Pre-service Teacher’s Development of Specialised Content Knowledge About Reading Through a University-School Partnership

CRISS MOORE

This thesis is submitted in fulfillment of the requirements for the degree of Doctor of Philosophy

Faculty of Arts and Social Sciences
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AUTHOR’S DECLARATION

This is to certify that:

I. This thesis comprises only my original work towards the degree of Doctor of Philosophy;

II. Due acknowledgement has been made in the text to all other material used;

III. The thesis does not exceed the word length for this degree;

IV. No part of this work has been used for the award of another degree;

V. This thesis meets the University of Sydney’s Human Research Ethics Committee (HREC) requirements for the conduct of research.

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Date: December 30, 2016
ABSTRACT

Teachers recognise that school students of all ages experience difficulties learning to be literate, especially to become skilled readers. These students often resort to using ineffective strategies to decode unknown words or simply guess them, leading to little or no comprehension of the author’s intended meaning of the text. To advance all students’ reading, teachers (who may be excellent readers themselves) must learn the specialised knowledge to teach reading. Despite the call from governments to enhance teacher preparation, there is little research exploring an optimal way to assist pre-service teachers (teachers) develop this knowledge and to engage and teach children the key elements of reading.

This aim of this study was to examine the impact on teachers enrolled in a University unit of study that addressed learning support for students experiencing difficulties in learning to read through on-campus lectures and in-school tutorials and field experience. The study used a mixed methods design to examine the impact of the eight-week unit of study on teacher knowledge, as well as on the learning of students identified with difficulties learning.

Results from the Fully Integrated Mixed Model design study showed that teacher knowledge changed over the course of the study, while student learning accelerated over the same time. Using an embedded multiple case study approach, the development of teacher knowledge was explored and inferences drawn from in-depth analysis of video-data of teacher-student interactions (e.g., emerging evidence that teachers were developing strong pedagogical knowledge of reading).

Conclusions from the study provide evidence that teacher education units of study that purposefully integrated theory and practice can commence the development of robust pedagogical knowledge for teaching reading. While the impact on whole class instruction is not informed, the study results do support calls from government for greater synergy between schools and teacher preparation courses. Implications for further research and practice are discussed.
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I would also like to thank the participating teachers who willingly shared their time and experience for the benefit of my research. I plan to do my best to ensure the valuable lessons learned will inform the preparation of teachers to teach reading science in the future.

Many thanks to my mob of Gamilaraay peoples for their encouragement and belief that this research will make a difference for all children who are learning to read, and be a way forward for our Aboriginal children.

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CHAPTER 1
Introduction

In my family, there are three cousins from literacy rich backgrounds. These six year-old girls are working towards the same English syllabus outcomes in different classrooms. One has learned to read quickly and easily, is fluent and accurate with her decoding, comprehends the authors’ intended meaning and enjoys reading books that are written for readers well beyond her age. One has learned to read texts that many of her class peers are engaging with, is developing fluency with decoding but does not always fully comprehend what she is decoding. The third has good sight-word knowledge and knows the phonemes for the letters of the alphabet. She has yet to learn how to blend letter-sounds together for word decoding. As a result she has limited reading comprehension; while she works hard at learning to read, she finds reading and language processing a struggle.

The ability to read, or more specifically effective decoding and comprehension of text (Shankweiler et al., 1999), is key to an independent lifestyle, acquisition of general knowledge, and essential for maintaining lifelong learning. The ability to read text for education and everyday purposes (e.g., newspapers, street signs and instructions) has a major influence on career opportunities and lifestyle (Rowe, 2005).

Equipping citizens to meet the literacy standards required by industry and the business community has been a key focus of governments worldwide. The Australian Government and educational institutions have investigated trends in reading performance over time, and looked at ways to raise the reading standards through more effective classroom instruction (Black & Wiliam, 1989; Hempenstall, 2016; Moore & Evans, 2005). In the United States of America, the enactment of Reading First legislation mandated that all students achieve specific levels of reading and literacy within the first years of schooling. This legislation was in response to perceptions within society that reading levels were falling and that education dollars were not achieving desired results (National Institute of Child Health and Human Development, 2000).

The Australian Government has displayed similar concern for literacy levels amongst young people in Australia. In 1997, Australian states and territories agreed to establish a minimum set of standards for literacy and numeracy for all students through the Ministerial Council on Education, Employment, Training, and Youth Affairs (MCEETYA). The aim of an early resolution was “that every child leaving primary school should be numerate and be able to read, write, and spell at an appropriate level” (MCEETYA Resolutions Report,
March, 1997). Since then, the Australian Federal Government has been working towards achieving subsequent MCEETYA goals.

In 2008, Australian schools were charged with the implementation of the National Assessment Program – Literacy and Numeracy (NAPLAN) for students in Years 3, 5, 7 and 9. NAPLAN testing provided a tracking mechanism for individual students against national reading and numeracy benchmarks; further, NAPLAN identified students who were at risk of failing to achieve key benchmarks. In the same year, the Melbourne Declaration provided further evidence of the importance of literacy in our society. Goal 1 of the Melbourne Declaration promoted equity and excellence for all young Australians with particular focus on those students from disadvantaged backgrounds, including students from Indigenous backgrounds, and students who for various reasons struggle to manage the demands of school programs and initiatives. It goes further, challenging all education sectors to:

• ensure that the learning outcomes of Indigenous students improve to match those of other students;
• ensure that socioeconomic disadvantage ceases to be a significant determination of education outcomes;
• reduce the effect of other sources of disadvantage, such as disability, homelessness, refugee status and remoteness. (p. 7).

The Melbourne Declaration stated, “Literacy … knowledge of key disciplines remain the cornerstone of young Australians.” (MCEETYA, 2008, p. 5). The importance of literacy was further highlighted by Goal 2 of the Declaration, which stated that successful learners will “… have the essential skills in literacy …as a foundation for success in all learning areas.” (p. 8).

Throughout these developments there has been ongoing tension about the optimal ways to promote literacy in the early years of schooling. In 2005, the Australian Federal Government through the Department of Education, Science and Training (DEST) undertook a National Inquiry into the Teaching of Literacy. The inquiry examined teacher preparation and practices for the teaching of literacy, reading instruction for all students and specifically students experiencing difficulties with learning to read. The ensuing report, titled Teaching Reading: Report and Recommendations (DEST, 2005), highlighted the most hotly contested controversy - how best to teach reading.

Teaching Reading: Report and Recommendations (DEST, 2005) contained twenty recommendations for enhancing literacy outcomes for students in Australian schools. These recommendations were in a range of areas, including: evidence-based approaches to the teaching of reading; assessment of reading; the role of parents; professional
development for teachers; and the preparation of pre-service teachers. The preparation of future teachers to teach reading was found to be a specific area of concern for panels of experts. Recommendation 13 highlighted the needs for “… significant national ‘lighthouse’ projects in teacher preparation and education be established to link theory and practice that effectively prepare pre-service teachers to teach literacy, and especially reading, to diverse groups of children” (DEST, 2005, p. 21).

The Action Now, Classroom Ready Teachers Report (Department of Education and Training, 2015) addressed the preparation of teachers in Australian universities and colleges. The formation of the Teacher Ministerial Advisory Group (TMAG), and subsequent report, was in response to ongoing government and community perceptions that graduating teachers were not sufficiently prepared to teach our students the skills to meet the challenges of tomorrow. The issues addressed included: pedagogical content knowledge (with specific reference to the teaching of reading), individual data collection and application, use of evidenced-based strategies, and the need for practical application of learning within schools. A key finding of the report was that “…teachers need a solid understanding of subject content, pedagogy and pedagogical content knowledge” (Finding 3.1.4, p. 18). This finding mirrors outcomes from reports across a period of time, including the 2005 Australian National Literacy Review: Teaching Reading, and Mapping the Territory: Primary Students with Learning Difficulties – Literacy and Numeracy (Louden et al., 2000).

The Australia Government recently reviewed the Australian Curriculum (Department of Education), in response to a key recommendation and implemented stronger teacher elements of phonological awareness and alphabetic principle to strengthen literacy learning and achievements. The Australian Government and state and territory departments have provided significant finance to schools for teacher professional development.

A key change in New South Wales has been the recognition that Reading Recovery for Year 1 students has not had the desired long-term results (Brooks, 2016) and has been discontinued (Bagshaw, 2016). Literacy leaders have been appointed to schools demonstrating poor literacy returns under the Literacy and Numeracy Strategy 2017-2020 ‘Bump Up’ strategy (Australian Government, 2016). Many of these leaders elected to implement a constructivist pedagogical approach that is similar to Reading Recovery, with little attention given to the decoding skills of the alphabetic principle and phonological awareness within reading instruction as mandated by the English K-6 curriculum. Others have chosen to deliver high quality instruction based on research recommendations that include the five big ideas of reading and fulfilling the K-10 syllabus requirements.
The 2015 Progress in International Reading Literacy Study (PIRLS) results were released in 2016 with the participating countries results indicating Australia returned an above average score when compared to all countries that participated. When compared to the English speaking countries only, Australia, after New Zealand returned the lowest results and continues the steady decline in reading from 2008-2016. Canada, a country often compared to Australia has reversed the decline in the 2015 assessment and demonstrated positive gains in students reading results (OECD, 2016).

The Australian 2016 NAPLAN results for reading have been disappointing for the New South Wales and Western Australian with no gains seen in Year 5, Year 7 and Year 9 over the period of time between 2008-2016 (OECD, 2016). Year 3 was the exception with a positive gain in reading for Year 3 students (OECD, 2016).

A common feature of these reports was the limited research material available about interventions that assist teachers entering the profession to gain and enhance the knowledge and understanding of how to effectively teach reading. This thesis has reported on a study that utilised a mixed-methods design to explore how primary pre-service teachers developed the specialised pedagogical content knowledge (PCK) in the area of reading through a university-school partnership.

1.1 Purpose of Study

The purpose of this study was to explore a fundamental underpinning to reports such as Teaching Reading: Report and Recommendations (DEST, 2005) and Action Now, Classroom Ready Teachers Report (Department of Education and Training, 2015), that is, the preparation of teachers entering the profession to teach children how to read. In particular, the study explored how pre-service teachers constructed professional knowledge to teach primary school students to read.

