculum domains
2.3	Allocation of time for comprehension strategy instruction	Investigates the amount of time allocated to teaching comprehension strategies across year groups and curriculum domains- this also investigates teacher perceptions of time allocated
2.4	Comprehension strategies demonstrated by students	Investigates the comprehension strategies teachers observe their students enacting in each lesson

RQ/Code no.	Code	Description
2.5	Evidence of students using comprehension strategies to understand content	Investigates the types of evidence students generate to demonstrate the use of comprehension strategies in lessons
2.6	Student demonstration of understanding of comprehension strategies	Investigates teacher views of students demonstrating an understanding of comprehension strategies in the classroom (assumed knowledge) without instruction from the class teacher
2.7	Evidence of deeper understanding of content by students	Investigates the practices enacted by teachers to enable students to demonstrate their understanding of content
2.8	Measurement of student understanding	Investigates the how teachers measure student knowledge and how this fits with their practice
3.1	The reasons why teachers choose to teach selected comprehension strategies	Investigates teacher views on the choices made when teaching comprehension strategies in the curriculum domain and across year groups
3.2	The need to teach comprehension strategies	Investigates teacher perspectives on comprehension instruction in the curriculum domain and across year groups
3.3	Teacher perspectives of effective ways students demonstrate understanding of content	Teacher views of how students learn and demonstrate their knowledge
3.4	Beneficial comprehension strategies in the curriculum domains	Teacher perspectives of those comprehension strategies that will promote student learning and understanding in the curriculum domain

Table 1: Codes and descriptions

Three themes have emerged from the data:

- Beliefs and understandings of comprehension to inform comprehension and curriculum knowledge;
- Pedagogical practices built upon teacher understandings of comprehension and curriculum knowledge;
- Relationships between understandings of comprehension, curriculum and pedagogy

Using these three themes, patterns in the data are further examined with a view to "analyse episodes with a sense of correspondence, to understand behaviour, issues and contexts in regard to the particular case" (Stake, 1995 p.78). Chapter 6 'The English Teachers' and Chapter 7 'The Science Teachers' elaborate upon these themes, providing the reader with interpretations of data.

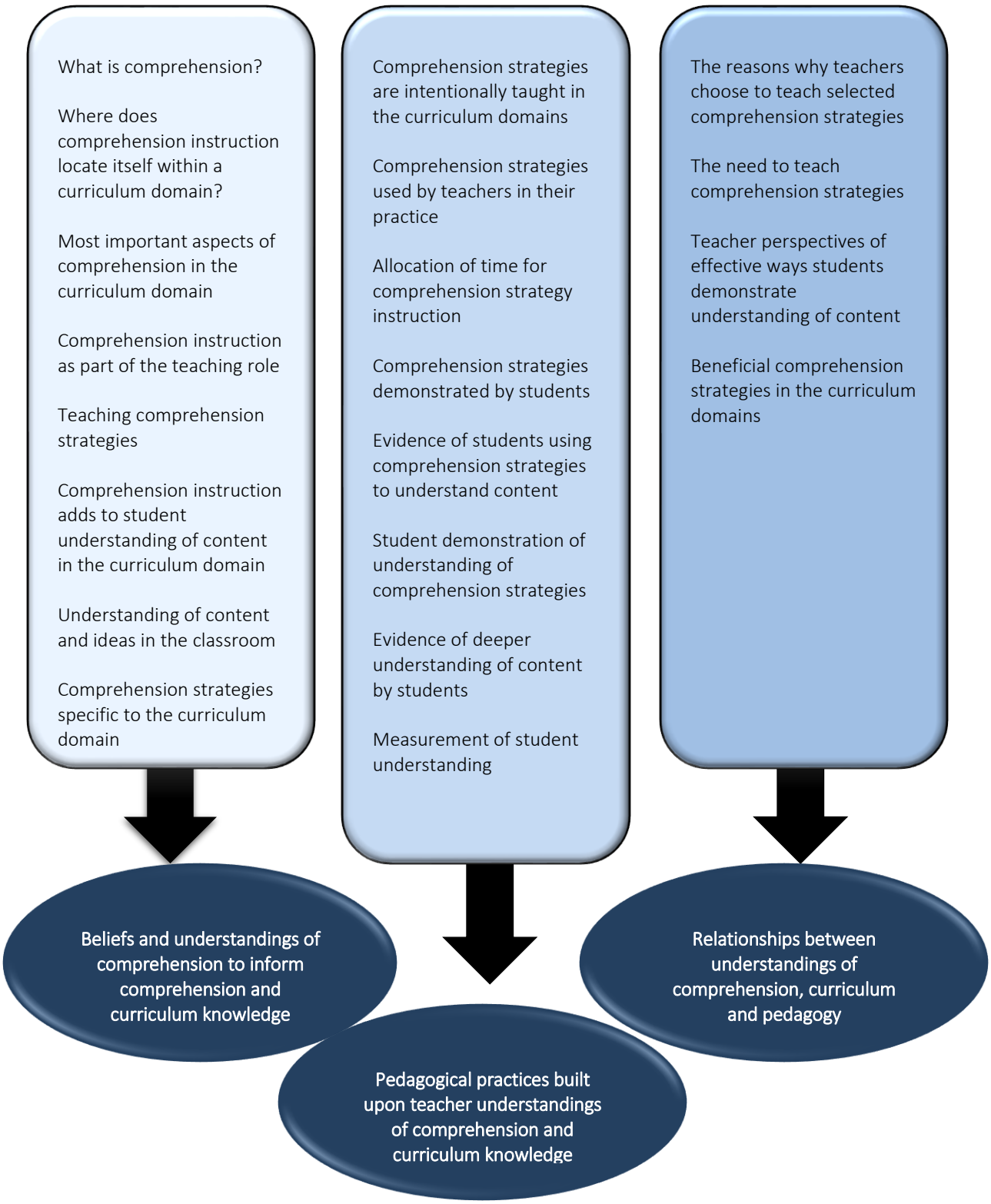


Figure 1: The relationship between categories and themes

Appendix H

Teacher professional development

The participant school has a strong focus upon the continued professional learning of its staff. Professional learning courses and activities occur both internally and externally. Preference is given to professional learning opportunities that are aligned with two key goals in the School Management Plan:

- Building the capacity for teachers to implement a cohesive school-wide approach to improving literacy and,
- Encouraging a professional and collegial learning environment that fosters a culture of professional dialogue and sharing both within faculties and schools and across the whole school.

During the inquiry, the focus of professional learning was primarily upon literacy across the school and the implementation of the Australian Curriculum. As such, individual teachers have participated in a series of professional learning courses and seminars. In my role as Co-ordinator of Literacy, Teaching and Learning (K-6), I provided a series of professional learning seminars to Junior School staff (Transition to Year 4) in comprehension strategy instruction across the curriculum during Term 4 Year A and Term 1 Year B. This professional learning was modelled upon the seminars I had provided to a small group of Middle School staff during an action research project in the preceding year. In August Year A, each of the Transition (pre-Kindergarten) to Year 6 teachers engaged in professional learning with a literacy consultant from the Association of Independent Schools NSW (AISNSW), with a specific focus upon literacy. This involved a classroom demonstration per year group and one 90-minute staff meeting. The same form of professional learning occurred in Year B, this time with an author visiting classes and meeting with teachers. Table 1 shows the literacy professional learning undertaken by teachers of Transition (pre-Kindergarten) to Year 6. It is interesting to note that professional development about comprehension strategy instruction was the primary focus of the professional learning programme during Year

A and B for teachers of Transition to Year 4, who are not the focus of this inquiry. These teachers did not have the opportunity to participate in the earlier professional development seminars, as they did not meet the criteria for selection to participate in the action research project.

This contrasts with the concurrent professional learning programme at the faculty level in Years 7 to 12, as shown in Table 2, which has primarily focused upon the implementation of the Australian Curriculum. Several teachers, including the Dean of Studies, Head of Junior School and Co-ordinator of Literacy Teaching and Learning K-6 and 7-12 have also attended professional learning courses on whole school literacy improvement.

Whole school staff meetings Transition (pre-Kindergarten) to Year 12 are held once per term, with the focus of professional learning at these meetings concerned with compliance and pastoral issues.

Date	Participants	Presenter	Literacy Focus
August Year A (two sessions)	Transition (pre- Kindergarten to Year 6 teachers	AISNSW Literacy Consultant	Literacy across the curriculum – staff sessions plus in-class teaching
October Year A	Transition (pre-Kindergarten) to Year 4 teachers	Co-ordinator of Literacy Teaching and Learning K - 6	Introduction to comprehension Comprehension strategy - inference
October Year A	Transition (pre-Kindergarten) to Year 4 teachers	Co-ordinator of Literacy Teaching and Learning K - 6	Reflecting upon strategies trialled – inference Comprehension strategy – vocabulary
November Year A	Transition (pre-Kindergarten) to Year 4 teachers	Co-ordinator of Literacy Teaching and Learning K - 6	Reflecting upon strategies trialled – vocabulary Comprehension strategy – activating prior knowledge/connecting
February Year B	Transition (pre-Kindergarten) to Year 4 teachers	Co-ordinator of Literacy Teaching and Learning K - 6	Review of concepts Comprehension strategy – questioning
March Year B	Transition (pre-Kindergarten) to Year 4 teachers	Co-ordinator of Literacy Teaching and Learning K - 6	Reflecting upon strategies trialled – questioning Comprehension strategy – retelling and summarising
April Year B	Transition (pre-Kindergarten) to Year 4 teachers	Co-ordinator of Literacy Teaching and Learning K - 6	Reflecting upon strategies trialled – retelling and summarising Comprehension strategy review
May Year B	Transition (pre- Kindergarten to Year 6 teachers	Co-ordinator of Literacy Teaching and Learning K - 6	The Australian Curriculum - English
June Year B (two sessions)	Transition (pre- Kindergarten to Year 6 teachers	Visiting author	Writing with purpose – staff sessions plus in-class teaching
July Year B	Transition (pre- Kindergarten to Year 6 teachers	Co-ordinator of Literacy Teaching and Learning K - 6	The Australian Curriculum - English

Table 1: Literacy professional learning undertaken by teachers of Transition (pre- Kindergarten) to Year 6

Date	Participants	Professional Development Focus for participant teachers of Year 7 to Year 12 (all teachers)	Other Professional Development Focus for participant teachers in Year 7 and 8 English and Science
October Year A	All Years 7 – 12 teachers	Faculty meetings	
November Year A	All Years 7 – 12 teachers	Faculty meetings	Australian Curriculum for English; Science
February Year B	All Years 7 – 12 teachers	Faculty meetings – goal setting for personal and faculty goals	
March Year B	All Years 7 – 12 teachers	Faculty meetings Australian Curriculum for History; Mathematics	Australian Curriculum for English; Science
April Year B	All Years 7 – 12 teachers	Faculty meetings Australian Curriculum for History; Mathematics	Australian Curriculum for English; Science
May Year B	All Years 7 – 12 teachers	Faculty meetings Australian Curriculum for History; Mathematics Workshops – Innovative Teaching and Learning or ICT use in classrooms	Australian Curriculum for English; Science
June Year B	All Years 7 – 12 teachers	Faculty meetings Australian Curriculum for History; Mathematics	Australian Curriculum for English; Science
July Year B	All Years 7 – 12 teachers	Faculty meetings	Australian Curriculum for English; Science
August Year B	All Years 7 – 12 teachers	Faculty meetings Australian Curriculum for History; Mathematics Workshop – Innovative Teaching and Learning	Australian Curriculum for English; Science

Table 2: In-school professional learning undertaken by teachers of Year 7 to Year 12

Appendix I

Teacher and student engagement in English Year 5 to Year 8

Duration	Teacher activity	Student activity	Resources
11 mins	Introduction of the poem *The Lizard,* explaining that poems have different features to other texts	Provide examples of different features of poems, then take turns to read aloud	*The Lizard* by Lydia Pender (1992) found in student copies of *Desert Centred (Desert centred, 1992).*
12 mins	Introduction and explanation of literary devices and language features	Respond with examples found in poem	PowerPoint displayed on whiteboard
7 mins	Explanation of the task - to identify examples of language features in poem	Begin the set task	Copy of poem Student work book
10 mins	Assist students as they complete the task, and lead a discussion at the end of the lesson	Complete the task in their work books and give examples of language features identified	Copy of poem Student work book

Year 5 English: Overview of teacher and student participation in Lesson 2 *Identifying literary devices and language features*

Duration	Teacher activity	Student activity	Resources
5 mins	Recap and review the story *The Tea and Sugar Train* from the previous lesson, questioning the students and prompting for examples of descriptive language	Respond to the questions asked and give examples of descriptive language	Excerpt from *The Min-Min* by Mavis Thorpe Clark (1966), titled *The Tea and Sugar Train* (1992) found in student copies of *Desert Centred (Desert centred, 1992)*
20 mins	Orally read the text to students, modelling how to find the meaning of unfamiliar vocabulary (using comprehension strategies contextually), questioning and responding to the students as the need arise	Ask for meanings of unfamiliar vocabulary and respond to teacher questioning	Copy of text
10 mins	Explanation of the task to students - use iPad app *Popplet* to describe and to provide examples of descriptive language found in the text	Work in small groups of three – four students and create *Popplet* as directed	iPad app *Popplet*

Year 5 English: Overview of teacher and student participation in Lesson 3 *Identifying descriptive language*

Duration	Teacher activity	Student activity	Resources
5 mins	Introduction of a short text *Wheel Away,* instructing students to read with her, with the purpose of identifying key words in the text	Read along or listen to the teacher read, and individually highlight key words they deem important	Individual copy of text *Wheel Away*
5 mins	Prompt students to make predictions about the text, based on the title.	Respond with predictions and answers to questions asked	
5 mins	Discuss the visual imagery used in the text and source an image to assist the students' understanding. Questioning of students as passage is read	Question teacher about vocabulary in text. Respond with answers to questions asked	
10 mins	Key words are identified and discussed, first in small groups and then as a class	Provide their key words and recap story with the teacher	
20 mins	Ask students to complete a multiple-choice comprehension task. She reads and discusses each question with the students	Complete the comprehension task, responding as needed to teacher questioning	Individual copy of text *Wheel Away* Individual copy of question sheet Student workbook

Year 6 English: Overview of teacher and student participation in Lesson 1 *Text study*

Duration	Teacher activity	Student activity	Resources
5 mins	Recap the novel *Holes* and read Chapter 36 with the students	Provide details of text read so far and read text aloud as required	Individual student copies of *Holes* iBook *Holes* projected onto whiteboard
10 mins	Ask questions about the characters and events as the chapter is read aloud, prompting students to use examples from the text	Respond to questions and discuss characters	Teacher-made task sheet
5 mins	Draw connection between Science unit taught earlier in the year and an event in the text	Add to discussion, answering and asking questions	
5 mins	Question students about compare and contrast, and reasoning for focus on characters Stanley and Zero	Respond to questions and discuss characters	Venn diagram projected on whiteboard
10 mins	Explain the task to students - use a Venn diagram to compare and contrast two characters, Stanley and Zero	In small groups, record ideas and understandings about Stanley and Zero	Individual student copies of *Holes* Teacher made task sheet
5 mins	Lead a concluding discussion about the students' findings	Share findings with their peers	Completed teacher made task sheet

Year 6 English: Overview of teacher and student participation in Lesson 3 *Holes Ch. 36 – character analysis*