Chapter 2 reviewed the literature about current research on how teachers develop the knowledge required to teach reading, and in particular to teach reading to students with learning difficulties. This review leads to the formulation of the research questions addressed in this study. Chapter 3 outlines the methodology used to address the research questions posed in the pilot study. Chapter 4 reports the findings of the pilot study and informs the development of the main study. At the beginning of Chapter 5, changes to the research design based on the pilot study have been outlined. Results of the main study have been reported, addressing each of the research questions in turn. The final chapter discussed the results in regards to each of the research questions. This discussion
interpreted the findings of the existing research literature, the Snow et al. (2005) framework, and future research directions.

1.2 Theoretical Context of Study

Researchers test theories (or models) to add to the bank of corporate knowledge about phenomena in our world. Explaining, understanding, predicting, observing and controlling differing constructs and variables within a particular area of interest, refines these theories. For example, Phelps and Schilling (2004) investigated how teachers’ content knowledge about reading impacted on their capacity to teach reading and hypothesised that specialised content knowledge is necessary to teach reading.

A theory sets out what we know, or think we know, about a given phenomenon. It gathers together a set of facts, laws, concepts and principles into a comprehensible, manageable form. It permits deductions to be tested and provides confirmation or rejection of the theory (or model), through the validation of the hypotheses derived from it. Repetition of positive results improves validity and acceptance of the theory (Cohen & Manion, 2007).

When a theory has been validated, it informs practice and can explain phenomenon under consideration (Cohen & Manion, 2007). The strength of a theory is further enhanced when it is able to explain the depth and complexities of facts, laws, concepts and principles within the phenomenon being researched. In an attempt to improve the strength of a theory, research is undertaken to better understand or explain links and relationships among individual elements. Finally, a good theory is stated in simple terms. It explains the connections between concepts and variables clearly, and the meaning of data is easily comprehended (Cohen & Manion, 2007).

Beliefs and theories on teaching and learning have changed over time. For example, a critical shift over the past 20 years is the move from the belief that students’ minds are filled by the teacher, to viewing the learner as an active constructor of meaning. Historically, behavioural theorists argued that if teachers behaved in specific ways, the students would respond to conditioning and react to stimulus. The current view on learning supports a more dynamic approach to learning, where young children are seen as competent, active agents of their own conceptual development (Wilson & Peterson, 2006). This understanding has resulted in learning being treated as two separate issues - content knowledge and pedagogy.

Shulman (1987) developed a theory on knowledge and teaching, which was built on the belief that teaching should emphasise comprehension and reasoning, transformation
and reflection. He justified his theory by explaining that these practices were not incorporated in policies. By observing teachers instructing in a particular discipline (e.g., science, mathematics), examining previous research and discussing his paradigm, he came up with findings that supported his theory. He declared the lack of research on subject matter and the role it played in teachers’ thinking and teaching to be a “missing paradigm” (1986 p. 7) in teaching and teacher knowledge research. His findings indicated that teachers require sophisticated, professional and specialised content knowledge to become effective teachers. As stated by Shulman:

... the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations - in a word, the most useful ways of representing and formulating the subject that make it comprehensible to others...Pedagogical content knowledge (PCK) also includes an understanding of what makes the learning of specific topics easy or difficult: the conceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons. (p. 9)

Shulman (1987) reasoned that content and pedagogical knowledge required understanding of separate issues, but required simultaneous amalgamation of content and pedagogy for effective teaching practice. His theory of pedagogical content knowledge appears to have been widely accepted for teacher preparation (Cochran, DeRuiter, King, 1993; Darling-Hammond, 2005).

The knowledge required to teach reading, described as the Specialised Content Knowledge, includes the major constructs of phonological awareness, alphabetic principal (phonemes), fluency reading, comprehension, and vocabulary (Department of Education, Science and Training, 2005; Hempenstall, 2016; Snow et al., 2005). Teachers acquire that knowledge over many years, beginning with teacher preparation and continuing, through professional development, with marked identifiable phases of learning. These phases have been discussed in this chapter. This journey carried the teacher from the initial steps of basic conceptual knowledge for the teaching of reading through to becoming a reflective expert in the field (Snow et al., 2005)

1.2.1 Importance of pre-service teacher training. Research findings reported by international and Australian researchers recognised teachers who were tasked with teaching children to read must have an understanding of the language constructs considered essential for early reading success (Boyd, Grossman, Loeb, & Wyckoff, 2009; Joshi, Binks, Hougen, Dahlgren, Ockerdean, & Smith, 2009; Podhajski, Varrichio, Mather, Nathan, & Sammons, 2009). This included knowing how language works at the phoneme, word, sentence and text levels, so that teachers are able to identify and respond to student
development and errors. They were able to do this by the use of appropriate examples for teaching phoneme grapheme relationships, organisation and sequence of instructional information, knowledge of morphology explanations during spelling, and entwining reading and writing activities into word study.

To examine the linguistic concepts for teaching reading, Moats (1994) administered a survey to experienced special education teachers and speech pathologists. The survey items required the participants to locate or cite examples of phonic, syllabic and morphemic units, and to analyse words for speech sounds, syllables and morphemes. They were also required to identify consonant digraphs, their use in spelling, and to identify sounds in example words given. The findings of this study and a later one by Moats and Lyon (1996) indicated that teachers had insufficient knowledge of language concepts to provide direct, systematic, language-focused reading instruction. Later studies (e.g., Bos, Mather, Dickson, Podhajski, & Chard, 2001; Department of Education, Science and Training, 2004) also indicated that pre-service and in-service teachers had insufficient or limited language specific knowledge to teaching reading.

These findings have been echoed by research in America, England and Australia. Teachers in England and the US demonstrated an insufficient understanding of English phonology, alphabet principal and morphology, whereas Australian teachers showed poor knowledge of the role of linguistics in learning to read or for improving the literacy skills of students (Colheart & Prior, 2007). In addition many teacher-training institutions do not provide the necessary studies for pre-service teachers to develop this strong specialised content knowledge about learning to read (Colheart & Prior, 2007). The lack of literacy skills poses the prospect that tomorrow’s teacher will not have the professional knowledge to educate potential young readers, described as the Peter Effect (Binks-Cantrell, Washburn, Joshi, & Hougen, 2012).

The Peter Effect is based on the biblical recount of the Apostle Peter, who, when asked for money, replied that he could not give what he did not have (Acts 3:5). Barber and Mourshed (2007) and Binks-Cantrell et al. (2012) hypothesised that future teachers will be unprepared to effectively teach reading to their students because ‘one cannot teach what one does not know’. Unfortunately, teachers often are unaware of what knowledge levels they hold, or when to seek professional development to gain this essential knowledge (Arrow, McLachlan, & Greaney, 2015; Cunningham, Perry, Stanovich, & Stanovich, 2004; Leader-Janssen & Rankin-Erickson, 2013). Unfortunately it is not easy to learn the linguistic components because of the complexities around phonemes, morphographs and orthography (Podhajski, Mather, Nathan, & Sammons, 2009).
1.2.2 Teacher knowledge, instructional expertise and developing reading proficiency. Research over the past three decades has provided a strong insight into what teachers need to teach during reading instruction to maximise the opportunities for students to become successful and skilled readers (e.g., Department of Education and Training, 2015; Hempenstall, 2016; Snow et al., 2005: Rowe, 2005; Snowling, 2005). Current recommendations advise the use of explicit and systematic instruction of the ‘big ideas’ of reading (i.e., phonemic awareness, alphabetic principle, fluency, vocabulary and comprehension) (Hempenstall, 2016; Snow et al., 2005). These recommendations provided a basis for teachers to design evidenced-based reading instruction, as well as supplementary and intensive interventions (Denton, Fletcher, Simos, Papanicolaou, & Anthony, 2007).

Teacher instruction is the most important factor in developing skilled readers. At a minimum, teachers need to (a) make sure that students learn and apply phonemic awareness and alphabetic principle rapidly and fluently in text; (b) enable students to connect what they read to their background knowledge and vocabulary; and (c) implement strategies so students gain the authors’ intended meaning from text (Carlisle & Berebitsky, 2011; Joshi et al., 2009; Podhajski et al., 2009). Teachers need to know more than the definitions of phonemic awareness and phonemes, they need to have a deep understanding of the working relationships between the two, and the ability to integrate that knowledge into practice.

Children experience difficulties in learning to read for a variety of reasons ranging from metacognitive processes to basic levels of processing (Wong, 1998). One critical reason is the student’s limited knowledge and understanding of the alphabetic principle and phonemic awareness (i.e., of letter-sound knowledge, and the ability to hear and manipulate the sounds in words). Without these elements the student may experience difficulties learning to decode words and access meaning, and require more explicit and intensive instruction (Harn, Chard, Biancarosa, & Kame’enui, 2011; Spear-Swerling, 2009).

Effective instruction matters a great deal to all students’ learning (Archer & Hughes, 2011). Given the diversity of students within the classroom setting, it is crucial that pre-service and in-service teachers know how to teach reading to all students. Some students learn to read easily while others struggle and require additional support (Hempenstall, 2016; National Reading Panel, 2000). All teachers need the specialised knowledge to support the full range of students.
Spear-Swerling et al. (2004) examined teachers’ understanding of reading development and related skills, including those that play a role in the development of reading ability (i.e., phonemic awareness and reading fluency). The results revealed that only 75% of teachers with high levels of experience and preparation to teach reading could explain the big idea of reading fluency, and why this was important to becoming a skilled reader. Only 9% of these teachers were able to explain phonological awareness and its role in learning to read. Among less experienced teachers, only 59% could explain fluency and why it is important to becoming a skilled reader. Only 4% of these teachers could explain phonemic awareness and the role it plays in learning to read. These teachers were considered in need of professional development to help them develop a deeper understanding for teaching reading and to advance their students’ reading competence.

Research examining the preparation of tomorrow’s teachers has received little focus. Spear-Swerling (2009) described a unit of study that involved substantial training and tutoring in the context of teacher preparation, balancing the needs of the students and teachers learning. The unit of study included assessment and tutoring of students in schools. The limitations were the number of sessions in schools and the ability to address the needs of struggling readers. Tutoring sessions were delivered at the school setting by teachers in a similar manner to Spear-Swerling and Brucker (2004). They reported those teachers who were tutoring students in spelling and basic reading skills demonstrated significant gains in learning when assessed on five pre and post measures. The studies did not report on the outcomes on student learning.

Moore and Evans (2011) and Evans, Moore and Strnadova (2007) report on an Australian study on tutoring students to read. This included a collaborative partnership among local schools, a regional learning and support team and university staff. Lectures were delivered on the university campus and the tutorials and tutoring sessions occurred in schools under the mentorship of trained experienced teachers. The teachers learned to select and administer assessments, to program for instruction from the data and to explicitly and systematically provide individualised instruction around the five big ideas of early reading (i.e., phonemic awareness, alphabetic principal, fluency, vocabulary and comprehension). As part of this study, data were collected through a survey completed by teachers on teacher knowledge required for teaching reading, an interview and observations with the teacher and student. Post interviews with the teacher revealed that the unit of study was successful in improving students’ reading outcomes, and specialised teacher knowledge for teaching reading. The researcher was critical of the mechanisms used to manage and monitor the promotion of content knowledge with teachers.
Understanding the intricacies of the development of teacher knowledge, and engagement with students is less clear. A literature search was conducted to locate theoretical models that explained the development of pre-service teacher knowledge about learning to read that incorporated content and procedural knowledge (i.e., facts, skills of reading) and procedural (i.e., understanding of how differing skills and knowledge support and interact with each other) without success. The framework developed by Snow et al. (2005) was selected as it demonstrated the sequence of learning from pre-service teacher to experienced classroom teacher (Hindman, & Wasik 2011). This model was selected and adapted to develop a matrix of the developing foundational knowledge for teaching reading.

The Snow et al. (2005) framework was developed through a thorough examination of the research literature and fulfills the description of a good theory. It described a theory of hierarchical development of domain specific knowledge and the skills required to teach reading. This theory of professional learning provided a set of facts, laws, concepts and principles that was be put into a manageable form. It began by assessing the basic understanding of pre-service teachers about promoting positive literacy outcomes, and moved to a point where teachers were expert and reflective in their use of and application of knowledge. A visual representation of this theory is shown in Figure 1-1, and the five levels of knowledge are discussed in the following section.

![Figure 1-1](image.png)

*Figure 1-1. Levels of knowledge proposed show that less mature levels of knowledge (e.g., declarative) underpin higher levels of knowledge (e.g., situated, stable) (Snow et al., 2005).*

1.2.2.1 Declarative knowledge.
Teachers at this level of their professional development were acquiring knowledge that was relevant to their respective field of study. In the case of pre-service teachers this related to the acquisition of disciplinary knowledge about a range of issues within education; in this study, the field of knowledge referred to disciplinary knowledge about promoting literacy and the teaching of reading (Snow et al., 2005). In some cases teachers were able to recall knowledge about the teaching of reading. This tended to be general, and applied with limits in terms of analytical reasoning and application. This knowledge alone, however, was not sufficient for teachers to be engaging in “good practice” (Snow et al., 2005, p. 8).

1.2.2.2 Situated, can-do procedural knowledge. At this level teachers needed to focus carefully on how to plan and implement a reading program. Pre-service teachers needed to be cognisant of the differing big ideas on reading, how the student was progressing, and how this all came together to form a focused and relevant plan. As a result, teachers were often not able to detect or observe other features of the learning environment. Developing good situated knowledge was best achieved through small group or one-on-one sessions with a developing reader. In this study, teachers engaged in one-on-one sessions under careful guidance of an “experienced mentor teacher” (Snow et al., 2005, p. 8).

1.2.2.3 Stable procedural knowledge. This level was typical of a teacher in their first year of teaching. They had declarative knowledge to ground them, and they were generally aware of how the reading elements came together to formulate procedural knowledge. This knowledge was sound for developing a program for most of the students in the teacher’s first class. However, students from diverse learning backgrounds were challenged to plan for and accommodate within their class. In a world of quality support, this teacher would have been provided with ongoing professional support to learn the skills and knowledge to cater for this group of students.

1.2.2.4 Expert, adaptive knowledge. Teachers at this level have acquired a sophisticated level of professional knowledge. They were able to analyse the reading behaviour of students, and integrate into their practice multiple levels of a sound reading program for individual students. They were considered in their school to be experienced and showing levels of expertise that allowed them to supervise pre-service teachers, and undertake leadership in promoting literacy across the school programs (Snow et al., 2005).
1.2.2.5 **Reflective, organised, analysed knowledge.** The previous four levels underpin this final level of knowledge. Teachers at this level were well versed in current research and theories on learning to read and on integrated literacy programs. They were considered to be a “master teacher … responsible for learning professional development activities in a school or department …” (Snow et al., 2005, p. 9). The mentors in this study had achieved this level of expertise and knowledge, and worked with the teachers to help them develop their own expertise.

1.3 **Conclusion**

This framework of knowledge development posed by Snow et al. (2005) underpinned the research being undertaken. As pre-service teachers moved through their university unit of study, they attended lectures, completed in-school tutorials, and worked with their student, their knowledge development was examined through a number of avenues. The Snow et al. framework was used to interrogate the knowledge developed and provide greater understanding as to how teachers of tomorrow could be prepared to assist primary aged students become skilled readers.

This framework was used to explore how teachers develop and learn the skills and knowledge required to teach reading. While existing literature (DEST, 2005) recommended that pre-service and current teachers be taught to teach reading, consideration of the hierarchical steps to gaining the theoretical knowledge and practical skills for this complex task are not addressed.
CHAPTER TWO
Literature Review

Chapter 2 describes the changing world of education and the role teacher preparation has in assisting primary aged students to become skilled readers. Historical and current research findings were examined and consideration was given to pedagogical content knowledge. The specific focus was the specialised content knowledge required to teach reading as drawn from reading research. This discussion lead to the formulation of the research questions posed for this study.

2.1 A Changing World

International and Australian educational standards have risen over the decades with the rapid expansion and change through globalisation, manufacturing, transportation and information services. During the past one hundred years employment has changed from skills based jobs such as used in factories, to careers requiring specialised knowledge and skills. Countries such as Singapore have focused on boosting community knowledge and skills as their key economic priority resulting in top listings in international comparisons (Thomson, Wernert, O’Grady, & Rodrigues, 2016). In contrast to countries like Australia and South Africa have continued to rely heavily on primary products and natural resources.

The advent of new technologies has made a significant impact on how societies communicate and acquire specialised knowledge and skills for living in a contemporary world. The current and continuous advances in these technologies have forged a new way of living and new ways of doing everyday business. Many of the current jobs today did not exist at the end of the last century. At least 70% of jobs today require specialised knowledge and skills compared to 5% one hundred years ago. This change has increased demands by employers and business communities for more complex literacy and numeracy skills (Workforce and Productivity Agency, 2014; Darling-Hammond, 2010). As a consequence, this has placed the outcomes of schooling and the work of teachers in the spotlight; a particular focus has been on how teachers are prepared to work in our schools that result in high quality student outcomes (Department of Education and Training, 2015).

2.2 International Educational Change

Education systems in Finland and South Korea have examined and created teaching and learning approaches to meet the challenges and changes in their societies. These countries have created new education standards through replacing factory style schools
with well resourced schools, staffed by highly educated and skilled teachers who use assessments and curriculum to focus on independent learning, problem solving, creativity, and self-reflection of learning (Darling-Hammond, 2010). In Singapore, where 80% of families live in high-rise, public housing, students attend well-equipped and resourced schools, staffed with highly educated teachers using inquiry curriculums and current technology. Despite poverty and cultural diversity, students in Years 4 scored first in the world in the Trends in International Mathematics and Science Study (TIMSS) (Darling-Hammond, 2010; Thomson et al., 2016). In achieving these outcomes, educators have focused on improved classroom instruction for learning and engagement.

Governments in these high performing countries have made substantial investments in education through enhancing the preparation of teachers. Other countries (e.g., South Africa) and education authorities (e.g., Brazil and Canada) followed suit and achieved similar outcomes by narrowing the gap between different socio-economic backgrounds (Mourshed, Chijioke & Barber, 2010; OECD, 2016). Understanding the nature of teacher preparation in these and other countries was part of ongoing investigations; the nature of teacher preparation continued to be examined. For example, Canadian pre-service teacher preparation for teaching reading has made significant gains in the knowledge relating to the five essential components required to teach reading. This is not so in Australia. Australian schools continue to be critically scrutinised (e.g., Action Now: Classroom Ready Teachers, DET, 2015) due to ongoing concerns about the level of student outcomes in our schools. T

Recently, this scrutiny was heightened as Australia’s students have fallen behind less developed and affluent countries on the high stakes PISA assessment (OECD, 2016).

2.3 **History of Teacher Preparation**

Teacher preparation in Australia began as an apprentice model based on pupil teachers, and moved to a more formal approach with the establishment of teachers’ colleges at the beginning of the twentieth century. A more scholarly approach developed in recent times as the Australian national system of higher education emerged, and teacher preparation became the domain of universities (Aspland, 2006).

When Ingvarson, Beavis and Kleinhenz (2005) investigated current factors impacting teacher preparation at universities, they recommended consistency and standards be developed for the accreditation of teacher preparation after finding major differences between university courses. The length of practicums, and the balance of theory and practice varied between universities. Secondary teacher preparation differed with teachers
expected to complete a specified number of courses and gain high levels of subject specific knowledge at some universities, while others completed units of study that encompassed broader aspects of education, and included educational philosophy, educational history, educational psychology and contemporary education as part of their course requirements. It was also found that practical experience in the context of schools and the classroom impacted on the quality of learning experience (Ingvarson et al., 2005).

The lack of consistency of teacher training produced a diverse quality of teacher preparedness for teaching in the classroom setting (DET, 2014). One result has been a high attrition rate of early career teachers from the profession, with as many as 46% of early career teachers leaving teaching within first 5 years post-graduation (Ewing & Smith, 2003). A key reason given is feeling unprepared to teach the diversity of students found in the classroom setting (Commonwealth of Australia, 2005; Department of Education, 2015).

Other research has reported similar figures. Ewing and Manuel (2005) and Johnson et al. (2011) report that between 20% and 40% of graduate teachers leave the profession within 5 years of their first appointment. In these studies, the lack of personal and professional knowledge left the beginning teacher feeling unprepared to teach.