Duration	Teacher activity	Student activity	Resources
10 mins	Instructs the students to read Chapter Two of *King of Shadows* silently, asking them to think about how the text relates to Shakespearean performance	Read quietly	Individual copies of *King of Shadows* by Susan Cooper
15 mins	Questions for students to answer written onto the whiteboard, which link to an assessment task about life in Shakespearean times	Respond with answers to questions asked, and record answers in note books	Student work books, teacher provided question sheet
25 mins	As students complete the three questions set, direct them to work on their assessment task that is due the following week	Complete set tasks, and ask questions of the teacher as needed, continuing their research	Student work books, iPad, laptop

Year 7 English: Overview of teacher and student participation in Lesson 1 *Reading, questions and research*

Duration	Teacher activity	Student activity	Resources
5 mins	Introduce the lesson and ask the students to write a brief description of an inanimate object - the door handle to the Matron's door (Activity 1)	Complete each task as required and share their writing when asked	Individual copies of *Boy: Tales of Childhood* by Roald Dahl, e-book or hard copy
10 mins	Comment on the techniques used by students and repeats the exercise, focusing upon different language devices, providing examples to the students	Complete each task as required and share their writing when asked	Student work books,
15 mins	Introduce the next task (Activity 2) to students - where students are asked to write a brief sentence about the 'Matron', and share with peers	Complete each task as required and share their writing when asked	Student work books, iPad, copy of text
15 mins	Presentation of the final task (Activity 3), where students must write a descriptive paragraph about the 'Matron' using the language devices taught	Complete the task as required, questioning the teacher as needed	Student work books, iPad, copy of text Teacher-prepared worksheet

Year 7 English: Overview of teacher and student participation in Lesson 3 *Boy: Tales of Childhood – creative writing*

Duration	Teacher activity	Student activity	Resources
10 mins	Review content of the previous lesson and reinforces learning of writing techniques to build suspense	Respond with questions and comments	
10 mins	Using the digital projector, draws attention to the details in settings using the five senses using a colour coded excerpt from *The Golden Compass* as the stimulus.	Record notes on their iPads or in notebooks	Student work books, iPad Excerpt from *The Golden Compass*
5 mins	The teacher leads a discussion about language devices and their use	Respond with their understanding about metaphor, simile, personification and alliteration	Student work books, iPad
15 mins	The teacher models writing a description of a setting using specific language devices. Using a variety of images as the stimulus, asking students to write 3-4 'high quality' sentences	Begin writing on iPads or in notebooks, following the teacher's model, then attempting their own descriptions of setting, using each of the language devices discussed	Student work books, iPad Images
10 mins	Asks students to plan for writing, using the language devices discussed	Plan writing and seek advice as needed	Student work books, iPad

Year 8 English: Overview of teacher and student participation in Lesson 1 *Writing techniques and literary devices*

Duration	Teacher activity	Student activity	Resources
10 mins	Review of previous content on themes in Much Ado About Nothing with the class, drawing attention to the themes of love and deception, prompting students to give specific details in their responses	Provide examples of the themes of love and deception Record ideas on iPads or in their notebooks	Student work books, iPad
5 mins	Distribute a copy of a past exam paper, which focuses upon Shakespearean performance, namely the text *Much Ado About Nothing,* and discuss with students	Review the paper, asking questions of the teacher as needed	Student work books, iPad Copy of past exam paper
10 mins	Lead a discussion about question answering techniques in exams, demonstrating on the white board the highlighting keywords in the question	Follow the model set by the teacher and then proceed to complete the task independently	Student work books, iPad Copy of past exam paper
5 mins	Discuss with the students the acronym PEEL (point, example, explain, link) to assist them in writing responses	Continue to write their responses using iPads or notebooks, asking questions and responding to teacher questioning	Student work books, iPad Copy of past exam paper
20 mins	Instruct students to complete section of exam paper, moving around classroom to assist students as needed	Continue to write their responses using iPads or notebooks, asking questions and responding to teacher questioning	Student work books, iPad Copy of past exam paper

Year 8 English: Overview of teacher and student participation in Lesson 3 *Review of texts – identifying plot and themes*

Appendix J

Semantic code analysis for English

Year 5 English – Case 1

Lesson 1 – Text study *Shatterbelt*

Analysis below begins at 23.54 mins into lesson. Prior to this, students were engaged in oral reading of the novel by the teacher and students. During the lesson, the teacher would stop and explain vocabulary and allow students to comment on the events of the text.

Turn	Time	Teacher	Student	Semantic movement and comment
1	00:00	Okay, so we know who and where and we just talked a little bit about what. I just want to quickly, before we move on **to you writing your summary like we've done before, I want to show you an example of a summary that somebody else has done last week.** It's not going to fit though is it? Let me make it smaller…		SG⇧ Teacher begins to unpack concept by showing an example.
2	00:24		That's mine and Alex's.	
3	00:25	It is. I just picked one out because I thought we could look at it together. Most people are doing it very, very well but some people are getting a bit muddled with the different parts okay**? I just wanted to talk through it all together. The sections that we have are "Who", "What', "When", "Where" and "Why".** *(T points to each heading)* I just want to talk about what we're going to put into each of those boxes. Those boxes are there to **help us think clearly to be able to write a *good* summary**. Okay? **We've got to remember that our summaries are meant to be telling us everything that happened in that chapter or that part that we've read without having to read the whole thing.** But, for example, when we've finished the written **summaries** for all of it, if you read them all, **you should have a pretty good understanding of what happened in *Shatterbelt*.** These little boxes at the top help us to get all the information that we need to write the **summary**. So **"Who" – what is that asking us?** What do we put in that box?		SG⇧ Teacher unpacks concept of summary by identifying the components and using a graphic organizer and common language to support student understanding.
4	00:34		Who are the characters.	SG⇧ Student provides an example of the concept

Turn	Time	Teacher	Student	Semantic movement and comment
5	00:36	The **characters** in that part of the story that we're reading. For example, in chapter two, **the characters were Tracy, her mum, Mr Barnes, Mr Bailey, Mrs Bailey and the man that owned the tip**. Okay? They're all the **characters.** The next section is "What?" What do we put in the "What" part do we think?		SG⇧Teacher unpacks student response by elaborating and providing examples from the text. Teacher questions students.
6	00:59		What happened.	SG⇧ Student provides an example of the concept
7	01:03	What happened? **What happened in that part that you've just read**, exactly. Not too complicated. "When?" What do you think we put there?		SG⇧Teacher unpacks student response by elaborating and with further questioning.
8	01:12		When it happened.	SG⇧ Student provides an example of the concept
9	01:14	When it happened. **We were just saying then that that part that we've just read now happened at school, at lunch-time didn't it?** That's where that discussion – most of it – happened there. "Where", again we just talked about it, so at school.		SG⇧Teacher unpacks student response by elaborating.
10	01:31	*Interruption at classroom door*		
11	01:43	So "**Where" we understand and then "Why?"** What do you think we do with that box?		SG⇧Teacher questions students.
12	01:55		Why they would do something, like for example, if it was like I don't know, a book about Ninjas and Jackie Chan threw a Ninja star at someone…	SG⇧ Student provides an example of the concept, not related to the text, but to student's interest.
13	02:10	Right.		
14	02:12		…doing that "Why" because the person that he was throwing at it might have been Bruce Lee.	SG⇧ Student continues with an example of the concept, not related to the text, but to student's interest.
15	02:17	Okay. That's an interesting example. If we have a look here (*T points to board*), we can have an example from chapter two. **We've got the "who" was Tracy, her mum, Mr Barnes, all the**		Teacher acknowledges response from student and moves on with explanation of

Turn	Time	Teacher	Student	Semantic movement and comment
		characters, "what", her mum went out with Mr Barnes is one thing that happened, the other one was Tracy went with Mr Bailey to the tip. "When", it was in the late afternoon, "where, the tip and Mr Bailey's house. So, they're all the settings and then "why", because Tracy was bored and she loves the tip so that's the reason why she went to visit him.		concept without elaboration on student's comment. SD⇧ Teacher begins to repack concept using examples from the text.
16	02:45		What's so cool about a tip?	SD⇧ Student asks question about text.
17	02:47		Why do you love a tip? It's horrible.	SD⇧ Student responds to question about text.
18	02:49	Well this tip apparently was very clean and tidy remember.		SG⇧ Teacher gives example from text.
19	02:51		How do you have a tidy tip? It's a tip.	SD⇧ Student seeks clarification.
20	02:54		You put everything in piles.	SD⇧ Student responds to question about text.
21	02:56	All right let's have a look at the example before we move to doing our next one. Have a listen as I read to you this summary. It was very thorough and a really good example of telling us all about what happened in chapter two okay? *"Tracy and her mum were both worried about the shed and they tried to forget about it. Then Tracy's mum got a call from Mr Barnes, a reminder about their date. Tracy was outside, and Mr Bailey noticed her and invited her to go to the tip with him. Tracy accepted because she loved going to the tip. They got there, and the keeper made a comment on their sky-high load of tree clipping."* So here, are words included from the text that really thoroughly described what they were talking about there. *"Tracy had lunch with Mr Bailey and Mrs Bailey, they had cake after and Tracy thought it was the best cake ever. Tracy went home and started reading a book which got her tired and she put her book down. She looked up at the ceiling and she saw a vision of a pipe that looked like it had been hit with something. She saw visions of the shower pipe with dirt pouring out. She started*		SG⇧ Teacher unpacks concept using an example written by a student in the previous lesson. She explains why it is a good example of a summary. She then consolidates the concept by reading an excerpt from the text that relates to the summary.

Turn	Time	Teacher	Student	Semantic movement and comment
		feeling scared as the silent violence went past" – which is another **quote** from the text		
22	04:11		Silent violence.	SG⇧ Student recalls part of the text.
23	04:13	**Silent violence. Remember we talked about what that actually meant. Who remembers what that meant in context?** That was one of those pieces of the writing that we could **infer meaning** from. It didn't make a lot of sense – silent violence – but within the **context,** we understood it. Do you remember?		SD⇧ Teacher elaborates on the student's response and brings a related concept to the discussion, using some specialised language. SG⇧ Teacher then begins to use the metaphor 'silent violence' to unpack as an example of inference-inference is the teaching point. Metaphor but not discussed as language device.
24	04:31		**It was like there was violence, but you can't hear it.**	SG⇧ Student provides an elaboration of the concept to clarify understanding.
25	04:38	Does anyone else remember exactly what we talked about when we had that example?		SD⇧ Teacher seeks further elaborations from students.
26	04:42		We were silent, and something got moving a lot	SD⇧ Student repacks concept.
27	04:47	Yes.		
28	04:48		The sound would be like shaking.	SD⇧ Student repacks concept
29	04:50	That's right because **what she was talking about with the silent violence was the shaking pipe** wasn't she? Okay? So that's what she was talking about. **She was saying that it seemed violent, what she could see seemed scary and a bit violent. It wasn't violence like people hurting each other but just what she could actually see was making her feel a bit scared.** "She saw visions of the shower pipe with dirt pouring out and she started feeling scared as the silent violence went past". Then her mum popped in and asked her if she was okay." That's a very thorough **summary** which is what we're trying to do so that we can make sure that we've fully understood what we've read so far. **That way, we've got a *good* summary to come back to help us when we go to read again,**		SG⇧ Teacher unpacks concept and elaborates using examples from the text.

Turn	Time	Teacher	Student	Semantic movement and comment
		and we can check that we remember what's happening. What I want you to do – I'll leave that up *(PowerPoint on whiteboard)* with those pieces of information filled in – and I want, in your book, which should be on your table; if it's not I think that some of the reading books are in the writing tray so I'll have to have a look for you… What I want you to do is to – on your own for now – I know that when we do the **summaries** on the iPad we've been working in pairs, but I want you to first, on your own, look at the text, think about all of those different **categories**. Focus first though on doing the "Who", "What", "When", "Where" and "Why" part.		SD⇧ Teacher repacks concept of summary and sets task.
	06:20	END		

Year 6 English – Case 2

Lesson 2 – *Holes* - identifying key elements; setting, characters.
Analysis below begins at beginning of lesson.

Turn	Time	Teacher	Student	Semantic movement and comment
1	00:00	Yesterday we were reading *Holes*. **We read two *really important* chapters. Who can give me a *brief* synopsis on what's actually happened in those two chapters**?		SG⇧ Teacher asks students to recall prior learning. She uses common and specialised language.
2	00:13		Zero's real name is Hector Zeroni	SG⇧ Student provides factual information.
3	00:18	Hector Zeroni. **Why's that *significant*?**		SG⇧ Teacher requests further information. She uses specific language to direct the student.
4	00:20		Because of Madam Zeroni.	SG⇧ Student provides factual information.
5	00:23	Why's Madam Zeroni important?		SG⇧ Teacher requests further information.
6	00:25		Because she helps Stanley's great, great grandfather get up the hill every day	SG⇧ Student provides factual information.

Turn	Time	Teacher	Student	Semantic movement and comment
7	00:43	That's right. Yeah good. Perfect.		SG⇧ Teacher accepts student response without elaboration.
8	00:45		Trout Walker and that young girl with freckles and the red hair is related to the warden which has red hair and freckles	SG⇧ Student provides factual information.
9	00:58		I think so.	
10	01:00		Yeah, we all thought that	
11	01:03	Ah yes, okay. So, the warden, what's her last name?		SG⇧ Teacher requests further information.
12	01:07		Walker	SG⇧ Student provides factual information.
13	01:11	Walker, okay. So, **we've hit a very significant part in the story**, okay.		SD⇧ No elaboration from teacher on why this part of the story is significant.
14	01:18		And we learnt that they're actually digging for the loot, like um, Kissing Deidre Barlow's loot. They're not just digging for punishment.	SG⇧ Student provides further information through an elaboration of the events in the story.
15	01:27	That's right. What loot? What loot? Go on.		SG⇧ Teacher requests further information.
16	01:32		Like the riches that Deidre Barlow stole from all the banks she robbed when she was an outlaw.	SG⇧ Student provides further factual information through an elaboration of the events in the story.
17	01:40	Okay, good. **Are you going to *expand* on that**?		SD⇧ Teacher requests further information. She uses specific language to direct the student.
18	01:42		No, I've got something else	
19	01:43	Okay, go ahead.		

Turn	Time	Teacher	Student	Semantic movement and comment
20	01:44		Deidre Barlow died from a yellow spotted lizard.	SG⇧ Student provides factual information, but not as teacher requested.
21	01:47	Okay, **what led to that *circumstance* though**? So, she did die from being bitten by the yellow spotted lizard but –		SD⇧ Teacher requests further information. She uses specific language to direct the student.
22	01:52		She was taken out by Trout Walker, so they knew where the treasure was. She got bitten.	SG⇧ Student provides further factual information through an elaboration of the events in the story.
23	02:04	She got bitten, okay. Did she give up the information of where the treasure was?		SG⇧ Teacher asks literal question.
24	02:08		No.	
25	02:10		And she said that your children and their children would be digging for centuries to come.	SG⇧ Student provides further factual information through an elaboration of the events in the story.
26	02:17		That's why it's great.	
27	02:19	**Why's that significant**? **Why's that line significant?**		SD⇧ Teacher requests further information. She uses specialised language to direct the student.
28	02:20		Because the warden didn't want her, if she had children, to do it, so she started up a camp that would make boys do it for her.	SG⇧ Student provides further information through an elaboration of the events in the story.
29	02:32	Someone else other than her to dig the holes?		SG⇧ Teacher clarifies student's comment, but she provides no elaboration on the significance.
30	02:35		Cause 110 years later they're still digging.	SG⇧ Student provides factual information.

Turn	Time	Teacher	Student	Semantic movement and comment
31	02:38	Still digging holes. She hid that treasure pretty well didn't she?		SG⇧ Teacher comments on student response but does not identify the significance of the event.
32	02:42		Two things. One, she was ready to die because she died laughing. And two, I bet the treasures not really there.	SG⇧ Student provides further interpretation of the text.
33	02:55		That's what I think.	.
34	02:58	It's a *good* prediction. I like that. Let's go back to something Quinn said. She was ready to die. What did Quinn ***mean by that***? Okay? This is something we *touched on* a little bit yesterday.		SG⇧ Teacher explores students' understandings using inferential questioning. She uses the term 'prediction' which is associated with comprehension strategies.
35	03:13		Um well, Deidre, she said her heart, she'd been wanting to die for the past 10 years after Sam was killed and so she said that she was ready to die just because she gave up and just gave up all hope of finding true love.	SG⇧ Student provides factual information from the text.
36	03:28	Okay, you've hit it there. So, the connection between Sam and Deidre was how did Deidre feel about Sam?		SG⇧ Teacher requests further information. She uses the term 'connection' which is associated with comprehension strategies
37	03:42		Love.	SG⇧ Student provides factual information.
38	03:44	She loved him. He loved her. Okay, so for 20 years she's been feeling alone and sad and you know, a little bit vengeful.		
39	03:51		She was feeling vengeful, she needed to kill.	SG⇧ Student provides factual information.
40	03:54	She did yes		SG⇧ Teacher accepts response.

Turn	Time	Teacher	Student	Semantic movement and comment
41	03:55		But she said Trout Walker was making stuff up.	SG⇧ Student provides factual information.
42	04:03	That's correct. Alright, now we've since discovered – who is one of the people that Kissing Deidre Barlow has robbed? Who?... Do you know? …Do you want to have a think about that?		SG⇧ Teacher accepts response and requests further information on another event in the chapter.
43	04:21		I think the Sheriff?	SG⇧ Student provides opinion.
44	04:24	She didn't rob the sheriff. But she did kill the sheriff and give him a kiss. But she didn't rob the sheriff. **There's somebody significant that's set that story into place for Stanley.** Okay tell me.		SG⇧ Teacher responds to student and clarifies information. She does not question the student's thinking. She asks a literal question using specialised language to guide students.
45	04:38		His great, great grandfather.	SG⇧ Student provides factual information.
46	04:40	Great Grandfather. That's right.		SG⇧ Teacher accepts response.
47	04:42		Great, great grandfather.	
48	04:43	That's right. Because his grandfather made money where? Do you remember where he made his money? I heard it but calling out.		SG⇧ Teacher comments on student response but does not identify the significance of the event. Teacher asks literal questions.
49	04:48		Um, two things. One, didn't he try to make heat warmer shoes?	SG⇧ Student seeks clarification.
50	05:03		That's his dad	SG⇧ Student responds to peer.
51	05:05	That's his dad, yeah.		SG⇧ Teacher accepts response.
52	05:06		Okay I forgot.	
53	05:07	That's okay. We're going to come back to the smelly feet and the smelly shoes a little bit later too.		SG⇧ Teacher accepts response.
54	05:12		California.	SG⇧ Student provides factual information.

Turn	Time	Teacher	Student	Semantic movement and comment
55	05:13	California. He made his money in California and he was coming back to his family and what happened on his way back home to his family?		SG⇧ Teacher elaborates on student response but does not identify the significance of the event. Teacher asks literal questions.
56	05:22		Kissing Deidre Barlow showed up.	SG⇧ Student provides factual information.
57	05:24	Kissing Deidre Barlow showed up. What happened to all the money?		SG⇧ Teacher comments on student response but does not identify the significance of the event. Teacher asks literal questions.
58	05:27		It's gone.	SG⇧ Student provides factual information.
59	05:29	It's gone. Alright. So, I've got a little activity to do today. We're going to work in groups. So, you need to listen to me carefully. So, **we've read the story and we're at a *really important part of the story,* so before we move onto part two, I need to make sure that *we're all on the same page* and we're *understanding the significance* of it,** because we've been going back and forward in time haven't we, so we're a bit in the present and a bit in the past. So, we're going to focus on that at the moment. So, this one **says key elements**. Okay, **what do you see as the key elements of the story, thinking about the characters, the setting and the family?** So that's in the middle, and all the boxes around here are where you are going to put what you think are the **key elements**. Now, must **support your answer with evidence from the story.** So, **a key element, what do you think one of the key elements is?** Just so we can start off with an example?		SG⇧ Teacher comments on student response but does not identify the significance of the event. SG⇧ Teacher moves on to explaining group task. She uses specialised language to explain each section of the task. She asks students for an example of a key element.
60	06:43		When Zero told Stanley that his real name was Hector Zeroni.	SG⇧ Student provides factual information.
61	06:52	Okay, why is that a **key element** do you think?		SG⇧ Teacher asks for clarification.
62	06:54		Because it relates back to the past.	SG⇧ Student provides a factual response.

Turn	Time	Teacher	Student	Semantic movement and comment
63	06:57	Great, so you would write that in one of the boxes. Okay. Now I said we'd come back to the smelly feet. So, **there's a link in there, a key element** – who had smelly feet in the past? I heard it over here?		SG⇧ Teacher accepts student response but does not identify the significance or seek evidence from the text. Teacher asks literal questions.
64	07:16		The great, great grandfather.	SG⇧ Student provides factual information.
65	07:19	He didn't have the smelly feet. Someone else had the smelly feet.		SG⇧ Teacher requests further information.
66	07:20		Trout Walker.	SG⇧ Student provides factual information.
67	07:23	Trout Walker had the smelly feet. Who was trying to solve a problem with sneakers that smell? Who was trying to solve that problem?		SG⇧ Teacher comments on student response. Teacher asks literal questions.
68	07:31		Wasn't he trying to solve the problem –	SG ⇧Student calls out but teacher questions a student who has not contributed
69	07:32	Angus?		
70	07:33		Stanley.	SG⇧ Student provides factual information.
71	07:34	Stanley's dad. Okay so **can we see there's a link in there** isn't there? **Everything's *intertwined***. Okay, hands down for a moment. So, you're going to come around in your group and you're going to write down **key elements** and then we're going to rotate around.		SG⇧ Teacher accepts response then provides further information to students to support their understanding. Teacher moves on to explain task.
72	07:48		He was trying to recycle old things –	SG⇧ Student provides factual information.
73	07:51		He was trying to recycle old sneakers.	SG⇧ Student provides factual information.
74	07:54		He needed to make them smell nice.	SG⇧ Student provides factual information.

Turn	Time	Teacher	Student	Semantic movement and comment
75	07:56	Okay, the smell. I might have given that part away a little bit. Okay, **setting**. So, this one says **setting**. **What is the setting**? **What has changed over time about the setting and why is the change significant?** We've talked about Camp Greenlake. We've talked about how it's changed, we've talked about why its possibly changed and why they have changed. So, in your group, you will write down some of those things. Again, ***support your answer with evidence from the story.*** Okay, this one. If you were stuck in the desert for a few days, how would you ensure that you survived? Okay, so we're going to think about what's going to happen. How are you going to survive in the desert? You've run off. Okay, how are you going to survive? You've got nothing with you.		SG⇧ Teacher comments on student response but does not identify the significance of the event. Teacher asks literal questions. Teacher continues to explain the task to the students. She uses specialised language and elaborates on particular aspects to support student understanding.
76	09:00		Nothing with you.	
77	09:03	Nothing. You, right now, ran into the desert. How are you going to survive?		SG⇧ Teacher elaborates
78	09:09		*Students speak at once, but teacher does not respond or elaborate on comments made- task needs to be completed*	
79	09:17	Alright so **character development today is going to focus on Zero.** You're going to write information about Zero in the boxes. So, **describe Zero, *what do you know* about Zero, what's significant about Zero and what part do you see Zero playing in the next section of the book**?		SG⇧Teacher provides information for next part of task. She continues to emphasise 'significance'. She uses inferential questioning.
80	09:43		Can we start at any one?	
	09:46	Yep, so remember **you're writing your information in the boxes and we're going to share all our information.** I'm thinking, our last one, yep, **prediction.** Okay. **Prediction**. **Where do you see the story going? Think about the characters, the setting and think about the family as well. So, your prediction. Can your predictions be wrong?**		SG⇧ Teacher uses specialised language to explain the task.

Turn	Time	Teacher	Student	Semantic movement and comment
82	10:17		No.	
83	10:18	No, they're your **predictions**. So, but again, **support your answers with evidence from the book**. Don't just go, they're going to live a life of luxury. Okay, you need to **support your information**. I've got your groups. You're going to move around in your groups and fill in the squares. You're going to discuss with your group what you're going to write in the boxes. This is a group effort. Not one person in your group. Everyone can have a say. If you run out of space in one box what do you think you can do?		SG⇧ Teacher does not elaborate on the meaning of prediction as a comprehension strategy. She reminds students again to use information from the text to support information, but she does not provide an example.
84	11:10		Go to the next one.	.
85	11:12	Go to the next one. Okay, I don't mind how many boxes you use. I've made two of each. I've even got, I can print out third copies. That's absolutely fine. So if you've got a lot to say, say it. But make sure that you're staying on topic with the question that is asked. Then we're going to come back together and we're going to talk about what we think and what we know.		SG⇧ Teacher provides instructions and students begin the task.
		END – students go to group work		

Year 7 English – Case 3

Lesson 2 – *Boy: Tales of Childhood* - identifying language devices

Lesson begins with students reading aloud from text. Analysis below begins at 06:42 mins into lesson. Prior to this, students were engaged in oral reading of the novel by the students.

Turn	Time	Teacher	Student	Semantic movement and comment
1	00:00	Okay, so now **we're going to look at contrast, but I did notice something. What technique is used in the second last line?** Can we have our hands up? Come on. Yep?		SG⇩ Teacher provides students with area of focus for lesson but then reviews concept from prior lesson. Specialised language is used.
2	00:16		**Simile**.	SD⇧ Student responds with concept from prior lesson, using specialised language.
3	00:18	Yep. So **explain a simile.**		SG⇧ Teacher seeks explanation of concept,

Turn	Time	Teacher	Student	Semantic movement and comment
				expecting student to draw on prior knowledge.
4	00:21		**It uses the word like.**	SG⇧ Student unpacks meaning of simile using common language.
5	00:23	Yep so read it out for us		
6	00:25		*(Student reads from text)* "All they give you is disgusting cabbage and brussel sprouts and you go off like firecrackers."	SD⇧ Student provides example of simile from text.
7	00:29	So, **what is that describing**? Yes, and don't be too rude.		SG⇧ Teacher questions students, using less specialised terminology.
8	00:34		Is that it's bad or…?	SD⇧ Student responds and provides his interpretation of the simile
9	00:36	yes, but what is going up like a firecracker?		SD⇧ Teacher questions students to elicit further information.
10	00:41		He's farting.	
11	00:43	Yes, so you can imagine he's tooting along because the brussel sprouts. And guys **remember last week when we did similes and I said they *enhance our understanding*… So, when looking at techniques they really give us a *greater understanding***. So, **I'm going to introduce a new technique today,** but I know I've talked about it. **Contrast**. Now, have I done the activity when I get two people up the front and we **contrast** them?		SG⇧ Teacher further explains similes using both common and specialised language. Teacher then moves on to new topic.
12	01:29		Once	
13	01:32	Yeah. Now let's do it again because it's a good thing to look at. *(teacher selects two students)*		
14	01:47	**Contrast**. **What does it mean if we are contrasting?** Stand close together. **What does it mean by contrast**? Can anyone remind us? Yep.		SD⇧ Teacher introduces new concept by asking students to provide an explanation.
15	01:57		When we are **comparing** them.	SD⇧ Student responds with specialised term, but without explanation.
16	02:00	**When we are comparing them. So, let's compare these two students.**		SD⇧Teacher accepts student's response but does not explain concept.

Turn	Time	Teacher	Student	Semantic movement and comment
17	02:03		One's a boy and one's a girl.	SD⇧ Student provides an example of the concept
18	02:04	Yes, that's the first thing straight off. **Now what else can we see that is different if we contrast them?**		SG⇧ Teacher accepts response. Some elaboration using specialise language.
19	02:22		One's wearing a tie.	SD⇧ Student provides an example of the concept.
20	02:24	One's wearing a tie, one's not. What else have we got? Just yell them out.		SD⇧ Teacher repeats student's response with some clarification. Further questioning for examples from students.
21	02:26		One's wearing a dress.	SD⇧ Student provides an example of the concept.
22	02:27	Yes dress. What else?		SD⇧ Teacher repeats student's response without clarification. Further simple questioning for examples from students.
23	02:30		One's wearing a blazer.	SD⇧ Student provides an example of the concept.
24	02:32	Yes blazer. What else?		SD⇧ Teacher repeats student's response without clarification. Further simple questioning for examples from students.
25	02:34		Short hair	SD⇧ Student provides an example of the concept.
26	02:36	Short hair		SD⇧ Teacher repeats student's response without clarification. No questioning for further examples.
27	02:37		Pants	
28	02:39	Yeah, pants. Ok guys, **so contrast is when we compare two things to one another. You could even contrast all three of us.** Now guys **contrast. The other term we use for contrast is juxtaposition**. Can everyone write this is in their book? Have a **guess who I want to contrast or juxtapose? I want to juxtapose two teachers in this novel at this stage.** Have a guess who.		SG⇧ Teacher unpacks concept and introduces additional specialised language. He then continues to unpack the concept of contrast and juxtaposition with an example from the text.
29	03.16		Hardcastle.	
30	03:18	And……Corkers. Because Roald Dahl actually liked Corkers and I think if you have to have a teacher who is laughing and joking then it is quite fun, but if you've got someone who is really bossy then that's not fun.		SG⇧ Teacher adds to student's response, elaborating upon the features of the two characters from the text.

Turn	Time	Teacher	Student	Semantic movement and comment
31	03:38	Now **juxtaposition is a *comparison between two things to highlight the difference***. And, as Dylan just said, we are going to **juxtapose** Hardcastle and Corkers. … *(conversation amongst students and classroom management)* So guys. **I want you to compare**, and that's what this sheet asks you to do, **I want you to compare Hardcastle to Corkers** and I actually might get you to fill in this sheet on the board. The **characters**, can everyone read along please? '**The characters of Captain Hardcastle and Corkers are very different in the novel. Think about the contrast between the two masters. What does masters mean in this context?**'		SD⇧ Teacher unpacks term using common language. He states the set task using specialised language SG⇧ Teacher explains the task using less specialised language. Teacher reads both the definition and the task from the PowerPoint presentation.
32	05:43		Teachers	SD⇧ Student provides an example of the concept, using understanding of the vocabulary.
33	05:44		The teachers.	SD⇧ Student provides an example of the concept, using understanding of the vocabulary.
34	05:45	Yeah, the teachers. Okay?		SD⇧ Teacher repeats student's response without clarification.
35	05:46		I thought masters were like old people	SD⇧ Student clarifies understanding.
36	05:49	Yeah but remember Roald Dahl is probably at school in the 1920s so it's nearly 100 years ago. Yeah. It's a bit like just calling them sir okay?		SG⇧ Teacher clarifies student's response.
37	06:02	Draw a table like this in your book and complete the necessary details……. **I want you to write down some characteristics of Hardcastle and then compare it to Corkers.**		SG⇧ Teacher uses specialised language as he sets task.
38	06:19		*Students work on task and some students record responses on whiteboard*	
39	06:55	**If Hardcastle is very strict and disciplined what are some ways we can describe Corkers?**		SD⇧ Teacher questions students about the two characters as they complete the task.
40	07:01		Relaxed	SD⇧ Student provides an example of the concept.