2.3.1 Teacher preparation in Australia. Universities have a significant influence on the learning of their tertiary students when they are well equipped to teach. University staff have acquired advanced specialised knowledge relevant to teaching primary and secondary students (Hattie, 2010). It is also expected that they will be caring, directive and enthusiastically engaged in their teaching and learning that encompasses higher order thinking, analysing, problem solving, and use of strategies (Hattie, 2010).

Most recently, the Action Now, Classroom Ready Teachers Report (DET, 2015) examined how initial teacher preparation in Australia could better equip new teachers with the skills required for the classroom. The enquiry findings included a range of matters related to preparing teachers for classroom teaching. The committee found that not all teacher preparation courses were equipping graduates with the pedagogical content knowledge as described by Shulman (1986, 1987), and evidenced based teaching strategies and skills required to respond to every students learning needs. They also reported that universities and schools were not working together to effectively develop the skills and knowledge that beginning teachers needed to integrate procedural knowledge and conceptual understanding into practice, resulting in a wash out of new teacher skills and knowledge required for the changing world (Department of Education and Training, 2014; Smagorinsky, Cook, Moore, Jackson & Fry, 2004). The experience wiped out much of the
research-based learning that occurred during teacher preparation and the teacher took on the supervisor’s schooling mindset, control mechanisms and the oppressive mindset of authority rather than using their own knowledge and creativity and developed a shared learning experience (Kanpol, 2007). The formation of strong partnerships between schools and Universities, therefore, could enhance teacher preparation (Ministerial Council for Education, Training and Youth Affairs, 2009; Winn & Zundans, 2004). School-based mentors in collaboration with university staff could provide guidance to the teachers in how to interpret theory and apply it when undertaking fieldwork and practicum (Hattie, 2012; Shaddock, 2012).

High impact teachers are passionate, caring, and consider teaching an important part of their lives (Hattie, 2012; Shaddock, 2012). They have a deep understanding of their students, know how to engage students using a range of teaching strategies and approaches and provide critical feedback. They critically examine each student to inform their teaching and constantly seek ways to impact their students. Teaching for high impact teachers is about the student’s success in learning. Their teaching differs from what many students experience in classrooms where instruction is passive. While busy, students are not stimulated nor engaged in learning. They appear to do a lot of listening, sitting quietly, or doing and developing domain specific language (Hattie, 2012; Sahlberg, 2012).

When students have had three great teachers in a row they have demonstrated academic growth regardless of disadvantage (i.e., the socio-economic status, culture or outside influence) rather than lowered academic achievement (Sahlberg, 2012; Vaughn et al., 2010). American research findings reported up to 59% of variance in student performance was attributable to differences between teachers and classes, while up to 21%, was attributable to school level differences (Vaughn et al., 2010). Hattie (2013) reported Australian school level differences accounted for 5-10% of variance in student learning. Given that teachers were seen as the highest influence on student learning (Connor, 2011), it is critical that they have a thorough command of the diverse sets of knowledge required to teach, and have acquired the specialised content knowledge that maximises teaching outcomes (Ball, Thames & Phelps, 2008; Darling-Hammond & Baratz-Snowden, 2005).

Alton-Lee (2003) when reporting on teaching quality lessons and student achievement, raised the necessity for facilitating learning for all students, including students with diverse learning needs. The detailed report included a large number of characteristics required for quality teaching that fell within the content and pedagogical fields. For example, teaching practices that pro-actively value and address diversity and multiple strategy instruction (e.g., explicit and scaffolded instruction, assessment based
learning, and feedback on students tasks) while expressing appropriate high expectations for learning outcomes of content delivered at a pace that furthers learning achievement. Anton-Lee (2003) delivered a warning that high expectations alone can be counterproductive unless supported by strong quality teaching. That type of teaching provides sufficient and effective opportunities for teaching and learning and includes data collection and analysis, deliberate and supportive technology use, positive relationships and curriculum content knowledge that is purposefully prepared and delivered for understanding by all students. Research over time has shown teaching to be a highly complex task that demands teachers are able to meet the diverse needs of students and have the knowledge and skills for everyday teaching practices (Barron & Darling-Hammond, 2008).

Researchers, Lyon, and Weiser (2009) reported that traditional university based teacher preparation courses have yet to ensure that teachers are well equipped with research-based knowledge for the teaching of reading. They reported university instructors prepared teachers for teaching reading yet lacked the specialised content and procedural knowledge provided by peer reviewed research findings. Findings that are pertinent to reading development and the knowledge, skills and understandings that students must possess to read proficiently (Lyon & Weiser, 2009). Overall, the research base for the preparation of teachers to teach the specialised content and procedural knowledge for teaching reading is sparse (Wilson, Floden, & Ferrini-Mundy, 2011) resulting in teachers being ineffective or learning by trial and error (Darling-Hammond & Bransford, 2005).

Moats (2009) reported that teachers (including academic lecturers) cannot teach well what they do not know themselves, and called for specialists with specialised content and procedural knowledge be elevated to the higher ranks of the profession. Moats (2009) recommended they be identified as instructional leaders, and be recognised as the best resource to facilitate quality instruction in oral language, reading and writing.

### 2.4 Teaching Reading

The teaching of reading is core business in the primary years of schooling. This is shown in the English curriculum from the Australian Curriculum, Assessment and Reporting Authority (ACARA, 2015), and the outcomes stated in the NSW Board of Studies K-6 English syllabus (BOSTES, 2015). Both of these curriculum frameworks emphasise making meaning from texts, as well as the building of other big ideas of reading (e.g., phonemic awareness, alphabetic principle). The inclusion of these big ideas is in part due to recommendations from the Review of the Australian Curriculum that the curriculum
have a stronger emphasis on alphabetic principle and phonemic awareness (Department of Education, 2015).

Reports such as *Read About It: Scientific Evidence for Effective Teaching of Reading* (Hempenstall, 2016), the *Inquiry into the Teaching of Literacy* (Reading Report) (Commonwealth of Australia, 2005), National Reading Panel (1998) in the United States of America, and the *Independent Review of the Teaching of Early Reading* (2006) in the United Kingdom highlight the empirical evidence around the teaching of reading. A second key point raised is the specialised content knowledge teachers need to be able to teach reading. The complexity of learning that knowledge, however, is considerable with Moats (1999) considering the teaching of reading to be rocket science (1999), and Snow et al. (2005) considering the teaching reading to be a job for an expert.

The complexity of learning to read is largely underestimated. Hoover and Gough (1986) advocated that reading is made up of two components, decoding and comprehension; the sub-components or strands within each of these components and how they interact and support each other makes learning to read complex. Hoover and Gough further argued that reading is “the ability to take lexical information and derive sentence and discourse interpretations.” (p. 131), and represented this interactive complexity through the expression: Reading equals Decoding by Comprehension (i.e., R=D x C).

Other researchers have represented or extended the simple view of reading (e.g., Tunmer & Chapman, 2014; Stuart & Stainthorp, 2016). Scarborough (2002) represented the interactive complexity of the differing elements of reading through her strands of reading (see Figure 2-1). This researcher provided a visual of a rope with differing strands that portrayed the notion of fluidity and continuum of changes within differing components, to provide an understanding of the science behind the complex multifaceted task of reading.
Figure 2-1 The many strands that are woven together to become a skilled reading (Scarborough, 2001, p. 24).

Figure 2-1 illustrates the major strands or big ideas that are required to become a skilled reader. While the strands are considered separate, each plays its part in recognising individual printed words and understanding the intent of the author through interactive processes. Many children who have trouble in learning to read during the early years of school stumble in mastering word recognition strands (e.g., phonemic awareness, alphabetic principle) with efficiency.

Review of reading research over the past two decades (e.g., National Reading Panel, 2000; Department of Education, Science and Training, 2005; Snow et al., 1998) has provided strong evidence that a skilled reader (the learner) will master the big ideas of reading. The big ideas of reading include phonological awareness, the alphabetic principle, fluency and automaticity, vocabulary and comprehension (Commonwealth of Australia, 2005; Hempenstall, 2016; Snow et al., 2005). Spelling and writing complement and support the learning of reading through the application of encoding (Moats, 2015). A description of each big idea of reading follows.

2.4.1 Phonological awareness. Yopp (1992) described phonemic awareness as a sub set of phonological awareness, and the ability to hear and manipulate sounds in words. It is the foundation of language, both oral and written. Chard and Dickerson (1999)
described phonological awareness as a general appreciation of speech sounds as the understanding of different ways that oral language can be divided into smaller parts and be manipulated.

Konza (2011) describe it as a broad term that refers to the ability to focus on the sounds of speech as opposed to its meaning, and as having a number of different levels or components.

Phonological awareness skills include a complexity of elements including rhyming, sentence segmentation, syllable blending and segmentation, onset rime, blending, segmentation, and blending and segmentation of individual phonemes. Skills enclosed within specific elements add additional complexity. Chard and Dickson (1999) proposed a continuum that exemplifies the hierarchy of complexity of these skills, shown in Figure 2-2.

![Figure 2-2. Continuum of phonological awareness skills as proposed by Chard and Dickinson (1999).](image)

Within each step or skill, there are micro and macro skills that must be accessed by the learner to read, spell and to analyse words (Adams, Foorman, Lundberg, & Beeler, 1998; Chard, Simmons, & Kame’enui, 1998). Moats (2015) when discussing segmenting words, for example, described the impact of deletion, addition and substitution of a sound within a word. Further discussion centered on first sound or second sound deletion that included addition and substitution of a phoneme within the words. Moats went further by discussing the impact of manipulating morphographs within a word, and subsequent changes of meaning resulting from those actions. Phonological awareness is a pre-requisite for learning to read. Therefore, if one can read well, by definition, you are phonetically aware. However, once you have learnt the letter sound relationships and spelling, it is often
difficult as an adult and a reader to identify just the sounds, without relating to the letters. It is important to just listen to the word to sound it out, rather than looking at a written version (Tumner & Rohl, 1991).

Gillian, McAllister, McLeod and Parkes (2008) researched how speech, language pathologists (SLPs) and teachers segmented hard words, and found that SLPs were able to segment the words more often than teachers. For the word start, for example, SLPs segmented the word correctly 31% of the time, and teachers 6% of the time. If teachers are to teach students how to segment hard words explicitly and systematically, they need to be able to process words phonologically (Fletcher et al., 1994) themselves.