Turn	Time	Teacher	Student	Semantic movement and comment
41	07:03	Relaxed		SD⇧ Teacher repeats student's response without clarification.
42	07:04		Nice	SD⇧ Student provides an example of the concept.
43	07:05	Nice		SD⇧ Teacher repeats student's response without clarification.
44	07:06		Laid back	SD⇧ Student provides an example of the concept.
45	07:07	Laid back		SD⇧ Teacher repeats student's response without clarification.
46	07:09			*Students complete contrast task in books, sharing notes on whiteboard*
47	17:00	I want you to discuss your findings. **Write down two points that could be similarities.**		SD⇧ Teacher introduces a related concept. He does not explain term.
48	17:10			*Students discuss amongst themselves*
49	17:30	**What did you find that are similarities?** They're both men, they're both teachers		SG⇧ Teacher provides an example of the concept but does not elaborate.
50	17:40		*Students discuss amongst themselves*	
51	18:00	*(Classroom management)* **I'm not hearing the discussion about the similarities**		
52	18:03		*Students discuss amongst themselves*	
53	18:19		They're both male and they're both teachers	SG⇧ Student provides an example of the concept.
54	18:22	Yes, but what else?		SD⇧ Teacher repeats student's response without clarification. Further simple questioning for examples from students.
55	18:25		They're both men	SG⇧ Student provides an example of the concept.
56	18:27	And what else?		SD⇧ Further simple questioning for examples from students.
57	18:29		.. and they're both teachers	SG⇧ Student provides an example of the concept.

Turn	Time	Teacher	Student	Semantic movement and comment
58	18:31	What's this? (*points to page in book*)		SD⇧ Teacher questions students.
59	18:34		They're both men and teachers.	SG⇧ Student provides an example of the concept.
60	18:35	Yes, but I said that. Guys, **can anyone find any similarities apart from them being men and teachers?**		SD⇧ Teacher seeks further information from students, without explaining the meaning of the term.
61	18:45		They're weird.	SD⇧ Student provides an example of the concept.
62	18:47	That's actually quite good isn't it? **They're peculiar, they're not…normal** isn't the correct word, but they're not normal.		SD⇧ Teacher acknowledges student's response with some elaboration.
63	19:00		They both care in some sort of way towards their students	SD⇧ Student provides an example of the concept.
64	19:04	OK Year 7. I think Elise has a good point here. They do care about their students in different ways. Because if Hardcastle's background he thinks that discipline is the way to go ad to be mean where Corkers thinks you need to have fun more than anything, doesn't he? He as a little more rude. He's not really rude but uses crude humour.		SG⇧ Teacher unpacks student's response and elaborates with an example from the text.
65	19:36		*Students work on task set*	
66	19:53	Now what I would like you to do in your book is to **write two sentences explaining their similarities.** We've discussed a couple. One is they care.		SD⇧ Teacher repacks concept, asking students to explain their understanding.
67	20:05		Peculiar	SD⇧ Student provides an example of the concept
68	20:06		They're both men	SG⇧ Student provides an example of the concept
69	20:08	They're both peculiar…. No they're not both men and teachers. …no, I don't want that. I want their peculiar behaviour, that Corkers goes for fun things, where Hardcastle is meaner.		SD⇧ Teacher accepts one response, but not the other. He is seeking a deeper understanding from the students.
70	20:23		But they're both **similarities**, men and teachers	SG⇧ Student seeks further clarification from the teacher.

Turn	Time	Teacher	Student	Semantic movement and comment
71	20:27	Because they care for the students but show it in different ways. OK. So, this is a harder question. I'm not saying they're not, but I think their motivation is the same. Hardcastle thinks you need to be tough. Corkers thinks you should have fun OK. I'll do the best for the kids if I yell at them and they're scared of me.		SG⇧ Teacher unpacks concept and elaborates with examples from the text.
72	20:50			*Students continue task as teacher moves to different groups of students.*

Year 8 English – Case 4

Lesson 2 – Review of texts for examination – identifying themes *Much Ado About Nothing; Zed for Zachariah*

Analysis below begins at 03:00 mins into lesson. Prior to this, the teacher was handing out the Yearly Examination Notice to the students.

Turn	Time	Teacher	Student	Semantic movement and comment
1	00:00	Alright, so we're going to read from here. So, the topic Shakespearean Performance, that means *Much Ado About Nothing.* Okay? So, you might like to write *Much Ado About Nothing.* It's just called Shakespearean Performance but we're not going to have to do any performance alright. It's just about *Much Ado About Nothing* and *The End of the World as We Know It. The End of the World as We Know It* is just the title for the unit of work that we're doing on *Zed for Zachariah*. So, if you like you could change that to *Much Ado About Nothing* and *Zed for Zachariah* to remind you, when you come back to read this again, exactly what we're covering, okay? So, it's just as I've said, we've been learning nothing new. Alright. Now the outcomes that need to be assessed. That's really for the teachers, not for you guys. So, we're going to read the nature of the tasks here. Okay? So, everyone see that. Okay, you need to follow this. Alright. *The nature of the task is an unseen exam set during the examination period.* And here's the task detail. *The yearly exam will be divided into two sections. These are as follows.* *Shakespeare's 'Much Ado About Nothing' short answer responses. Section two, 'Zed for Zachariah' novel study short answer responses.*		SG⇧ Teacher unpacks lesson using common terms and reading from text. She explains what will be required in a forthcoming examination.

Turn	Time	Teacher	Student	Semantic movement and comment
		So short answer responses mean you're not going to have to write a massive essay or anything like that. It's going to be a one-hour exam. How much time should you allocate to each section do you think?		
2	01:40		Probably half an hour each?	
3		Yeah, half hour. A half hour each. You might find that you finish the *Much Ado* section in much less than half an hour. Okay. But you should plan in your head to have half an hour for each section. Alright, so let's talk about what we can do to prepare for this exam. *To prepare for this exam, students should revise the topics studied in class including* ***a focus on the plot about Shakespeare's 'Much Ado About Nothing'.*** **What does the word plot mean? Focus on the plot?**		SG⇧ Teacher unpacks lesson using common terms and reading from text. Some reference is made to specialised terms of the syllabus content.
4	02:14		Just an outline of the story?	
5	02:16	Yeah, **plot** means, can you read please, **a plot just means the storyline, what happens**, okay? So, I would say **plot** just means who……. who is in *Much Ado About Nothing*. You might just like to add this on just to remind yourself. Who is in *Much Ado About Nothing.* Have you got that? **The plot? Because you need to know what that means. What happens, so what are some of the *events* that happen in the *story.*** Could you write this down please? Just to give yourself a reminder. Why? Why stuff happens, for example, why does what happen to Hero happen? Remember that. Where it happens, okay? And maybe how it happened. So, **it's just *the story line.* All those different elements in *Much Ado About Nothing*.** Okay. So, **we're going to focus on the plot of Shakespeare's *Much Ado About Nothing* and the novel of *Zed for Zachariah*.** So this is why I'm telling you… So it's exactly the same thing. This is why I've said to you guys you need to be reading the novel at home. **You have to understand the plot, the whole of the story line, and all of those things, who, where, what, why, and have a really good response of *Zed for Zachariah*.** Okay. Reading again, *for the Shakespearean Performance unit,* ***students should be familiar with the plot, characters and themes of the Shakespearean play.*** Can everyone highlight **themes** for me? Where is says the **themes** of the Shakespearean		SD⇧ Teacher repacks concept and elaborates on student's response. SD⇧ Teacher introduces new concepts. SG⇧Teacher begins to unpack other aspects of syllabus content, using specialised terms interspersed between common language.

Turn	Time	Teacher	Student	Semantic movement and comment
		play. Highlight **theme**. **What does it mean guys by the theme of a play or the theme of a film?** What do we mean by **themes**? Maddy?		
6	04:18		Like romantic or like horror or something like that?	SD⇧ Student repacks concept using prior knowledge.
7	04:21	That would be, **that's a good idea, but that would be a genre**. Okay, **we didn't talk a whole heap about themes, but themes are**, you need to listen, and you need to write this down. **Themes are *ideas* that run through the play.** Okay? So, I'm just going to write (on whiteboard), you can write all over your sheet, I don't mind. I'm just going to make sure. I think we did this, but I'm just going to check. **So, a theme is an *idea*…. that we see… *more than once* in a play or a novel. So, we can talk about themes of a play alright, and we can talk about the themes of a novel**. So, for example, I'll give you an example of one of the **themes** of *Much Ado About Nothing*. So, **one of the themes in *Much Ado About Nothing* which we all know very well, is trickery. People are tricked really quickly**. Can you guys remember, because I know you're pretty good at remembering the **plot** of *Much Ado About Nothing*? Can you remember? Why don't you give me some examples with your hands up of times when people were tricked in the story?... I need to see a few more hands than that okay, because you need to be revising this at home. So, when were some times that people were tricked in the story? Zac		SG⇧Teacher unpacks concept of theme. Teacher reads aloud as she writes notes on the whiteboard *a theme is an idea that we see more than once in a play or a novel*. Students copy notes. SD⇧ Teacher begins to repack concept of themes with an example from the text, but then asks students to recall.
8	06:05		Um, when Don Pedro and Leonato were talking about Beatrice loving Benedick when he was there. And when I don't know, the old lady and Beatrice were talking, oh, someone was talking about...	SG⇧ Students provide examples of concept from text.
9	06:18	That's lots of examples there isn't it? So, let's add to that. Good remembering.		
10	06:24		Um when Beatrice and Benedick get tricked into	SG⇧ Students provide examples of concept from text.

Turn	Time	Teacher	Student	Semantic movement and comment
			being, they love each other, and they get tricked by Claudio and Hero and that.	
11	06:35	Okay, okay. We'll come back to that.		
12	06:38		And when Hero was pronounced dead.	SG⇧ Students provide examples of concept from text.
13	06:40	Mmm, when Hero was pronounced dead.		
14	06:43		Um, when Don John was tricking the, oh it was Don Pedro and Claudio and Hero and Borachio.	SG⇧ Students provide examples of concept from text.
15	06:55	Right, good, good. What were you going to say?		
16	06:59		That's what I was going to say.	
17	07:00	Did he steal your idea?		
18	07:02		Yeah.	
19	07:03	Okay. Right, now, listen up. Right, just jot down. So we've got trickery, we've got Beatrice and Benedick. Okay? How they're tricked to fall in love. Remember in the garden? Remember we watched the movie, the garden? You remember that?		SD⇧ Teacher repacks ideas, prompting students to recall episodes in text. She records notes on the whiteboard. Students record notes in their books.
20	07:21		Yeah.	
21	07:22	Yeah. Okay. And then we've got the Don Pedro, the Hero plot. Okay, with Margaret, okay?..... So, Don Pedro makes it look like Hero has been unfaithful to Claudio. But it's not Don Pedro is it? It's not Hero is it? I've given you the name. No, it's Margaret isn't it? Okay. And then there's another it of trickery when Hero pretends to be dead. Okay. Now you can see that that trickery. So, we've got three times at least, and there's more in the play as well, so we just remembered three times there. Beatrice and Benedick are tricked into falling in love, Don Pedro tricks Claudio into thinking Hero has been		SG⇧ Teacher provides further information to the students,

Turn	Time	Teacher	Student	Semantic movement and comment
		unfaithful to him and Hero and Leonato trick Claudio into believing she's dead.		
22	08:37		Wasn't it Don John who tricked Claudio?	
23	08:45	Don John, sorry. Don John. Sorry. Alright, okay. Don John. Good, so you have understood it. Good boy. Okay, Don John. Alright, now so what I've showed you is that **that *idea* comes up *more than once*. An idea that comes up *more than once* is a theme. So, there are other themes to the play as well, alright, and we'll go over that.** We'll take a couple of lessons and we'll go over the **themes. I'm not going to go over the plot with you.** We're not going to have time. I've told you before, we're not going to have time to watch the movie again, okay? **The plot is easy, you can do that.** You guys know it. This, we just need to think about this some more, okay? It's not difficult. It's not difficult. It's a big word for a small idea okay? **This is how we work out a theme. We've done that. I'll help you with the other themes** and you'll have a question that's a little bit longer than the other question because you have to write a bit more. If you're in an exam, don't forget, how much you need to write you need to look at the amount of lines. You need to look at the amount of lines that you've got. If you've got two lines you fill those two lines. If you've got ten lines you need to write lines. Okay? Ten lines. So, we'll look at that in a couple of lessons and **you as homework are going to go over the plot**. Alright, now then. Let's go back to this. We're saying, alright, you should be able to discuss these in detail which you will be able to. **You can already discuss the plot in detail and you're going to be able to discuss the themes as well.** It says the focus of the exam, and I'm reading the sheet now again, is not on the language of Shakespeare. So, **you don't have to talk about similes and metaphors in this exam,** okay**? It's just about what happens and the themes** and everything you could be asked is in there, so you don't need to worry about anything else. Okay now for the novel study, for *Zed for Zachariah*. *Students should be familiar with the first chapter of the text.* So that's a really big clue isn't it? A really big clue that the exam question is going to be about the first chapter of the text. So you need to make sure that you know it really well. We'll revisit that, but it's important for us to do the whole		This section of dialogue continues 03:13 minutes. SD⇧ Repacks concept of themes as an idea that appears more than once. She uses a combination of common and specialised terms. Teacher refers to plot does not elaborate. SG⇧ Teacher discusses exam requirements with students. SD⇧ Teacher refers briefly to related concepts with specialised terms but does not elaborate. She then moves on to next text. SG⇧ Teacher reads exam requirements for new text. She identifies some

Turn	Time	Teacher	Student	Semantic movement and comment
		novel as well isn't it? Because we're getting ready for year 9. *You should also revise notes on this chapter with a particular focus on how the* ***composer uses language to create a feeling of suspense for his readers.*** *The questions for this exam will be focussed on the extract and chapter one only.* Okay, can we **highlight how the composer uses language**. Let's highlight that. Alright, and let's make sure we know those terms. I know you know them because we've used them in class. **What do we mean by the composer**?		specialised terms she considers important for the students to understand. SD⇧ Teacher questioning to elicit student understanding. Literal questions are asked using specialised language.
24	11:58		The **writer**	SG⇧ Student responds.
25	12:00	Right, good, the person who wrote it, right, the person who wrote it. **What's the name for, right so the composer is the person who wrote it.** The…		SD⇧ Teacher seeks out an alternative term for the response provided by the student.
26	12:09		The **author**	SG⇧ Student responds.
27	12:11	**What's the proper name for the audience?** The…		SD⇧ Teacher questioning to elicit student understanding. Literal questions are asked.
28	12:14		**Responder**.	SG⇧ Student responds using specialised language.
29	12:15	**Responder**. Okay so the **respondent**. Alright, so that is telling you is there's going to be a question on the first chapter**. It's going to be about the language tools it uses and it's going to tell us how they create suspense. So, we know all the techniques that are needed to create suspense** don't we? Because we used those for our writing assessment. Okay? So, we'll have a go, we'll come back to chapter one and we'll have a go at that close study. But we need to press on with the novel because we need to have an understanding of the whole novel, to do really good exam answers and also, we need to be ready for year 9 when you'll be expected to read all of the novel at home.		SD⇧ Teacher acknowledges student response and does not elaborate. She moves onto the next concept, using the specialised language of the concepts. These concepts are not elaborated upon.
30	13:03	Students talking and class management/organisation to prepare for next part of lesson on novel *Zed for Zachariah*		
31	14:30	Chaps, yesterday when everyone was here, we started to talk about the moral dilemma that Ann faces at the end of chapter three. Okay. **I want a concise definition of what a moral dilemma is.** And I want more than the usual people to have their hands up. Everyone should		SD⇧ Teacher reviews content from previous day. Uses the term 'concise definition' to elicit responses from the students.

Turn	Time	Teacher	Student	Semantic movement and comment
		be able to tell me exactly, not look it up on your iPad and read it but remember **a concise definition of a moral dilemma.**		
32	15:04		**It's when there's a problem that the person has to choose whether to do the right thing or the wrong thing.**	SG⇧ Student responds.
33	15:13	Yeah, yeah, along those lines. Can you add to that?		
34	15:16		A **personal problem** that you need to decide.	SG⇧ Student responds.
35	15:19	A personal problem. Alright. So, we've said that, right, so we talked about what moral were. What are morals?		SD⇧ Teacher questioning to elicit student understanding. Literal questions are asked.
36	15:29		Um, your personal opinion of whether something is right or wrong.	SG⇧ Student responds.
37	15:32	Yeah, so your personal opinion, how you behave? And a dilemma is…. what's a dilemma?		SD⇧ Teacher questioning to elicit student understanding. Literal questions are asked.
38	15:38		A dilemma is your personal opinion, it's like, it's something that's gone wrong and then it's like…	SG⇧ Student responds.
39	15:47	Is it easy to solve?		SD⇧ Teacher questioning to elicit student understanding. Literal questions are asked.
40	15:49		It's not easy to solve and then you've got to figure out how to solve it.	SG⇧ Student responds.
41	15:51	Okay so a moral dilemma is a choice about, a really hard choice to solve about how you		SD⇧ Teacher acknowledges ideas and then continues

Turn	Time	Teacher	Student	Semantic movement and comment
		behave. Okay, what's Ann's moral dilemma at the end of chapter three?		questioning students. Literal questions are asked.
42	16:03		Like the situation?	SG⇧ Student responds.
43	16:05	Yeah, what two choices does she have to decide between, that's right.		SD⇧ Teacher acknowledges ideas but does not provide further support or elaboration
44	16:10		Like if she should do the right thing and tell him not to get into the water or should she not? Like, just stay away?	SG⇧ Student responds.
45	16:17	Alright, listen up. If you weren't here yesterday this is what we did. Following on from all the stuff we did about the moral dilemma, we have talked about whether Ann was right to let Mr Lumis go into the water, become contaminated by activity, or whether she was wrong. And something very interesting happened. We found that most of the girls, most of the girls, said yes, Ann did do the right thing, she, you know, she shouldn't have stopped Mr Lumis. And most of the boys, if not all of the boys, said?		SD⇧ Teacher doesn't acknowledge idea or provide further support. She moves on with the lesson.
46	16:50		All of the boys?	
47	16:52	Yeah, all of the boys said no Ann should have stopped Mr Lumis from getting into the water. And guys who weren't here yesterday, this is a really, really important point, and you guys who weren't here need to listen to this. Somebody from yesterday, tell me, what did we, how did we explain that difference in opinion from the girls to the boys? What did we say, what did we say was a factor in that opinion?		SG⇧ Teacher begins to unpack concept through review of previous lesson. She questions the students to elicit their understanding.
48	17:17		Because girls and boys they're like different in the way they think. Like the way…. I don't know how to explain it.	SD⇧ Student begins to repack knowledge but experiences difficulty.
49	17:28	Give it a go.		
50	17:29		They…	

Turn	Time	Teacher	Student	Semantic movement and comment
51	17:30	You're along the right lines.		
52	17:32		It's different, like, if a girl was like by herself it would be harder for them to defend themselves over the boy.	SD⇧ Student begins to repack concepts.
53	17:41	Good, good, good. Okay, because we talked about the physical differences okay. Ann is how old, how old is Ann?		SD⇧ Teacher questioning to elicit student understanding. Literal questions are asked.
54	17:49		Sixteen.	SG⇧ Student responds.
55	17:50	Fifteen, nearly sixteen years. And she's a young girl, and against a grown man, there are physical differences in size. Mr Lumis would be much more powerful than Ann, but also Mr Lumis is an adult. Like he's got life experiences, so Ann might make the wrong choice, panic, be physically less powerful than him so we said that, you know, the girls kind of appreciate that more than the boys. But we also said, did we think that if the nuclear war hadn't happened, if everything was normal, would Ann have stopped Mr Lumis from going in the water? Yeah. Okay? So, her morals changed because of the circumstances, the unusual circumstances, because no one, everyone is dead, everyone she knows is gone. So not only, so what we were saying is that your moral code changes according to…., it can change according to the circumstances. Alright, now then. Let's just look. Can you get the sheet from yesterday or the ones I just gave you about comprehension? Okay, we looked at chapters five to eight on our iPads. There is a box at the bottom to tell you where to find the information. So, for example, in chapter one, why is the stranger sick, it says chapter five page forty-two. So, you find the information on page forty-two and you put it into your own words don't you? What did I say yesterday about how you should write your answers? You should use…?		SG⇧Teacher unpacks episode in text to explain moral dilemma. SG⇧ Teacher moves onto explaining comprehension task and required skills for completion.
56	19:33		Full sentences.	
57	19:35	Full sentences. Why is it important to use full sentences?		SD⇧ Teacher questioning to elicit student understanding. Literal questions are asked.

Turn	Time	Teacher	Student	Semantic movement and comment
58	19:40		So you can remember it.	

Appendix K

Example of commercial comprehension passage for Year 6 English

Wheel Away

Nathan and Daniel were both ten years old and best friends. Nathan and Daniel first met when they were in grade three at Fairview Grammar, a boarding school for boys whose parents lived either a long way from the city, interstate or overseas. Nathan's parents owned a farm near Nairne in South Australia and Daniel's parents lived in Singapore. Every school holidays Daniel would go with Nathan to the farm. Each day the boys delighted in fishing down by the creek which ran through the property or simply hanging around the farm exploring.

It was on one of these lazy summer days that the boys found an old pram at the back of the machine shed. It had enormous metal handles and huge springs. Nathan's mother agreed to let them modify the pram.

Permission granted, the boys took the wicker top off the pram and bent the handles so it was possible to kneel inside the pram and control it better. Behind the house was a steep hill with lots of rocky outcrops. This was the perfect place to experiment with the prototype.

The boys started with clear gentle runs on the lower slope. When the two inventors had gained more confidence, they tried higher runs that require accurate steering and skilful manoeuvring between the treacherous rocks. The ultimate test was to drag the pram to the top of the hill and run the whole slope.

Nathan was a natural. He controlled the pram like a professional and the pram accelerated. That was until one wheel hit a rock slab and detached itself from the pram. The runaway pram launched into the air like a space shuttle being launched from NASA. It landed heavily in the hen yard, much to the alarm of his mother's prize hens. Dazed and bruised, Nathan emerged from the wreckage as his mother came to investigate.

"It's time to go fishing," Daniel shouted.

"Yeth, you might be right," Nathan replied as he spat out the pieces of straw he had collected in his mouth as souvenirs of his adventure.

Questions and answers

Question focus	Question	Possible responses
Main Idea (MI)	1) What is the main idea of paragraph 1?	a) Two boys enjoy fishing on a farm. b) Two boys attend Fairview Grammar. c) Boarding schools are for boys whose parents live a distance away. **d) Two friends from boarding school have a holiday on a farm.**
Words in Context (WC)	2) What would you be doing if you modified something?	a) Making an object more modern. **b) Changing the form or shape of an object in some way.** c) Taking an old item and recycling it. d) Making repairs.
Facts and Details (FD)	3) What did the boys require before they	a) tools b) a shed to work in

Question focus	Question	Possible responses
	started the modifications on the pram?	c) money to buy equipment **d) permission**
Sequencing (S)	4) After the boys had discovered the old pram they decided to...	a) go fishing down by the river. **b) convert the pram into a go kart.** c) collect eggs from the hen house. d) explore the farm and surrounding properties.
Cause and Effect (CE)	5) What happened to the invention as a result of it accelerating down the slope?	a) It went so fast that it crashed into a rock. b) Nathan wasn't able to control it. **c) It hit a rock which caused the wheel to dislodge.** d) It eventually came to a stop in the hen house.
Comparing and Contrasting (CC)	6) What did the author compare their invention to?	**a) a space shuttle** b) NASA c) a launched missile d) a rocket in space
Predicting (P)	7) What do you think will most likely happen next time the two boys visit the farm?	a) They will modify something else to make it fly. **b) They will go fishing down by the creek.** c) They won't visit the farm at all. d) They will spend their holiday reading and hiking.
Figurative Language (FL)	8) 'The runaway pram launched into the air like a space shuttle lifting off from NASA.' This is an example of a...	a) pun. b) exaggeration. **c) simile.** d) metaphor.
Conclusions and Inferences (CI)	9) What could you conclude about the boys?	**a) They were both adventurous and creative.** b) They did not enjoy living at the boarding school. c) They didn't like to take risks. d) They had no respect for their mother.
Author's Purpose (AP)	10) The author chose this text to...	**a) entertain readers with an amusing narrative.** b) persuade readers to carry out experiments. c) explain to readers how to follow instructions. d) describe how accidents can happen.
Summarising (SM)	11) The best summary for this story is...	a) two boys invent a new toy. b) two boys make a nuisance of themselves. c) two boys spend the summer holidays together. **d) two boys entertain themselves with a potentially dangerous activity**.
Fact and Opinion (FO)	12) Which of the following statements is an opinion?	a) Students stay at a boarding school if their parents live overseas. b) The pram was elevated into the air. c) The boys were very good friends. **d) Boarding schools provide the best education for their students.**

Appendix L

Teacher and student engagement in Science Year 5 to Year 8

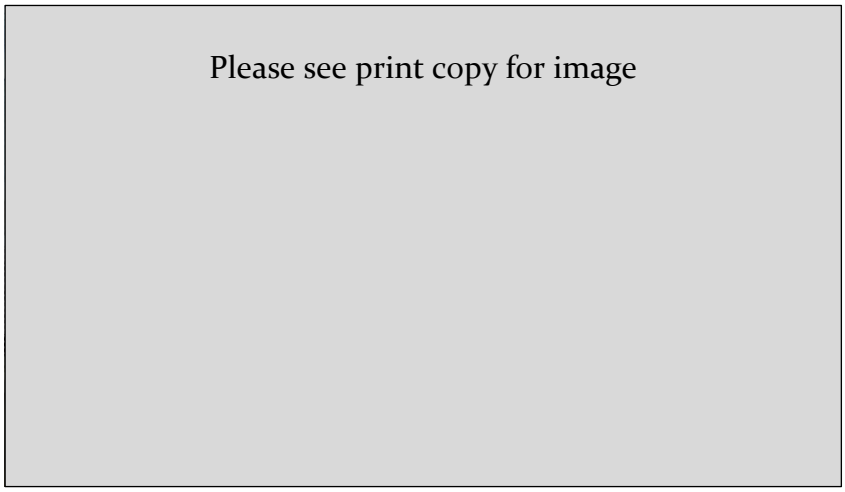
Teacher and student engagement in Years 5 and 6 Science

Duration	Teacher activity	Student activity	Resources
5 mins	Review scientific drawings of gases, liquids and solids. She discusses chemical and physical changes to matter and how these are depicted in drawings. Instruct students to draw particle diagram, based upon model drawn on whiteboard	Respond with questions and comments, referring to the workbook activity as they do. Draw diagrams in workbooks	Student worksheet Student workbook
5 mins	Explanation of experiment one (change of physical state of corn kernels when heat is applied), and two (change of physical state of a block of chocolate when heat is applied), asking students to make predictions, based on their prior learning about states of matter.	Respond to questions	Student worksheet
10 mins	Demonstrate each experiment, asking questions and clarifying understandings of the scientific terms used	Observe the experiment with the teacher. They ask her questions as needed	Experiment materials – saucepan, hotplate, corn kernels, block of chocolate, safety glasses and aprons
10 mins	Ask students questions about what they are observing in both experiments and to record their observations, reminding them of the scientific terms and their meaning	Make suggestions and comments about the experiment and record their observations by drawing particle diagrams in their workbooks	Student workbook
5 mins	Lead concluding discussion about observations and concepts learned	Respond to questions, give examples of other solids that change state when heat is applied	

Year 5 Science: Overview of teacher and student engagement in Lesson 1 Physical changes and the properties of matter

Duration	Teacher activity	Student activity	Resources
5 mins	Introduce the lesson content, the vocabulary and levels of competency required for handling poultry. Reviews safety procedures for the farm.	Ask questions, make comments, then walk to the farm with the class teacher	Student worksheet Student workbook Science lab
5 mins	Demonstrate the correct handling procedures for poultry, then instructs the students to collect a chicken, weigh and record mass.	Collect their chicken, weigh and record mass in their workbooks	Student worksheet Poultry shed
10 mins	Lead a vocabulary task, explaining terms and working with students by asking questions and clarifying understandings of the scientific terms used	Complete the task and ask questions as needed	Student worksheet
15 mins	Conclude the lesson - explains the different features of male and female chickens.	Students complete the written task, put chickens in pens and gather eggs	Student worksheet

Year 6 Science: Overview of teacher and student engagement in Lesson 3 Poultry: an introduction



Year 6 Science: Student engagement in Lesson 3 Poultry: an introduction

Teacher and student engagement in Year 7 Science

Duration	Teacher activity	Student activity	Resources
5 mins	Reviews the concept of 'cells' and explain the experiment - making an onion skin slide, viewing under a microscope and drawing their observation	Respond with comments, referring to the workbook activity as they do.	Student note book *Cells* booklet
10 mins	Introduce the experiment and explain the scientific vocabulary used in the lesson, in the context of the experiment	Respond to questions and record their hypothesis as to what they might observe	Student note book *Cells* booklet iPad microscope slides onion skins methylene blue aprons safety glasses
20 mins	Move to each group as they complete the set task, asking questions of the students and clarifying understandings of the scientific terms used and observations made	Engage in the experiment at their designated work stations. They ask the teacher questions as needed	Student note book *Cells* booklet iPad microscope slides onion skins methylene blue aprons safety glasses
5 mins	Prompt the students to complete their drawings of their observations, using the correct magnification on the microscope, and use correct terminology	Complete their observations by drawing in their workbooks or using the iPad to photograph their observations as a record prior to drawing up`	Student note book *Cells* booklet iPad microscope slides onion skins methylene blue aprons safety glasses

Year 7 Science: Overview of teacher and student engagement in Lesson 1 *Cells and using a microscope*

Duration	Teacher activity	Student activity	Resources
5 mins	Review of prior learning of 'forces' and concept of mass, weight and gravity. Question student understandings of force	Respond with definitions and understandings	Student note book *Forces* booklet
15 mins	Explanation of the experiment and demonstration of the use of equipment and recording methods, answering questions as needed	Observe the demonstration and ask questions as needed	Student note book *Forces* booklet Textbook *Science Focus 1* p. 200 spring balance triple beam balance scissors funnel ring 50g mass 100g mass
20 mins	Move to each group, explaining and clarifying understandings in response to student questions	Complete the experiment in small groups at work stations, asking the teacher questions as needed. They then record their observations in their note books	
10 mins	Leads a concluding discussion about observations made by students, referring to worksheet questions to be completed	Contribute to the discussion and complete written task	Student note book *Forces* booklet Textbook *Science Focus 1* p. 200

Year 7 Science: Overview of teacher and student engagement in Lesson 3 *Forces*

Teacher and student engagement in Year 8 Science

Duration	Teacher activity	Student activity	Resources
5 mins	The teacher introduces and provides an explanation of the Periodic Table.	Students takes notes during explanation	Student workbook
20 mins	The teacher introduces and discusses each of the divisions of the Periodic Table in detail - metals, semi-metals and non-metals	Students ask questions and make comments	Student workbook
20 mins	The teacher shows a PowerPoint to provide a visual representation of the concepts	Students continue to ask questions to clarify their understanding	Student workbook
5 mins	The teacher directs the students to complete a task about the Periodic Table, using visual prompts as a guide	Students complete the set task with the assistance of the class teacher, asking questions as needed	

Year 8 Science: Overview of teacher and student engagement in Lesson 2 *The Periodic Table*

Duration	Teacher activity	Student activity	Resources
5 mins	The teacher introduces the lesson, defining terms and questioning students	Students comment, ask questions and record notes	Student workbook
20 mins	The teacher shows a 'circuit' and 'wet cell', using a PowerPoint. She explains the flow of energy and tells students they will be making a 'wet cell' later in the lesson	Students ask questions and record notes from PowerPoint	Student workbook
20 mins	The teacher continues to explain different types of cells that will conduct energy, such as dry cells, photovoltaic cells. She explains the origin of the terms	Students continue to records notes and ask the teacher questions as needed.	Student workbook
5 mins	The teacher asks the students to begin the practical task, assisting and questioning as needed	Students begin the practical task, building a single wet cell to power a small light bulb.	