2.4.2 Alphabetic Principle. Children's knowledge of letter names is a strong predictor of their success in learning to read (Snow, 1998). The alphabetic principle, therefore, is foundational to literacy. Fielding-Barnsley and Purdie (2003) explained that research clearly demonstrated that reading and understanding connected text is dependent on acquiring and using letter-sounds with automaticity, and understanding that letters of the alphabet and the phonemes to which they correspond, can be used to read words. This explanation is similar to those given by other researchers (e.g., Adams, 1990; Camilli, Vargas, & Vurecko, 2003; Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1994; Hempenstall, 2016; Torgesen, 2000).

There are 24 single graphemes that represent the letters of the alphabet in the English language yet there are at least 44 phonemes that are used to code words (Pikulski, & Templeton, 2000). In addition, some sounds are said using voice and others without voice. Some sounds are articulated. Then there are co-articulation, allophonic variations that include affrication (e.g., tongue position consideration in dress-train), aspiration, de-aspiration of stops (e.g., take, Kate and stake) and tongue flapping (e.g., latter and ladder). There is vowel nasalisation before nasal consonants and syllabic consonants as well as consonant phonemes by place and manner of articulation. Learning this knowledge takes a long period of time and requires repetitions and systematic pronunciation of sounds and to read words.

Students when learning to read are faced with deciphering an alphabetic script that represents a diversity of sounds. It cannot be assumed that they will understand that letters representing the phonemes will not always represent the same sound. This is because a phoneme is a linguistic sound that is “not part of their easily accessible mental calculus, and because its existence is obscure by the physical properties of the speech stream” (Moats, 2015, p. 11).
Knowledge of the alphabetic principle is fundamental to text reading. Single or multiple graphemes (i.e., symbols representing letters and corresponding sounds of the alphabet) form the irregular and regular words that are read in text. For example, the grapheme or single letters, and multiple letters are known as digraphs (e.g., ph, th) and trigraphs (e.g., sch), make one sound. McArthur et al. (2012) reported that alphabetic principle instruction positively impacts reading skills for non-word reading, word reading accuracy and letter-sound knowledge with significant results demonstrated. The effectiveness of phoneme training was not weakened significantly by the training form (i.e., alphabetic principle only versus alphabetic principle and phoneme awareness versus alphabetic principle and irregular word training), teaching intensity (i.e., less than two hours per week versus a minimum of two hours per week), teaching duration (i.e., less than three months versus a minimum of three months), group size (i.e., one-on-one versus small group), or training administrator (i.e., human administration versus computer directed). When the alphabetic principle was used in conjunction with phonemic awareness it provided a mechanism for manipulating sounds within words (Camilli et al., 2003; Hempenstall, 2016) and decoding written text.

2.4.3 Fluency and automaticity of code. Fluency is the ability to decode a text accurately, quickly, and expressively (Hempenstall, 2016). It is a multi faceted task that provides a link between decoding, word recognition and comprehension. Fluent readers group words quickly to help them gain meaning from what they read. The reader automatically translates letter to sound representations; unitises those sounds into recognisable words and accessing the lexical representations; processes meaningful connections within and between sentences; and relates text meaning to background knowledge and forming inferences to fill in missing information (Fuchs, Fuchs, Hosp, & Jenkins, 2001). Their reading sounds natural and at the same speed of speaking. Readers who have not yet developed fluency decode text slowly, word by word and are likely to experience difficulties gaining meaning from the continuous text they are reading (Baker, 2013; Carnine, Silbert, Kame’enui, Tarver, & Jungjohann, 2006; Morris, 2010; Pikulski & Chard, 2003).

In the state of New South Wales (NSW) Australia, the Department of Education and Communities (DEC) (formally the NSW Department of Education and Training) (2006), the required fluency rating for students in primary school who are learning to read are set out in the Programming and Strategies Handbook for Years 3 and 5. Students in Kindergarten - Year 2, are expected to read 50-80 words per minute; students in Years 3-4
should read at 80-100 words per minute; and students in Years 5-6 100-120 words per minute. These ratings are set to a comparable speaking rate, and concur with the recommendations within the literature (e.g., Howell & Nolet, 2000).

For fluency to develop practice is essential. As the reader gains an understanding of the alphabet and its function, they appreciate that each time they read a word that was previously unknown, recognition of the word becomes easier. It is when automaticity becomes evident, whole words are recognised as quickly as single letters.

Fluent reading relies on the complex synchronisation of a number of diverse cognitive and textual processes. These processes include the orthographic, phonological and semantic processes used to identify words, and the grammatical, syntactic, and semantic linguistic processes necessary for making sense of connected text (Hempenstall, 2016). When fluency develops, there is a reduced load on the reader’s working memory. The words banked in the long-term memory are easily accessed and the reader is able to concentrate on gaining the author’s intended meaning from the text.

Researchers report that poor readers use four to five times as much energy when compared to fluent readers when reading the same phonetically based text (Hempenstall, 2016). Readers who say that reading is too difficult are those whom struggled to decode words accurately and quickly with expression. When it is difficult to decode text, students become less motivated to read. Hence, fluent readers gain more vocabulary growth because they are motivated to read, and with greater vocabulary growth comprehension of text is increased (Hempenstall, 2016).

Cooper (2001) when explaining the purposes of the six types of texts for reading instruction described basal series texts as beneficial to supporting learning to read. Basal texts contain a high number of words that use sound-letter relationships that children are being taught as well as a number of high-frequency words skills. The benefit of this type of text is that it provides practice of sequential decoding and the development of fluency and automaticity (National Reading Panel, 2000). Students are able to experience immediate success given they are based on the instruction they are receiving. It is to be remembered that this type of texts is to assist the student to become accurate and fluent in their reading and should be used along side other types of texts to help the student to broaden their language base, vocabulary and use of comprehension strategies and skills.

2.4.4 Vocabulary. Vocabulary refers to the meanings of words children need to know to communicate and comprehend. Oral vocabulary is the words recognised or used
when listening and speaking. Reading vocabulary is the words recognised or used when reading and writing (Carnine et al., 2006).

Expressive vocabulary refers to vocabulary used during speaking or writing. Receptive vocabulary refers to vocabulary understanding when listening and reading. The development of expressive and receptive language relies heavily on early childhood experiences with language in the home and school setting (Cirrin & Gilliam, 2006; Sinatra, Zygouris-Coe & Dasinger, 2011). When young children have an extensive number of words in their word bank they are better able to comprehend the meaning of the spoken words within discussions and communications (Rose, 2006; Sinatra et al., 2011).

The number of new words young children learns each year varies significantly (Beck & McKeown, 1991). Early learning of language takes place through oral context, and oral contexts are life long. It is through the learning of language that vocabulary develops. It is also facilitated by phonological awareness (Ehri, 2014; Perfetti 2011; Rose, 2005). There are, however, profound differences in vocabulary knowledge between learners depending on numerous variables (e.g., background experiences, family education, socio-economic grouping (SES)), from early childhood through high school.

Year 1 children from higher SES background know about twice as many words those from low SES backgrounds. High achieving secondary school students know about four times the number of words as their lower-performing peers, and high performing students in Year 3 have vocabularies about equal to low performing Year 12 students (Beck, McKeown & Kucan, 2002; Graves, Brunetti, & Slater, 1982; Graves & Slater, 1987). In the early years vocabulary development occurs through oral contexts. Engagement with text impacts later vocabulary development, hence fluency of decoding impacts vocabulary development.

Mol and Bus (2011) examined the impact of print exposure on students in Grades 1-12 and found the influence and impact of exposure to books broadened as students moved through education. In kindergarten there was a 12% variance in oral language skills, in primary school 13%, middle school and high school 19%, and in university 34%. Variance in vocabulary knowledge is impacted by other factors. Nagy and Anderson (1998) estimated that primary students read between 100,000 and 10,000,000 (a ten fold difference) per year depending on reading proficiency. Blachowicz et al. (2006) reported: “There is a gap in vocabulary knowledge between economically disadvantaged and economically advantaged children that begins in preschool and is an important correlate of poor school performance.” (p. 526)
Students who do not engage in reading or are not skilled readers do not encounter nor learn to use the same number of new words each year; this difference in exposure cannot be breached by specific instruction in schools. Hence, exposure to rich, natural language within reading text is critical from early stages of schooling.

Beck et al. (2002) recommended a focused and consistent approach to developing vocabulary; they suggested a three-tier approach to teaching vocabulary. Tier 1 consists of the most basic words (e.g., clock, baby, happy). These words are usually learned prior to school and rarely need instruction. Tier 2 words are those that students use alternatives for but offer a more precise or mature way of referring to ideas they know (e.g., to say fortunate instead of lucky, or to say maintain instead of keep going). Tier 3 words are subject specific words (e.g., antennae, metamorphosed and entomologist in a unit of work on bugs). These words may need to be explicitly taught by subject area teachers.

The importance of vocabulary knowledge has long been recognised in the development of reading comprehension skills. Acquiring a rich vocabulary is a complicated, multifaceted task that has serious implications for understanding texts as the development, use and understanding of vocabulary strongly impacts on oral and written comprehension. Morphology (i.e., the smallest part of a word that has meaning) and entomology (i.e., regularities associated with larger parts of words) contribute to understanding sections of words, and ultimately, word meanings (National Reading Panel, 2000).

Young children who have spent extensive time participating in discussions and listening to books being read will understand more word meanings than children who have little or no experience with books (Hiebert & Kamil, 2009). New learning of vocabulary is language based and builds on foundations the learner already knows and understands. Students who have not been exposed to books and oral language learning are at a disadvantage to their peers when reading words that are formal and complex (Hempenstall, 2016). To make the leap from communicating orally to reading and writing, a large vocabulary is needed to enable the student express themselves and comprehend what is read (O’Hara, 2009). To assist these children vocabulary instruction needs to be explicitly planned for and taught (Becket al., 2002).

2.4.5 Comprehension.

Comprehension is extracting and constructing meaning from written text using knowledge of words, concepts and ideas (Hempenstall, 2016, p. 25)
The lower level language skills are the foundation that the higher level language is built on. This includes proficiency of reading accurately, a rich and diverse vocabulary, and strong coding skills that impact on successful comprehension of text (Hogan, Sittner, Bridges, Justice, & Cain, 2011). There is a strong correlation between linguistic knowledge and reading comprehension.