Year 8 Science: Overview of teacher and student engagement in Lesson 3 *Electricity: The Spark*

Appendix M

Semantic code analysis for Science

Year 6 Science – Case 5

Lesson 1 – Properties of liquids

Analysis below begins at beginning of lesson

Turn	Time	Teacher	Student	Semantic movement and comment
1	00:00	Alright. Last week we talked about **properties of solids**. This week we're going to talk about **properties of liquids**. I have a worksheet here for you to glue into your books. You need to glue them in flat, not folded, okay, so it does mean you need to cut them out a little bit and stick them in your books. **We're going to look at properties of liquids. Does anyone want to give me a *definition* of a liquid?**		SD⇩Teacher reminds students of prior learning and then introduces topic using specialised terms. Introduction interrupted by classroom management.
2	00.29		You can **pour**. **You can pour it and it takes the container of its shape.**	SG⇧ Student offers definition as asked, using the language of the concept, but says words in incorrect order.
3	00:34	It takes the? Just mix that sentence around a different way. **It takes the shape of its…**		SG⇧ Teacher scaffolds student response.
4	00:42		…**container.**	
5	00:43		It takes the **shape of the container**	SG⇧ Student elaborates response.
6	00:45	**It takes the shape of its container.** Well done.		SG⇧Teacher clarifies understanding using the scaffolded language.
7	00:48		**Definite volume.**	SD⇧ Student uses specialised language and provides learned fact.
8	00:50	**Definite volume**.		SD⇧ Teacher restates student response without elaboration
9	00:51		**Higher density of gas but less than solid, lack of definite shape but it takes the shape of its container**…	SD⇧ Student reads further information from text provided to students.

Turn	Time	Teacher	Student	Semantic movement and comment
10	01:03	**Can we hold it**?		SG⇧ Teacher asks question to determine student understanding.
11	01:05		Yes.	
12			No.	
13	01:06		Yes, if you put your hands like that…for example, **blood**.	SD⇧ Student provides an example.
14	01:09	**Can we hold it very well**?		SG⇧ Teacher provides further detail to the initial question. No response from student.
15	01:12	**Blood? Blood's a good example of a liquid.** Okay has everyone got this worksheet that you need to stick in your books?		SD⇧ Teacher agrees with student without elaboration or clarification. Then refers to classroom management matters.
16		*Students cut and glue worksheet into work books*		
17	02:53	We were told **we can't hold very successfully liquids - that liquids take the shape of their container.** That's probably **the *most important thing* about a liquid. Any liquid that we have will take the shape of its container** and when you go to a supermarket **there are many, *many different types of* containers that we find liquids in.** (*Teacher holds container with liquid in it and demonstrates to students*) Okay, so **liquids** actually ***lend themselves* to being**, you know, ***quite easy* to hold. That's probably the *main reason* we can pour them *easily***. Like ***can you imagine* if we had a solid** in here? It would have to **have a *completely different lid***, wouldn't it? **You *couldn't pour* solid *out of that little nozzle.***		SD⇩ Teacher repacks concept by providing examples of everyday objects and demonstrating the concept. Common language is used to repack the concepts.
18	03:36		No way.	
19	03:38	Okay, so **examples of liquids in containers would be**…		SD⇧ Teacher begins to repack concept and asks for examples.
20	03:45		… **Blood**	
21	03:48	**Blood**. **What container is blood *stored* in?**		SD⇧ Teacher scaffolds for correct responses by referring to question.
22	03:50		**Veins**	
23	03:52	Think about the question		SD⇧ Teacher prompts students to consider what

Turn	Time	Teacher	Student	Semantic movement and comment
				question is asking but does not scaffold.
24	03:54		Veins	
25	03:55		Skin	
26	03:56	You need to think about the question before we yell out the answer		SD⇧ Teacher prompts students to consider what question is asking but does not scaffold or rephrase the question. Teacher expects student o understand what the question is asking.
27	03:58		Skin	
28		Skin?		SD⇧ Teacher repeats response but does not provide scaffold or means to support students to identify correct response.
29	03:59		Veins	
30	04:00		It holds it	
31	04:01	Okay. **Vessels are the veins and the arteries in our bodies that hold our blood.** Yeah, you've got the gist		SG⇧ Teacher unpacks the concept and acknowledges the students' efforts.
32	04:13		It's **veins**.	SG⇧ Student unpacks concept and clarifies teacher response.
33	04:16	**Veins** and…?		SD⇧ Teacher seeks further information from the student based upon her previous statement.
34	04:17		Arteries	SG⇧ Student unpacks concept and clarifies teacher response.
35	04:18	No. Is it? **Arteries**. Okay, **what's another liquid that can be *stored* in a container, that can *commonly* be *stored* in a container?**		SD⇧ Teacher acknowledges response and begins to repack concept through questioning.
36	04:25		**Water, which can be held in bottles**…	SD⇧Students begin to repack concept using common language and everyday examples
37	04:27		**Rivers, lakes, dams…**	SD⇧Students continue to repack concept using common language and everyday examples
38	04:30		**Billabongs.**	SD⇧Students continue to repack concept using common

Turn	Time	Teacher	Student	Semantic movement and comment
				language and everyday examples
39	04:32		**Do rivers count**?	SD⇧Students continue to repack concept using common language and everyday examples
40	04:34	Yes		
41	04:35	Okay, so you need to write down in your worksheets – okay on the right page – you need to write down in that box, ***examples*** **of liquids,** ***common daily*** **liquids that we use.**		SG⇧ Teacher moves between common language and specialised language of the concept. Task instruction occurs at this time.
42	04:50		You said ***commonly used***. **I was going to say nitrogen.**	SD⇧ Student repacks concept further by providing an additional response indicating her prior knowledge.
43	04:53	**Liquid nitrogen**. Yes, that's ***not commonly used***, but ***plumbers use it commonly***.		SG⇧ Teacher acknowledges the student 's contribution and elaborates.
44	04:57		Really?	
45	05:01	Yep, plumbers use it to ***freeze pipes*** –		SG⇧ Teacher elaborates by providing an example.
46	05:03		Oh yes.	
47	05:04		So it doesn't freeze!	SD⇧ Student repacks concept
48	05:06	If you live in apartment blocks, because imagine if you lived in a six-storey apartment and you know, your tap was running and you couldn't stop it, you get a plumber in, and what the plumber does is he uses **liquid nitrogen** rather than turning off all the people, the twenty thousand people apartment block, he cuts off the water by freezing it and **pours** some **solid** in that pipe for a bit, fixes the ***water problem*** and then **de-freezes** the **nitrogen**. It's a very ***clever*** way of using it actually. They're probably the most common people who use ***liquid nitrogen.***		SD⇧Teacher repacks example through a real-life example. She uses informal spoken language in a conversational manner to explain the concept.
49	05:36		**I was going to say that doctors use liquid nitrogen**.	SD⇧ Student repacks concept further with her own example.
50	05:38	Yes, **liquid nitrogen is** ***not that common.*** Think of things, go to a supermarket. What does your mum go and by at a supermarket probably every week		SG⇧ Teacher does not elaborate on student response. The teacher returns to the task set.
51	05:47		**Oil**	.

Turn	Time	Teacher	Student	Semantic movement and comment
52		**Oil**.		
53	05:50		**Liquid dishwashers**	
54	05:52	**Liquid dishwashing detergent.**		
55	05:55		**Sauce**	
56	05:58	Yeah, **sauce**		
57	06:01		**Soft drinks**	
58	06:12	**Soft drinks**. So **many different containers that we can put liquids in.** I've just got a picture there of just some, you know, **coloured water in some scientific containers.** **Another property of liquid is that they remain level at all times.**		SD⇧ Teacher begins to repack concept and draws attention to image in student workbook. Teacher then repacks the concept further by providing further characteristics of liquids.
59		*Teacher goes to bench to fill beaker*		
60	06:42	Okay, I've put **water** in a **beaker**. One of the ***skills*** **we teach in Year 7 science is how to read that level of water because no matter which way we use it, it's always going to be parallel to the ground**. Okay, so **water** – water's good – but **all liquids remain level**. **An application of where we use this in everyday science or every day is building** – is anyone's father a builder here or got a **spirit level** at home? You know **spirit levels**? Okay, what's in a **spirit level** that shows us something is **level**?		SG⇧ Teacher unpacks concept by providing a practical demonstration and linking concept to a known experience. Specialised terminology is used in her explanation.
61	07:16		A **water bubble**	SG⇩ Student offers an example.
62	07:18	A **bubble**. So, **the bubble's got to stay between the two lines but it's water and it shows us that something is level**. Here in science when we put in some **water** here and we want to read that **level**, where should we be holding the **beaker** or where should our eyes be?		SD⇩Teacher demonstrates concept.
63	07:34		***Exactly***…	
64	07:35	***Exactly*** **level**. So, I wouldn't actually hold it up because I wouldn't hold it very straight, but **a *skill in science* is to say "How much water is there". Do you realise that water has a meniscus?**		SD⇧Teacher provides new specialised term and questions students.
65	07:46		What's a **meniscus**?	SD⇧ Student uncertainty.

Turn	Time	Teacher	Student	Semantic movement and comment
66	07:50	What is a **meniscus** …? It's a ***funny word***.		SD⇧ Teacher repeats response.
67	07:54		A thing that…	
68	07:56	A thing?		
69	07:58		Yes, it's a thing…	
70	08:00	Things are good yes. **Meniscus**. Okay, **water has a meniscus**. (*Asks student*) Do you want to go any further?		SG⇧ Teacher acknowledges the student's contribution and elaborates.
71	08:11		A **line** that tells you the **measurement**	SG⇩ Student offers an example.
72	08:15	Not quite. Not quite. It is on that line … **when water and *every other* liquid *besides* mercury, *sits in a special way* in a container.**		SG⇧ Teacher acknowledges the student's contribution and elaborates. She uses common language to explain.
73	08:27		**Flat surface**.	SD⇧ Student repacks concept
74	08:28	**Flat surface** but pass this **water** around, the **water sits**… **if you're looking at the side level, the water actually *sits down and it hugs the sides of the jar, of the* beaker.**		SG⇧ Teacher unpacks concept using common language.
75	08:39		It does too.	
76	08:40	**See how it hugs the side. Now, that's surface tension but this is a meniscus here… In mercury, the meniscus goes the other way** and it sits there like that. (*draws diagram on board*)		SG⇧ Teacher unpacks concept using common language, before using specialised language. She includes a diagram to aid understanding.
77	08:55		Is that **mercury**?	
78	08:57	**Quicksilver** they call it. Have you ever seen **mercury**, **liquid mercury**?		SG⇧ Teacher acknowledges the student's question and elaborates.
79	09:04		No	
80	09:05	Yes, pass it around *(the beaker with water).* I'll see if I can get it out later *(the mercury).* Mr W might have put it away. We're not allowed to actually play with it as such but **it's a heavy metal**, **it's a silver liquid. Mercury is liquid at room temperature, but it has a *different* meniscus to everything else. Everything has a meniscus *this way*;** (*point to drawing)* **mercury has a meniscus this way** (*point to drawing*) so just something a bit ***quirky*** about ***special*** **liquids**.		SG⇧ Teacher unpacks concept, providing additional information about the content. She uses common and specialised language to support student understanding.

Turn	Time	Teacher	Student	Semantic movement and comment
		Do you know where to **measure from when you're measuring the amount of water in that beaker? Do you measure from the *points at the side*** or the ***main flat* level**?		
81	09:39		***Points at the side.***	
82	09:41	***Flat* level.** Okay? So just from the ***flat* level**. So, **if we're going to look at the measurement of the amount of water in here –we'd be measuring from this level** here. Okay? **Not at the point at which it *rises*.** Okay? **Applications** when we would **use** it? I said builders use **spirit levels**. **When would we make sure we need a *certain* amount of liquid for something? In the kitchen at home especially.**		SD⇧ Teacher begins to repack the concept, seeking examples from the students.
83	09:50		**Cooking**.	SG⇩ Student offers an example.
84	10:10	**Cooking, baking**, we need a **cup of water**; we don't need a **cup and a half of water**, we need a **cup of water** for something. What about, who else have we got?		SD⇧ Teacher continues to repack concept, using real-life examples. There are no examples of specialised language used.
85	10:19		Scientists when they do **experiments** in **Chemistry**	SD⇧ Student repacks concept
86	10:21	**We need to know *exact* amounts. We don't use a beaker when we know *exact* amounts – that'll give us a *rough* amount. We use measuring cylinders which are much more specific in their measurement**		SG⇧ Teacher unpacks concept, adding extra information.
87	10:28	END		

Year 7 Science – Case 6

Lesson 2 – Stem Cells

Analysis below begins at 10:08 mins into lesson. Prior to this, teacher and students were engaged in other classroom matters not related to the content of this lesson.

Turn	Time	Teacher	Student	Semantic movement and comment
1	00:00	**We've looked at cells, we've looked at animal cells and we've looked at plant cells and we should be able to tell the difference between plant and animal cells.** We had a look at our **eye cells** on our iPads yesterday and we should remember from looking at either the examples or from looking on the internet and also in our booklets that **plant cells are different to animal cells**. Aren't they? **How might we identify the difference between a plant cell and an animal cell?**		SD ⇩ Teacher begins with a review of plant and animal cell features and differences, using students' prior knowledge. Specialised/technical language is used.
2	00:38		It's a different type of **shape**	SD ⇩Student uses common language to unpack concept.
3	00:41	Different type of shape, yes. Knowing that **plant cells and animal cells can be different types of shapes**. Excellent.		SG ⇩ Teacher elaborates on student response.
4	00:47		…**plant cell** has a **cell wall**.	SD ⇧Student uses specialised/technical language to repack concept.
5	00:50	Perfect. **Plant cells have a cell wall. Why do they need a cell wall?** We never really talked about that but why. **It's an interesting *concept*.**		SD ⇧ Technical language used requiring understanding of context of term 'cell wall'
6	01:01		Because **animals can fend for themselves** and know if there's rain or if there's water or if there's mud or something; **plants can't move though.**	SD ⇧ Student repacks concept to clarify understanding.
7	01:25		To ***protect***……**inside it**	SD ⇧ Student repacks concept to clarify understanding.
8	01:36	**Plant cells… as we know, and most animals have a way of having structural integrity.** What does that mean? That's a big word. We as **human beings**, **have a backbone**; we keep ourselves upright. Other **things that don't have a backbone like crabs and yabbies and that sort of thing have got an exoskeleton**, something to protect them from the outside. **Plant**		SG ⇧ Teacher uses specific terminology of cells in review- structural integrity; vacuole; epidermis. This continues later in the discussion also. Terms are explained in using simple language

Turn	Time	Teacher	Student	Semantic movement and comment
		cells need a cell wall for that structural integrity, things that can then make **plants** grow really tall. Some of the tallest things and some of the biggest things in the world are in fact **trees**… **they're only held together by these things that basically make up these cell walls which is a particular sugar called "cellulose**".		
9	02:34		So technically when you touch a **plant it's like flesh**?	SD ⇧ Student begins to unpack concept and provides real-life comparison for plant cells- epidermis 'like skin or flesh'
10	02:39	Yes, a bit.		
11	02:42		They don't have a **skin** or something?	SG ⇧Student seeks clarification through questioning.
12	02:44	**They have a skin; they call it an epidermis** and that's the thing that we had a look at when we had a look at our **onion skin cells** remember? We know that **plant cells have a cell wall**, … what else do they have? A really big one versus animal's ones. They've got much smaller little ones.		SD ⇧Teacher repacks concept and makes reference to prior experience and prior learning to support understanding of concept. Some use of specialised and common language.
13	03:09		**Vacuole**?	SG ⇧ Student clarifies understanding using specialised language.
14	03:12	**Vacuole** which is fantastic. Is it **air**?		SG ⇧ Teacher unpacks concept through questioning and specialised language
15	03:18		Yes.	
16	03:19	Is it an **air-filled sack**?		SG ⇧ Teacher unpacks concept through questioning and specialised language
17	03:21		Yes.	
18	03:22	**It's used for gas exchange but it's not necessarily air**. No, it's sort of a **liquid-filled vacuole**. So, **they've got vacuoles and they've got a cell wall**.		SD ⇧Teacher repacks concepts using specialised language.

Turn	Time	Teacher	Student	Semantic movement and comment
19	03:32	What we're going to look at today is a thing called a "**stem cell**" and **a stem cell is not necessarily a plant cell from a plant stem but something else**. Has anybody got an idea of what a **stem cell** is? What's a **stem cell**? **There's quite a bit of *controversy* around…**		SG ⇧ Teacher unpacks concept using specialised language. Introduces new term and asks for definition and understanding from students.
20	03:52		A **stem**, a **cell**	SG ⇧ Student attempts to clarify understanding using specialised language modelled by teacher.
21	03:54		… A **cell** from the **stem**.	SG ⇧ Student attempts to clarify understanding using specialised language modelled by teacher.
22	03:57	A **cell** from the **stem**? Yes, **it's kind of from a stem but where's the stem from**? It's not from a **plant**.		SG ⇧Teacher begins to unpack concept, scaffolds question.
23	04:04		From the **roots** or something?	SG ⇧ Student attempts to clarify understanding using specialised language
24	04:05	No, close. Very close but not really. Alright. **Stem cells are in fact animal cells… animal cells, stem cells. Has anybody heard of the term stem cell**?		SG ⇧ Teacher uses specialised terminology.
25	04:17		Yes	
26	04:18	And there's quite a bit of what they call **stem cell research**.		SD ⇧ Teacher introduces concept of stem cell research prior to defining what a stem cell is – abstract notion at this stage.
27	04:25			*Time spent at this point by teacher organising IT*
28	05:57	Okay, without the calling out, let me read to you: "**Stem cells** are **biological cells** found in all **multi-cellular organisms** that can ***divide*** through **mitosis** and ***differentiate*** into **diverse specialised cell types** and can **self-renew** to ***produce*** more **stem cells**. In **mammals**, there are **two broad types of stem cells**; **embryotic stem cells** which are ***isolated*** from the **inner cell mass** of a **blastocyst** and **adult stem cells** which are found in various **tissues**. In **adult organisms**, **stem cells** and **progenitor cells** act as a **repair system** for the **body**, ***replenishing*** **adult tissues** in a ***developing*** **embryo**. **Stem**		SD ⇧ Teacher-led discussion "What is a stem cell?" The text is from a website. The definition read by the teacher uses highly technical and dense language. No context was evident to support student understanding.

Turn	Time	Teacher	Student	Semantic movement and comment
		cells can ***differentiate*** into **specialised cells (ectoderm, endoderm and mesoderm, see induced pluripotent stem cells**). These are called **pluripotent cells** but also can maintain the normal turnover of **regenerative organs** such as **blood, skin** and **intestinal tissue**". In that space provided, **can you just write a summary of that please.**		
29	07:03		We tried to write it down but…	*Many students comment at this point at the difficulty of the task. There is overtalk as students articulate the difficulties they are experiencing as they attempt to complete the task.*
30	07:18	**Just write down what you think a stem cell is**.		SG ⇩ Teacher asks students to record their understanding.
31	07:21		I think a **stem cell…**	
32			A **cell** is…	
33			It is in **mammals**.	SD ⇧ Student uses specialised term but is unable to elaborate
34			I've no idea.	
35			It wasn't in English…	
36	08:29	"I think a **stem cell** is…" That's a good start.		SG ⇧ Teacher scaffolds beginning of answer
37	08:37	**Stem cells**… it was in English. I read it in English.		SG ⇧ Teacher uses specialised term.
38	08:43		Is that Wikipedia?	
39	08:49	Interesting. But everyone knows Wikipedia is a reliable resource and you should use it and quite often, you will reference it. *(Teacher says this in joking and jovial tone of voice)*		
40	09:19		Are you going to actually tell us…?	
41	09:22	My point was probably, is that **some of the information which I read to you is a little bit difficult to understand because they use words that possibly even I don't**		SD ⇩ Unpacking of concepts using specialised language.

Turn	Time	Teacher	Student	Semantic movement and comment
		necessarily really understand. All right? So we need to break it down into little bits and pieces that we can go "Okay, well that's kind of what a stem cell is". We know a stem cell is not necessarily a cell from the stem of a plant, we know that it's not necessarily, a cell from the root of a plant but it's a cell from an animal. That's the first thing we need to know – that a stem cell comes from an animal. There are two types of stem cells; one comes from embryos – an embryo is just a *little, little, tiny little* baby and the other ones come from adults. Let me put up a second reference point for you and we'll see whether we can understand this one a little bit better.		The teacher is referring to a comprehension strategy – teaching vocabulary
42	10:22			*Time spent at this point by teacher organising IT*
43	11:12	Let me read this one I've typed into Google "stem cell, what is a stem cell" and you'll be doing this in a little while on your iPads. It came up with a number of different things. Obviously, they come up with ten different websites which you can address; this is probably the second or third one that I saw. It's a website from www.stemcellresearchfacts.org which you would think is probably a slightly more reputable website than Wikipedia. So, what is a stem cell? Let me read this to you – hopefully a little bit easier to understand. "A stem cell is *essentially* a blank cell *capable* of becoming another, more *differentiated* cell type in the body such as a skin cell, muscle cell or nerve cell. Microscopic in size, as we know all cells are, stem cells are big news in medical and science circles because they can be used to *replace* or even *heal damaged* tissues in cells in the body. They can serve as a *built-in repair system* in the human body, *replenishing* other cells as long as the person is still alive."		SG ⇧ Explanation by teacher using less technical language. The definition from the website is less dense than the previous example. It unpacks the concept using specialised terms and less dense language.
44	12:46	So, from our Wikipedia definition and from the one which is up on the board, we should now start to understand what a stem cell is. Yes, it's an animal cell.		

Turn	Time	Teacher	Student	Semantic movement and comment
45	12:50		I think it's a **blood cell.**	SG ⇧Students provide interpretations using familiar terms and knowledge.
46	12:52	Could be a **blood cell**, it could be made into a **blood cell**.		SG ⇧ Teacher continues to unpack concept.
47	12:58		I think it's probably more used as a **blood cell.**	SG ⇧Students provide interpretations using familiar terms and knowledge.
48	13:00	Can be used to produce **blood cells…**		
49	13:05		…**damaged tissue**.	SG ⇧Students provide interpretations using familiar terms and knowledge.
50	13:10	…. essentially **it is a blank cell; it hasn't been *differentiated* yet.** "***Differentiate***" – **what does that mean?** What does that mean?		SD⇧. Teacher repacks concept using a new term. The teacher is referring to a comprehension strategy – teaching vocabulary
51	13:18		**It's made into a different type of cell.**	SG ⇧Students provide interpretations using familiar terms and knowledge.
52	13:20	Yes, made into something that is different from another thing, if we break the word down. We know in our own bodies we've got **hair cells**, we've got **cheek cells**, we've got **eye cells**, we've got **eyebrow cells**, we've **got eyelash cells**, we've got **tongue cells**; **we've got *many different types* of cells in our body These stem cells, quite often come from embryos or from the umbilical cord** which is the cord between mum and bub - mum and the baby. **These stem cells are blank cells**. **They haven't been made into another type of cell yet.** Imagine the amount of research and the amount of things that we can do to change these **blank cells** into **cells** that we need. Imagine that; changing these **blank cells** which are in our **bodies**, into **cells** that can ***repair* spinal cords** to help those people who are being caught in accidents; **quadriplegics, paraplegics, paraplegics** to get their **nervous system**, their **spinal cord** back to ***normal***. ***Imagine the possibility*** of that. Imagine the possibility of one of you, if you've got **diabetes**, having those little **blank cells**		SD ⇧ Teacher discusses the uses and benefits of stem cells. Repacking of concept.

Turn	Time	Teacher	Student	Semantic movement and comment
		turned into **pancreatic cells** which then ***produce*** **insulin** which then makes you ***less of a*** **diabetic**. ***Imagine the potential*** **of these stem cells** if we've got **cancer** in our **bodies**, ***to get rid of all*** the **cancer** and then to put these **cells** in there so these **cells** then make new **livers** and make new **kidneys** and make new **hearts** and make new **brain cells**. Imagine the potential that has. Imagine that.		
53	16:11	From our Wikipedia definition which is a little bit harder to understand, from this one which we've got up on our board, plus that little bit of conversation that we had, **can we come up with a definition of what a stem cell is**? At worst, all you need to do is copy that first paragraph, at worst. But if you can put it in your own words that would be better.		SD ⇧ Teacher identifies sources for students to use to complete task. Students write own definition of stem cells using text book and website, but are able to copy definition if unable to create their own
	16:30	END		

Year 8 Science – Case 7

Lesson 1 – Conduction and Convection

Analysis below begins at 08:46 mins into lesson. Prior to this, students were engaged in a review of the previous lesson – a textbook question and answer task.

Turn	Time	Teacher	Student	Semantic movement and comment
1	00:00	This is a bit of revision from Year 7 hence why you would have used this yellow textbook. It gets a bit tricky chopping and changing between textbooks. If you didn't get it, that's fine, we're going to go through it now. That's what today's about. **Now conduction – who can explain "conduction" to me?** Yes? Go on.		SD ⇧Teacher questions students to determine prior knowledge.
2	00:23		It's something that ***allows*** **heat** or **cool** to ***travel through*** it.	SD ⇧ Student unpacks concept. Use of 'common-sense' language in explanation
3	00:26	***Travel through*** **it.** Exactly. How? **How does it** ***travel through***?		SD ⇧ Teacher questions student. Use of pronoun 'it' for 'material, and student language used in response.
4	00:30		***Through*** **the material.**	SD ⇧Student adds information

Turn	Time	Teacher	Student	Semantic movement and comment
5	00:33	***Through*** **the material**?		SD ⇧Teacher repeats student comment and questions response.
6	00:35		**Steam**… **water** is **conductive**	SD ⇩Student provides an example
7	00:41	Mmmm, yeah...Okay, **what is all matter made of?**		SG⇧ Teacher redirects to desired concept
8	00:43		**Atoms**.	SG ⇧ Students uses specialised language
9	00:46	**Atoms, particles**. Okay, **what happens with conduction is you will heat a metal rod that you've seen in here… if you heat that end the particles**…. if you remember…**when we heat particles up, they vibrate *faster*; they *don't* move in this case – they just vibrate. The faster it's vibrating…**		SG ⇧Specialised language is used by the teacher. She refers to a diagram to explain the concept. She begins to unpack the concept
10	01:16		The ***higher*** it gets	SG ⇩Student unpacks concept using incorrect concept
11	01:19	**It's not temperature that you're measuring; it's heat**, okay? So, **as it vibrates, it then touches the next one on the next side and they start to vibrate, then it touches the next one**. Okay? And **that vibration is causing that heat to move along the rod**. At the beginning of the rod – do you want me to draw this up for you to explain it? *(draws diagram on whiteboard*)		SG⇩Teacher makes statement without context. SG ⇧ Teacher unpacks the concept using specialised language and clarifies by using a diagram
12	01:53	Okay so, this is our **heat** here.		SG ⇧Teacher unpacks concept by referring to a diagram as she explains
13	01:55		Is that a candle?	SG⇧ Student seeks clarification of image in diagram
14	01:56	Let's call it a candle, yes.		SG⇧Teacher answers question
15	01:59		I thought it was a **Bunsen burner**. **We need to be *scientific***.	SG ⇧ Student seeks specialised term. Interesting comment from student
16	02:04	**Bunsen burner**. Okay.		SG ⇧ Teacher responds using specialised language and concurs with student
17	02:18	**This is heating up this part of the rod…**….		SG ⇧Teacher unpacks concept

Turn	Time	Teacher	Student	Semantic movement and comment
18	02:26		Is that **why you don't put metal inside a microwave?**	SD ⇧ Student repacks concept through questioning
19	02:30	There are **many reasons why you don't put metal inside a microwave but a microwave works on a *different concept***. We'll get to that.		SG ⇧Teacher redirects and continues unpacking concept without answering question
20	02:37		Is this why when you have like a pan on the stove and the handles get **hot?**	SD ⇧ Student repacks concept using prior knowledge
21	02:45	Yes. Why?		
22	02:47		So, **it doesn't go through, so it won't heat up**.	SD ⇧ Student repacks concept
23	02:49		**It won't conduct…**	SG ⇧ student repacks concept through clarification of own understanding
24	02:51	Exactly right. **So, the heat is heating up this part of the rod. There are particles inside**. Let's just do a very simple version here. *(draws diagram)*		SG ⇩Teacher unpacks concept using specialised language, supported by a diagram
25	03:00	**Heating *directly* there makes these ones vibrate a lot**. Okay, so this is ***very* hot.** What happens, **they start to vibrate**… *(more drawing)*		SG ⇧Teacher begins to repack using visual support
26	03:21		Increase.	
27	03:23	…more and more, **the hotter they get and that *guy* might *bump* into this *guy* here and *he'll* start vibrating as well. It transfers along, so looking at this, this side is very hot, this side is cold, in here we can call it warm. The particles *bump* into each other until they get to the end and the entire rod's hot so the heat *moves* from there to there.** Does that make sense?		SD ⇧Teacher repacks concept using common-sense language (guy, bump), with some examples of specialised language (particles) A diagram is used by the teacher as she explains.
28	03:48		Yes.	
29	03:49	If you understand it better that way, you're welcome to draw it in right now.		
30	03:57		Is that when **certain materials start melting or boiling**?	SD ⇧ Student begins to repack concept using common sense language
31	04:03	**It depends on the boiling point or melting point.**		SG ⇧ Teacher provides context to student question