In addition to the learned skills and knowledge for reading, one must also acknowledge the notion of working memory on learning to read. Working memory is defined by Baddley (2012) as the capacity to store and process information simultaneously. The complex character of reading comprehension draws on the integration across words, sentences, passages and texts that are organised globally and locally. These processes allow for storage of learning and recall of the semantic and syntactic information.

While research advocates that there is not one way to teach comprehension, Duke, Pearson, Stratchen, and Billman (2011) recognised that “if learning to read well is a journey towards ever-increasing ability to comprehend texts, the teachers are the tour guides” (p.51).

Very young children are involved in gaining the meaning of words and oral vocabulary as they hear words in conversations taking place around them. Most children acquire vocabularies connected to reading and writing when they commence school. Before they can do this they must know how the printed letters relate to the phonemes and how printed words relate to spoken words (Pikulski & Templeton, 2004).

Reading comprehension is the understanding and interpretation of what we decode. It is a complex task that requires a number of processes. To make meaning of written text, the reader must be able to decode and make connections between the code and their background knowledge requiring them to think deeply about what they know. The skills for reading comprehension that require teaching include skills and strategies (e.g., literal comprehension skills, using fix up strategies when meaning is lost) to use of general and specific vocabulary, transfer and generalisation from individual skills and strategies to using those within reading.

Comprehension is the making of meaning from oral and written texts. The comprehension trajectory begins with oral comprehension of the spoken word and progresses through to the understanding of written text comprehension. Lemke (1988) explained the importance of oral language to understanding the authors intended meaning of texts:

*The problem with learning through texts is, I believe, fundamentally a problem of translating the patterns of written language into those of spoken language. Spoken language is the medium through which we reason to ourselves and talk our way*
through problems to answers. It is for the most part, the medium in which we understand and comprehends. (p. 136)

Text is more than speech written down. Language development, fluency, vocabulary knowledge and decoding are key features in learning to comprehend text (Chall & Jacobs, 2003; Moats, 2000). Comprehension is a complex task that requires the reader to respond to, interpret, integrate, critique, infer, analyse, connect and evaluate ideas in texts. The purposes, feelings, punctuation, text type, the number of unique words, word structure and morphographical knowledge interact and impact on comprehension. Predicting, asking questions, self questioning, monitoring and repairing understanding, summarising, knowing how to find the answer to a question in text, finding the main idea, inference, sequencing, drawing conclusions, making connections are all elements within comprehension. Mastering these intricate and inter-related aspects of comprehension requires careful instruction by the teacher, who understands their students and can motivate them to engage purposefully in instructional sessions.

2.4.6 Spelling and writing. Research showed that learning to read and learning to spell rely on much the same knowledge (i.e., relationships between letters and their sounds) (Ehri, 2000). It is not surprising that spelling can be designed to help students better understand the key knowledge that assists with learning reading (Ehri, 2000). Spelling and reading rely on the same mental picture of the word. Knowing the spelling of words makes that representation of it accessible for fluent reading (Snow et al., 2005). Ehri (2000) and Snowling (2004) found that the ability to read sight words rests on being able to map letters and letter combinations to sounds. This is important because the number of words students can remember is limited unless insights into the alphabetic principal, phonemic awareness and morphology are developed.

Learning to spell requires the teacher to systematically introduce information about print, speech sounds and meaning. These in turn support students to memorise whole words that are used in spelling and sight-reading. Spelling assists students in reading, vocabulary and writing development (Westwood, 2009). Talking about the new information accelerates the retention of information as it facilitates application of knowledge to new situations, and develops higher-order thinking skills (Brockbank & McGill, 2007). Writing a learning journal, for example, facilitates memory and a ready reference of ideas, feelings, thoughts and evidence of what is learned. The purposeful and
intentional use of reflecting on learning facilitates the development and attainment of goals (Adams, 1990).

2.5 Teaching and Learning Reading

A student becomes a skilled reader when they master the complexities and interactions of decoding the script and comprehending the intent of the author. Achieving the status of skilled reader can be accomplished through a carefully structured instructional program that incorporates the knowledge and skills and specialised elements reading.

Teacher acquisition of the specialised knowledge for teaching reading is critical if they are to develop instructional programs that incorporate the macro and micro skills of phonological awareness, alphabetic principal, fluency, vocabulary and comprehension essential (Brownell et. al., 2016; Hempenstall 2016; Snow et al., 2005).

2.5.1 Teaching decoding. The National Research Council (1998) focused on the importance of the alphabet principle and phonemes. Designing a program to meet the needs of students requires the teacher to have a strong insight into the manner in which the differing big ideas of reading can be sequenced and integrated to meet the needs of the learner. With the insight that written words are comprised of letters and phonemes, students in turn, can commence mapping speech sounds to print (Juel, 1991).

Letters (graphemes) of the alphabet and the corresponding letter-sounds are essential for reading, spelling and writing. Single letters and specific groups of letters (e.g., digraphs) represent a single sound that when blended together create words. Decoding primarily involves decoding words and recognising and pronouncing sight words with accuracy giving students knowledge and the ability to access print. Instruction of phonemes when combined with phonological awareness facilitates decoding. Decoding requires knowledge of the sounds (i.e., phonemes) letters represent, and skills in manipulating those sounds in words, as there is a predictable pattern too much out the English language when decoding or encoding text.

Phonemic awareness is having a precise awareness of sounds in words and the ability to manipulate those sounds in words (Hoover 2002). When applying phonemic awareness skills to reading, a student needs to recognise that within each reading element there are numerous sub-units (e.g., rhyming, blending and segmenting). Further sub-skills lay within these skills (e.g., segmenting skills include deleting, adding and substituting phonemes in words; segmenting compound words into simple words; deleting the first sound in pit to form it, adding a letter-sound to it to form bit, and substituting the letter /s/
for the /p/ in *pit* to form *sit*). More complex segmenting skills include manipulating the sounds in words that begin with two consonants (e.g., adding a second consonant to back, forms the word black) (Hoover, 2002; Moats, 2015). Practice of these skills and knowledge is essential for all students; for students who experience difficulty in acquiring these skills it is essential that the program is well designed and implemented with integrity. The program can be further enhanced through knowing student’s interests and motivations, and the use of instructional games to motivate and engage students.

### 2.5.2 Teaching reading comprehension

Reading comprehension is a process of simultaneously extracting and constructing meaning through the intertwining, interacting and involvement with written language. Comprehension engages three elements. That is, the reader who comprehends the author’s intended meaning, and the activity or task in which comprehension is embedded.

While the reader uses capacities, abilities, experiences and knowledge that they bring with them when they read written or electronic texts, skilled and deliberate explicit and systematic instruction of the many skills and strategies that encompass comprehension is essential. Mastropieri and Scruggs (2014) described explicit instruction in comprehension to incorporate: structure, clarity, redundancy, enthusiasm, appropriate rate and maximised engagement (i.e., SCREAM variables). These techniques support students with learning difference and disabilities, such as cognitive organisation, distractibility, sustained attention, memory, social behaviour, affect, and motivation (e.g., Mastropieri & Scruggs, 2014).

Comprehension instruction needs to give consideration to content of engagement, and how students will demonstrate their understanding. Instruction should be designed to ensure all students have the opportunity to engage in comprehension activities regardless to the socio-cultural context, skills as a reader, the available texts, and the activities in which the reader is participating. Students from low-socio-economic societies, for example, have been found to fail in making positive gains in learning comprehension due to not giving consideration to their background language (Snow, 2002). Knowing your students, and carefully designed instruction can assist remove this barrier and provide a rich instructional context.

To comprehend, a reader must have a wide range of skills, strategies and knowledge (e.g., critical analysis, inference and visualising). They need to be interested in and motivated by the content being read and have self-efficacy as a reader to retain knowledge (e.g., vocabulary, domain and topic knowledge, linguistic and dialogue knowledge).
Students who comprehend the meaning of text often have multiple comprehension strategies (e.g., memory strategies, organisational strategies, retell strategies) (Snow, 2002; Wooley, 2010).

After observing a group of expert teachers instruct comprehension, Durkin (1979) concluded these teachers spent less than 1% of the total reading instruction time actually teaching comprehension skills. They did not teach students how to: locate answers; find the main idea; determine sequences; noting cause and effect; use key words; defining; demonstrating; modelling; describing; explaining; providing feedback; thinking aloud; and guiding students through learning activities. Neither did they explicitly and systematically teach students how to retell what they had read, and merely asked questions or occasionally mentioned a skill.

Text features impact heavily on comprehension of text. These features include surface code (i.e., exact wording), the text base (i.e., units of ideas representing meaning), and the mental models (i.e., the way the meaning is processed). Electronic text, for example, adds to complexity with hypertext often being non linear (Snow, 2002). Text that is used to promote decoding fluency can be complicated by heavy content specific vocabulary, or speech and dialogue. Text can be purposefully chosen to promote specific skills. Text that supports vocabulary development (e.g., within text definitions) can enhance opportunities for comprehension (Weiser, 2013; Sweeney & Mason, 2011). Text that has a primary purpose of supporting the development of decoding fluency (Cooper, 2001), may be different in structure to text being used for researching a topic.

Teaching comprehension requires explicit instruction on how to construct complex understandings, draw inventive conclusions, make critical comparisons, and to carefully evaluate the materials they read (Carson, Gillon, & Boustead, 2013; Chard et al., 2000; Cree, Kay, & Steward, 2012; Fuchs, Fuchs, & Vaughn, 2014; Lynch, Buckman & Krenske, 2003; Lyon, 2003). Teachers require the skills for teaching reading comprehension themselves before they are able to teach it.

2.6 Engagement and Participation in Learning to Read

Student engagement for this study refers to the degree of attention to curriculum, behaviour and social interactions that the teacher and student demonstrated when they were involved in instructional sessions. It is an essential prerequisite for the development of understanding and for learning (Wiggins & McTighe, 1998).

Davis, Summers, and Miller (2012) and Fredricks, Blumenfield, and Paris (2004) reported that there are three integrated dimensions to engagement in learning. Behavioural
engagement encapsulates participation and involvement with an absence of non-productive or neutral behaviours while cognitive engagement involves how students feel about themselves, their work, their skills and the strategies they use to complete their work (Davis et al., 2012). Cognitive engagement refers to the students’ investment in their learning, where effort focuses on understanding and mastery (Fredricks et al., 2004). Relational engagement involves emotional engagement that gives the student a sense of belonging and acceptance and involves interest, happiness, anxiety and anger (Markwell, 2007).

When students are engaged actively in their own learning, engagement with each other and/or a mentor, with teaching staff and with a range of resources they have a real sense of belonging (Holodynski & Kronast, 2009). These factors are important to learning as they enhance the quality of the learning experiences, and consequently, the engagement in learning. This applies to teacher preparation and school students.

Participation is similar and is about initiating and responding to the curriculum, trusting the teacher and/or student, and feeling safe enough to allow oneself to make errors and corrections. It is about trusting the teacher to teach what genuinely needs to be learned, accepting affirmation. It also depends on the teacher organising focused lessons that are based on assessment data (Quinn, Heynoski, Thomas, & Spreitzer, 2014). The teacher then has significant responsibility in engaging the student in learning. That is, establishing a positive relationship that includes enjoyable positive social interactions. Lessons that provide interesting curriculum content, and strategies to support the student’s specific learning needs

2.7 Learning to Read Supports and Interventions

For a child to read fluently, he or she must recognize words at a glance, and use the conventions of letter-sound correspondences automatically. Without these word recognition skills, children will never be able to read or understand text comfortably and competently. (Westwood, 2008, p. 13)

When pre-school children are read to in their early years, they begin to build the knowledge and skills eventually required for reading. They develop a curiosity about texts and the authors intended meaning that the text delivers. The children observe that we enjoy and value reading, and want to share that experience with the reader (Adams, 1990). Pre-school children who are read to regularly at home and literacy rich environments come to school with 1000 of more hours of hearing texts that build on reading understanding and expand language skills and background information (Adams, 1990). They also develop an understanding of the conventions of print. Children who come from homes and
environments that are literacy poor are likely to have limited experiences of being read to (Adams, 1990; Strickland & Riley-Ayers, 2006).

Research over time has shown that children who get off to a poor start in reading rarely catch up to their classmates (Jenkins, Vadas, Firebaugh, & Profilet, 2000; Stanovich, 1986; Vadas, Jenkins, & Pool, 2000). The results of this difficulty increased over time. Those who fall behind in reading development by being unable to identify letters and spelling patterns spontaneously, fluently, and effortlessly to transform them into words that give meaning, are likely to avoid reading (Adams, 1990). In the students third and forth years at school, students with poor decoding skills and few sight words continue to fall further and further behind (Juel, 1988). This further distances students from their peers in terms of willingness to read, motivation to read, and overall reading ability (Anderson, Wilson, & Fielding, 1988; Byrne, Freebody, & Gates, 1992; Torgesen, 1998).

Some students learn with little effort, while other students struggle to learn to read. Approximately 16% of students in the state of New South Wales experience significant difficulties in learning to read and require additional support if they are to succeed (DEEWR, 2005). Readers have several ways of identifying the words they are reading. They include decoding, using analogy and spelling patterns, using morphographical knowledge, automatic word recognition, context clues and a strategy of a combination of all of the above. Researchers have identified that letter-sound correspondences and phonological awareness as playing a foundational role in learning to read. The phonological skills include the ability to hear and manipulate sounds in words and segmenting, blending, identification of on-set rime as necessary for reading unknown words (Leyva, Sparks & Reese, 2012; Torgenson, Morgan, & Davis, 1992). To decode words, the students must first be able to segment the words into phonemes, then blend the phonemes together to produce a word.

Vadas, Sanders and Peyton (2006) investigated the effect of additional reading support for students in Kindergarten who were experiencing difficulties in learning to read. The group of students who were tutored by trained personnel in phonemic awareness and the alphabetic principle over 18 weeks, outperformed their non-tutored peers significantly on measures of reading accuracy, reading comprehension, reading efficiency, passage reading, fluency and spelling. One year later those students continued to read accurately and fluently.

Wanzek, Wexler, Vaughn, and Ciullo (2010) examined reading interventions for students in upper primary years (ages 9-11yrs) through synthesising 20 years of research. The synthesis involved thirteen studies on reading treatment designs and eleven single
subject studies examining reading interventions with students in Year 4 and 5. The analysis indicated that the highest student effects occurred when they received explicit and systematic instruction in phonological awareness, alphabetic principle, fluency, vocabulary and comprehension. Furthermore, they found that these components for teaching reading were common with those students in middle to high school. Findings indicated that young readers (K-3) from low socio-economic backgrounds could read the simple texts, yet struggled when required to read complex texts that are considered appropriate for Years 4 and above. This finding reflects the concerns articulated by MCEETYA (2008) and the failure of students from low socio-economic backgrounds, Aboriginal students and those students who were learning English as an additional language.

Students who experience difficulty learning to read require a teacher who can analyse reading assessment data to better understand the needs of their students (Arrow, Tumner, & Greaney, 2015). Using these data, these teachers integrate into their practice multiple levels of a reading program for individual learners that promote decoding and gain meaning from texts based on the needs of the student. Such a teacher will need to be familiar with the big ideas of reading, know how to assess and continually evaluate the students progress, and how this all comes together to form a focused and relevant intervention plan. They must also be able to identify features of the learning environment that impacts on the students learning, and implement adjustments to ensure the best possible outcomes.

Snow (2015) examined how reading is taught and reported that teachers were not prepared during their university training to teach children the alphabetic principle letter-sounds (phonemes). This finding concurs with the Inquiry into Literacy (Commonwealth of Australia, 2005). The lack of specialised reading preparation leaves the teachers unable to identify and address the needs of students who come to the learning with varied prior learning experiences or experience difficulties in learning to read. While teachers may have general PCK they do not have the specialised knowledge required to teach reading.

The NSW Government’s Special Education Initiative recognises students experiencing difficulties learning to read. Education Amendment (Educational Support for Children with Significant Learning Difficulties) Bill 2008: Amendment of Education Act 1990 Section 20 (4) subsection (1) (a1) states:

_A child has a significant learning difficulty if a qualified teacher or other qualified education professional is of the opinion that the child is not, regardless of the cause, performing in the basic educational areas of reading, writing, spelling and mathematics in accordance with the child’s peer age group and stage of learning as the child’s peer age group and stage of learning._
In 2005, the Australian Commonwealth Government passed further legislation and mandated that all children be provided with the same education as their peers. The law states: **“All students will be treated on the same basis as a student without a disability”** (Commonwealth Disability Discrimination Act Amendment (Educational Standards), 2005 (Commonwealth of Australia, 2005B). Teachers are required to address those needs through the teaching of strategies and making adoptions that assists students learning.

Research over time has highlighted the differing rates that students learn to read. Some students will learn quickly and easily while others will require additional intensive interventions to learn to read (Juel, 1991; Snow et al., 2005; Vaughn, Schum, Haager, & Lee, 1993; Vaughn & Wanzek, 2014). Kame’enui (1999) reported that 5% of students learn to read regardless to teaching quality. Approximately 45% learn with reasonable instruction, and the remaining, experience difficulties on learning to read, with the lowest 20% being two years or more behind their peers at any one time (National Reading Panel, 2000).

The **Progress in International Reading Literacy Study (PIRLS)** (Mullis, Martin, Foy, & Drucker, 2011) reported on reading achievement across differing countries. This report indicated that 10% of Australian students reached the advanced international benchmark, 32% reached the High benchmark and 34% reached the Intermediate benchmark. The remaining 24% of students failed to meet age appropriate outcomes for reading. Students from low socio-economic backgrounds, students undertaking distance education, English language learners and Aboriginal students achieved consistently in the lowest benchmark band. It would seem that little has changed over the past decade with the proportion of students struggling to learn to read English language texts (Thomson, Hillman, Wernert, Schmid, Buckley, and Munene, 2012). The 2016 Australian PIRLS data revealed a further decline in the reading progress of Australian children with an average score of 503, a drop of 6 points from 2011. Canada, a country Australia has often been compared to has successfully reversed the negative decline in 2016 and made significant gains (National Council on Teacher Quality, 2016).

While assessment is a vital part of teacher’s responsibilities (Arrow, McLachlan, & Greaney, 2015), a review of the literature failed to discover how teachers learned to assess student’s knowledge and skills for reading within their university course work. This leaves these teachers in the position where they may not be able to choose, implement, analyse and teach what the students need to know to learn (Grainger & Adie, 2014). While critical for all students learning, these skills leave students experiencing difficulties in learning to read without key supports to assist them overcome their difficulties. Grainger and Adie
(2014) found that 59% of pre-service teachers where either not confident, or unsure of having the knowledge to assess generally and reported that few universities offer courses on assessments leaving graduates feeling confused and unprepared to teach.

A literature search found that few researchers had investigated how teachers construct the specialised content and procedural knowledge required to teach reading and engage students in learning. It is the all encompassing pedagogical content knowledge (PCK) and facilitates the type of instruction that is required for students including those who learn differently, making it necessary to consider the phenomena through considering Pedagogical Content Knowledge (PCK) within science and mathematics. Ball et al. (2008) investigated the nature of professionally oriented subject matter knowledge in mathematics by observing actual mathematics teaching and identifying mathematical knowledge for teaching, and based their analyses of the mathematical problems that arise in teaching. They followed two sub-domains of PCK and specialised content knowledge. In doing so they established that teaching is not purely about content knowledge and isn’t purely about teaching. Both are necessary and required to be effective in teaching mathematics.

Phelps and Schilling (2004) investigated the content knowledge required to teach reading. They administered a survey containing 261 multiple-choice questions with 1542 primary school teachers. The survey results indicated that comprehension teaching knowledge is more common amongst beginning teachers than decoding or word study knowledge. They also found two distinct domains (i.e., knowledge of content and knowledge of teaching and content). It is then, the specialised content and procedural knowledge required to teach reading that teachers need to know and be able to do.