Turn	Time	Teacher	Student	Semantic movement and comment
32	04:07		Like **metal**?	SD ⇧ Student repacks concept through questioning and clarification to understand example given by teacher
33	04:09	Yes, but they're actually heating them up in furnaces that go up thousands and thousands of degrees.		SD ⇧Teacher repacks concept by providing an example of metal melting
34	04:14		Can we draw in the box?	Student focused on task rather than content
35	04:17	You can either write the description or you can draw it in - however it's best for you to understand it when you come to an exam, you do it that way. I do not mind as long as you've done the work.		Teacher focus on understanding concept for exam
36	04:25 – 05:25		*Students draw diagram in books*	
37	05:25	Did someone have a question for me or did I imagine that?		
38	05:30		You said they **vibrate**?	SG ⇧Student seeks clarification of concept from teacher
39	05:32	Yes		
40	05:34		So you **can actually see them vibrating**…?	SG ⇧Student seeks clarification of concept from teacher
41	05:38	No, **not with your eyes, no. Possibly with an electron microscope**, yes.		SD⇧ Teacher repacks concept by providing more information
42	05:45		…will it change?	SG ⇧Student seeks clarification of concept from teacher
43	05:47	I mean, **in heating up certain things you might get a change in colour** so you might see the rod glowing red.		SD ⇧ Teacher repacks concept with an example of what happens following the application of heat
44	05:50		…start **vibrating**…	Student clarifies understanding
45	05:54	It's like a ***visual confirmation*** **of what's happening but you won't see it vibrate. You'll just see the colour change**.		SD ⇧Teacher reinforces concept
46	06:01		So **what's actually vibrating?….are they molecules?**	SG ⇧Student seeks clarification through questioning
47	06:03	**The particles inside, so the atoms, all the atoms inside**.		SG ⇧Teacher unpacks concept

Turn	Time	Teacher	Student	Semantic movement and comment
48	06:12		So, the **atoms are vibrating**.	SD ⇧Clarification from student
49	06:14	Yes, absolutely. If you've drawn that in, don't forget to label it.		SG ⇧Teacher confirms student understanding. Discussion ends with instruction to continue drawing diagram
50	06:23 - 07:48		*Continue drawing diagrams*	
51	07:48	I'm going to move on. You need to be ready. The next one, "**convection**". We'll do this differently. You've had a chance to draw. This one already has a good diagram here so I'm going to explain to you what's happening in that diagram. You can label it or you can write what I'm going to say to you in this box. I'll also write it on the board so you can copy it down. Okay, **during convection, the particles actually move and carry the heat with them. So not in conduction they vibrate, *bump* into each other and it's passed along; here they're actually moving and carrying it with them.** Let me write that first point down for you. You can copy it if you need to.		Teacher signals to students that it is time to begin next part of the lesson. SG ⇧Teacher unpacks concept and compares to previous concept. Use of common language and specialised language.
52	08:32		**Is this the air**?	SG ⇧Student seeks clarification
53	08:34	It can be. It can be. I'll give you some more examples in a moment.		Teacher provides brief response but does not elaborate.
54	08:34 - 09:29		*Continue labelling diagrams and taking notes*	
55	09:29	Someone already mentioned "Is that what happens in **air**?" Yes it does. It also happens in **water**. Another good example is it happens in the **mantle** of the **earth** with the **convection current**s in the **magma**. There are many other examples which you'll think of when I tell you exactly what it is.		SG ⇧Teacher begins to unpack concept by providing some examples
56	10:00		How do you know that the **magna** is in the **mantle**?	SG ⇧Student asks question (unpack concept using questioning)
57	10:03	Because that's where **lava** is coming from. So, what happens? I don't know if you've ever made a cup of tea with tea leaves in it…		SD ⇧Teacher begins to repack the concept by providing examples based on real-life experiences
58	10:12		Yes	

Turn	Time	Teacher	Student	Semantic movement and comment
59	10:16	But you see how the leaves **move**? They kind of **float** around. They go **up,** they drop **down**. Same thing happens if you make a miso soup or something like that; you can see the **particles moving**. ……. Now, **the reason these particles are moving is because what happens to hot air? Where does it go?**		SD ⇧Teacher begins to repack the concept by providing examples based on real-life experiences. Use of common language and specialised language.
60	10:53		To **cold air**.	SG ⇧Student unpacks concept
61	10:54	Up.		
62	10:56		**Cold air** comes down.	SG ⇧Student unpacks concept
63	10:58	**When it cools down again, it *drops down*. This is convection**. You've got a heater on here *(points to heater in classroom*), it's down sitting quite low in the room. **It's heating up that cold air down here. When that air gets hot, it becomes *less* dense and it floats up to the top.**		SD ⇧Teacher repacks concept using everyday items. Use of common language and specialised language.
64	11:13		**It's lighter.**	SD ⇧Student begins to repack concept
65	11:15		**Heat rises**.	SD ⇧Student begins to repack concept
66	11:17	**You could say it's lighter, it's less dense, yes. It gets to the top and it *travels across* and it might start cooling down and it will drop down again. As it goes past that heater, it warms up again and floats up. The *action* of the air moving in that cycle, up and down, that's convection; it is taking the heat with it.**		SG ⇧Teacher unpacks using common language and specialised language to explain concept.
67	11:36		**What makes it actually go in a cycle?**	SG ⇧ Student seeks clarification through questioning.
68	11:40	What makes it go… Okay, **because it's heating up, it's going up and it just floats. I mean, there are some other forces that are in effect that you won't need to know about just yet, things like Coriolis force and how things actually move.**		SD ⇧Teacher repacks using common language and specialised language to explain concept.
69	11:55		**So by the time it actually gets inside it cools down quite *quickly*?**	SG ⇧ Student seeks clarification through questioning.
70	11:59	Yes		
71	12:00		..and then **heats** up on the roof	SG ⇧ Student seeks clarification through questioning.

Turn	Time	Teacher	Student	Semantic movement and comment
72	12:02		There's no heater on the roof.	
73	12:04	No…. there isn't any heater on the roof. That's why it starts to **coo**l down...and it will drop down		SG ⇧Teacher continues to unpack concept in response to student input.
74	12:08		You know how you said **water**?	
75	12:09	Yes.		
76	12:10		**Is it the same cycle as the rain?**	SG ⇧ Student seeks clarification through questioning.
77	12:14	Not really. **The water cycle works differently but I can see the *concept* that you're grabbing. You're thinking about - it's evaporating and it's condensating. You've got the *concept*** there but it's a different thing.		SD ⇧Teacher begins to repack the concept by providing examples related to prior learning
78	12:30		Would that be the same thing as a **lava** lamp?	SG ⇧ Student seeks clarification through questioning.
79	12:33	Yes, **lava** lamps work in very much the same way. **They have two liquids of different densities in there. One heats up more than the other and it floats up and down.** Okay? So, let me write those points in for you for you to copy down.		SG ⇧Teacher unpacks using common language and specialised language to explain concept.
	12:40	END		

Appendix N

Year 7 Science stem cells definitions

https://en.wikipedia.org/wiki/Stem_cell

Direct from transcription 2013 – Obs 2

> *"Stem cells are biological cells found in all multi-cellular organisms that can divide through mitosis and differentiate into diverse specialised cell types and can self-renew to produce more stem cells. In mammals, there are two broad types of stem cells; embryotic stem cells which are isolated from the inner cell mass of a blastocyst and adult stem cells which are found in various tissues. In adult organisms, stem cells and progenitor cells act as a repair system for the body, replenishing adult tissues in a developing embryo. Stem cells can differentiate into specialised cells (ectoderm, endoderm and mesoderm, see induced pluripotent stem cells). These are called pluripotent cells but also can maintain the normal turnover of regenerative organs such as blood, skin and intestinal tissue".*

Passage 2

http://www.stemcellresearchfacts.org/what-is-a-stem-cell/

A stem cell is essentially a "blank" cell, capable of becoming another more differentiated cell type in the body, such as a skin cell, a muscle cell, or a nerve cell.

Microscopic in size, stem cells are big news in medical and science circles because they can be used to replace or even heal damaged tissues and cells in the body. They can serve as a built-in repair system for the human body, replenishing other cells as long as a person is still alive.

Appendix O

Science student work samples

Examples of student's written responses to Stem Cell task in Year 7 Science

Stem Cells and Cloning

Webquest or read Science Focus page 108-9

Answer the following questions

1. What is a stem cell?

A Stem cell is from a animal. It hasn't come into another cells since the last one went.

2. What future possibilities can stem cell research offer?

comes
your nevice system back pretty much everything you lost can come back.

3. Can you perceive any problems with stem cell research?

yes because if people get sick and died with blood they why is it different with cells

What is a stem cell?

* Different type of shape
* Need a stem wall
* I think a stem cell is a ~~cell~~ blank cell, its a skin cell, a muscle cell, or a nerve cell. ~~heal~~ used to replace or even heal damaged tissues and cells in the body. Sometimes can serve as a a built-in repair system for the human body, helping re-new other cells as long as a person can live.

What is the ~~sic~~ bad thing about it?

~~Over~~
* Over reliable
* sometimes can't help
* clones of animals
* not living that long sometimes

~~Spicy~~ Opinion
~~Open~~
I think that the stem cell is good but more research to see how they could live ~~longer~~ longer and

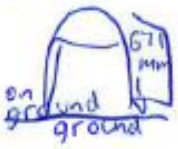
Student work sample of Year 8 Science comprehension task.

Historical development of our understanding of air and air pressure

- What did these scientists do to increase our understanding of air pressure?

  - Galileo - (early 1600s)
    He was the first person to weigh air

  - Torricelli (1643)
    Built the first barometer + the first vacuum ↳ air pressure

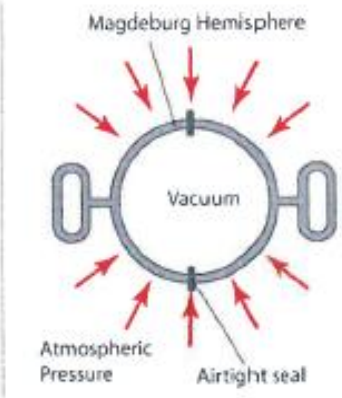
① 

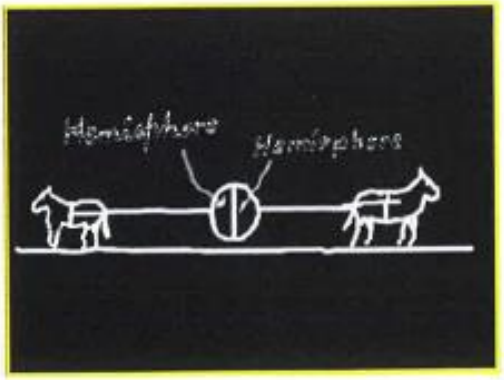
  - Pascal (1644)
    The Air pressure on the mountain is less than air pressure on the ground.

② 

  - von Guericke (1650)
    He did an experiment on the mountain is less than air pressure on the ground

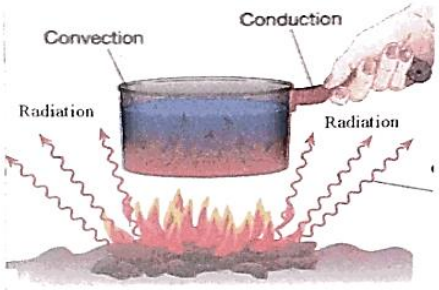
What is a Magdeburg hemisphere?
The magdeburg hemisphere is a big, cut in half circle made of brass





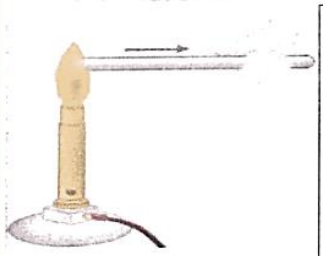
Heat Transfer

Heat is transferred by the following processes:



Describe how each heat transfer operates

1. Conduction



Vibrates when Hot.

conduction = vibrates/colour changing. The atoms inside are vibrating and changing colour

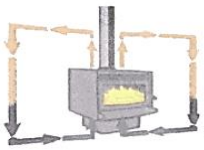
Hot warm cold

- bunsen

Air and Atmosphere
Year 8 Science

NAME: _____

2. Convection

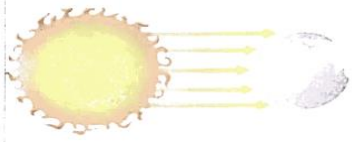


particles move and carry the heat with them.

- air
- water
- magma (mantle)

(Hot air goes up)
(cold air goes down)

3. Radiation



The transfer of heat by invisible waves. It does not need a medium to travel through. Examples are IR (Infra-red radiation, UV (Ultra violet radiation)

Hot particles become less dence and float up. once they cool they drop down again to be reheated.

Student work sample of Year 8 Science 'cloze' comprehension task

Air
the gases in our atmosphere

Copy and complete (SS2page95)

Air is a mixture of gases.

The main gases in dry air are:

78% - Nitrogen
21% - oxygen
0.9% - Argon
0.1% - other gases
100%

Symbols
N_2
O_2
Ar

- The most important of the other gases is carbon dioxide, formula CO_2.
- In factories, Nitrogen (N_2) is combined with Hydrogen (H) atoms to make the compound called ammonia (NH_3).
- Ammonia is used as a fertiliser, and it can be used to make other fertilisers and chemicals.
- Oxygen is needed by all plants and animals. They use it to release the energy in food.
- Oxygen is needed to allow substances to burn.
- Argon is an inert gas.
- Argon is used in welding to shield the molten metal from oxygen.
- Carbon dioxide is the gas we breathe out.
- Hydrogen is an explosive gas.

Appendix P

Curriculum across jurisdictions

Jurisdiction	English Curriculum	Science curriculum
The Common Core Standards for English Language Arts and *Literacy in History/Social Studies, Science and Technical Subjects* (USA) (2010)	Comprehension outcomes within the English language Arts Reading Standards for Literacy. 'Range of Reading and Text Complexity' • literature and informational texts	Comprehension outcomes within the Science Reading Standards for Literacy. 'Range of Reading and Text Complexity' • informational texts
The National Curriculum in England	*English Programmes of Study* (English programmes of study: Key stage 3. National curriculum in england, 2013, English programmes of study: Key stages 1 and 2. National curriculum in england, 2013) Key Stages 1 and 2 (Years 1 – 6) • two dimensions: word reading and comprehension Key Stage 3 (Years 7 and 8) • outcomes indicate the need for comprehension instruction	*Science Programmes of Study* (Science programme of study: Key stage 3. National curriculum in england, 2013, Science programmes of study: Key stages 1 and 2. National curriculum in england, 2013) Analysis and evaluation skills as part of 'Working Scientifically'
The Australian Curriculum	*The Australian Curriculum: English (Australian Curriculum Assessment and Reporting Authority, 2015a)* • Comprehension located within the Literacy Strand • Outcomes refer to comprehension strategies to interpret, analyse and evaluate print and digital texts.	*The Australian Curriculum: Science (Australian Curriculum Assessment and Reporting Authority, 2015d)* • Comprehension located within the Science Inquiry Skills strand • Outcomes refer to questioning, predicting, processing and analysing data and information, evaluating, and communicating
The NSW Syllabus for the Australian Curriculum	The *NSW Syllabus for the Australian Curriculum – English K-10* (BOSTES NSW, 2012b) Outcomes for comprehension, skills and strategies at each stage level.	The *NSW Syllabus for the Australian Curriculum – Science K-10* (BOSTES NSW, 2012c) Outcomes for comprehension to develop knowledge, understanding, skills in applying the processes of 'Working Scientifically' and Working Technologically'

Comprehension in international and national curricula