Luft and Zhang (2014) investigated how teaching beliefs changed over the first three years of teaching and the impact this has on early career teachers using qualitative and quantitative data collection method. Seventy-six beginning teachers were observed and interviewed, and the resultant data analysed quantitatively. One group of teachers were mentored to use teacher centred methods (AC) and the other through traditional methods (GEN). The AC group of teachers moved onto using student centred approach while those who where mentored by the traditional teachers grew to use the traditional standards of their mentors. This study highlights the need for early career teachers to have specialised content knowledge they do not dilute their passion and drive to teach, and put into practice their learning from university programs.

Denton, Fletcher, Anthony, and Francis (2013) investigated the impact of an intervention featuring phonological awareness, phonemes, high frequency word recognition, phonemic decoding, structural analysis, spelling and writing based on
assessments findings, fluency, oral reading and reading comprehension and word study. The researchers reported a strong mean growth in reading as a result of 1-2 hours of intensive weekly support over a school semester. Denton (2012) examined primary grade response to intervention for reading difficulties and reported a mild decoding problem, unidentified by teachers or not resolved in the early years resulted in some students acquiring a pervasive reading disorder during the primary years. If the difference between developing readers and those struggling to read during the early years had been identified and addressed, more serious reading difficulties could have been prevented. Many children failed as a result of not receiving the tailored reading instruction in the primary years (McDonald Connor et al., 2009). Torgesen, Alexander, Wagner, Rashotte, Voeller, and Conway (2001) delivered a 1:1 intervention for 2 hours per day for students in grade years 3-5 who were experiencing severe reading difficulties. After 8 weeks, the students were found to have made large standard score gains in word reading and comprehension.

Considerable research and thought was given to how schools might assist students who had fallen behind in their academic progress, and required assistance to catch up to their peers. Vaughn, Denton and Fletcher (2010), for example, researched the implementation of a three-tiered approach to learning. Tier 1 is the everyday core teaching and learning that occurs in the classroom. Tier 2 is supplemental support that occurs within small groups in addition to the Tier 1 teaching and learning for those who are not making expected gains. This support would occur two to five times each week and last for eight weeks on. Tier 3 is small group (1-3) or individual instruction that is in response to the student who has not made the necessary gains during Tier 1 and Tier 2 support. This support is intense, systematic and explicit, occurs daily and lasts over an extensive period of time as necessary (Vaughn et al., 2010). These researchers recommended comprehensive intensive interventions that vary in emphasis based on specific students learning needs.

Ensuring students get off to a good start in reading is important for students, schools and the community. While early intervention can address many student’ needs, prevention is a stronger academic and financial option. Teachers entering the field need to be equipped so that have the specialist reading knowledge to address the needs of all students within a supportive educational environment (Darling-Hammond, 2010).

2.8 Pre-service Teacher Education and Teaching Reading

In the words of Dr Louisa Moats, teaching reading is rocket science (Moats, 1999). To teach a young child to read requires the teacher to have a deep understanding of the
complexity within the English language (Moats, 1999). Having the specialised conceptual and procedural knowledge for teaching reading is part of this and is crucial for teachers as reading underpins learning (National Council on Teacher Quality, 2016). Of greater interest in this study is how to prepare teachers to teach reading. The following section discusses outcomes of research and reports that have examined the preparation of teachers teach reading.

In 2014, the Teacher Education Ministerial Advisory Group (TEMAG) examined and made recommendations on how initial teacher preparation in Australia could be improved to ensure new teachers were equipped with the theoretical knowledge and practical skills needed for the classroom. The report made 38 recommendations across a number of fields. The findings related to the need for universities to work in specific ways that would enhance teacher’s ability to foster student learning. Recommendations included the use of research-based practices that incorporated strategies and skills to support diverse student learning needs, and the use of assessment data to inform and improve teacher practice that is cognisant and implemented using pedagogical content and procedural knowledge.

Snow et al. (2005) examined the knowledge required to teach reading and focused on how this knowledge developed. This developmental sequence, shown in Darling-Hammond (2007), sees teachers move from teacher preparation through to having reflective, organised, and analysed knowledge for teaching. (This sequence was presented in detail within the introduction on pages 11 and 12).

The Teacher Education Ministerial Advisory Group recommendations (DET, 2014) also suggested schools form collaborative partnerships with universities to provide quality in-school practice, and assessments (of performance) across school and university. Furthermore, the necessity of having especially trained and skilled mentors who work with the teachers was highlighted (DET, 2014).

Findings of a longitudinal study by Johnson et al. (2010) investigating early career teacher resilience, found reoccurring themes that impacted early career teachers. The teachers reported that as teachers, they were not equipped with sufficient knowledge and skills to meet the demands of being a classroom teacher. Their school leaders (mentors) also reported that they lacked the skills to effectively support them or were too busy to do so, and they felt that the school structures and practices were “deskilling teachers and robbing them of the enthusiasm to move forward with their job creatively” (Kanpol, 2007, p. 1).
2.9 Specialised Content Knowledge for Teaching Reading

Specialised knowledge for the teaching of reading goes beyond knowing the curriculum content, and knowing that phonemic awareness, alphabetic principle, fluency, comprehension and vocabulary is the content knowledge required for the teaching and learning of reading. Specialised content knowledge extends to the sub-domains and the micro-domains, and how and when to employ them to engage the teachers and current teachers in learning.

A number of studies have been undertaken in the area of specialised content and procedural knowledge in information technology, mathematics and science, but few have investigated the specialised content and procedural knowledge (SCK) to teach reading. Ball et al. (2008) emphasised being good at mathematics does not mean that the person has the specialised content knowledge required to teach mathematics well. Teachers who have pedagogical content knowledge (Shulman, 1986), but do not have specialised content knowledge (Shulman 1987), are not likely to be able to teach it or to make sense of the content for the students (Phelps & Schilling, 2004). This principle can be applied to the teaching of reading.

Bate, Day, and Macnish (2013) discussed the outcomes of an initiative that introduced technology to teacher educators so that they might pass the knowledge and skills onto teachers in preparation. The teachers learned, manipulated and explored the learning design and took ownership to their own learning. Findings indicated that the approach used with teachers in preparation was more successful as they gained specialised teaching knowledge as well as learning to use the software themselves. Practical application when aligned with theory as discussed by these authors appears to solidify theory and practice into stronger learning (Benedict, Holdhlede, Brownell, & Foley, 2016).

Joshi et al. (2009) investigated the knowledge for teaching reading held by university educators in the United States. Forty instructors from 12 universities were involved, all who had doctoral degrees, had taught in primary schools and believed themselves to be well prepared to teach reading. The educators when asked the cause of reading difficulties, suggested low-socio-economic backgrounds, English as an additional language, and family background. Even though these are research-based findings, another well known reason for failure in learning to read, the quality of reading instruction provided in primary schools, was not spoken of by any of the educators.

The philosophical approach identified by participants varied. Twenty five percent of the instructors aligned with a whole language approach and 15% with a language experience approach. The remainder of participants claimed they provided a balanced
approach to teaching reading (Johsi et al., 2009). This approach, however, has been questioned as the needs of the students across decoding, fluency, comprehension and motivation were not specifically addressed (Arrow, Tumner, & Greaney 2015).

The investigation by Joshi et al. (2009) revealed that university educators experienced misconceptions about phonemes, words and sentences. When asked to provide a definition for phonological awareness, 20% correctly defined it, while 80% defined it as the alphabetic principle. Phoneme instruction was suggested as the best method to teach reading by 80% of the educators, but they were not knowledgeable about the steps involved in explicit synthetic phoneme instruction (Joshi et al., 2009; Rose, 2005). To increase the knowledge of teacher educators, significant professional development and training was provided on-site for teacher educators. This included presentation of research findings, modelling evidenced based instructional strategies in the college classrooms, and the provision of resources and materials to facilitate integration of evidenced-based instruction into courses. It was found that educators and teachers in preparation who gained the specialised knowledge for teaching reading through this training, performed significantly better than teachers instructed by teacher educators who did not have this knowledge (Binks, 2008).

These research findings are concerning given that they are not new phenomena. A decade ago, Rohl and Greaves (2005) investigated the views of beginning teachers on how well they had been prepared to teach literacy and numeracy, with a focus on students with diverse learning needs. The findings indicated teachers did not feel adequately prepared and that they lacked knowledge of phonemes and spelling, and were ill prepared to assist students with language related learning difficulties. In contrast, Rohl and Greaves (2005) identified just one site from those visited across the country, as taking a mandatory, highly structured approach to working with students who were at risk of learning difficulties in literacy and numeracy. The unit of study allowed teachers to complete one of three areas of study (i.e., numeracy, language, early learning in literacy). The teachers were divided into groups of 10 and supported by one lecturer, who conducted the preparation and debriefing sessions and supervised the teaching sessions. The teachers prepared teaching plans and outcomes were discussed with peers and the lecturer/mentor, and difficulties were dealt with. The lecturer/ mentor modelled strategies for teaching and learning as necessary. The participating teachers were well prepared to teach literacy to students who were considered the hardest to teach (Rohl & Greaves, 2005).
2.10 Pre-Service Teacher Considerations  Aydin et al. (2015) studied through secondary analysis, how interactions among teachers pedagogical knowledge (PCK) developed throughout a 14 week course of study. Using three case studies, qualitative data was collected from content representations (CoRe) and semi structured interviews. The case study participants were science teachers in their final year of study. The research methodology was interactive in nature, including a content analysis that used a constant comparative method. There was consistent movement between the content representation-based (i.e., CoRe based) two-dimensional matrixes that included the big ideas across the horizontal axis that recorded prompts that shaped the teacher’s instructional decisions across the vertical axis. Each teacher wrote lesson plans that were handed into the instructor. Microteaching, written reflections and trained educative mentoring were utilised during the study. These mentors highly trained in mentoring, were in the process of writing PhD dissertations and held at least four years of experience as science teachers. A deliberate decision on the selection of mentors was taken in consideration to the research findings that veteran teachers are less likely to be student-centred in their approach. Assessment and instructional strategies were implemented with teachers taking into account the students learning needs. While the analysis demonstrated the teachers’ PCK was fragmented prior to the study, their PCK was coherent and were more integrated by the end of the study. This study used a visual representation to demonstrate the integrated connections between knowledge elements, providing a deeper understanding of teacher learning not available in purely quantitative data.

Findings from the Aydin et al. (2015) study provided significant food for thought. That is, PCK components cannot be considered to be independent of each other and need to be integrated if the teacher is to meet the needs of all students. Teachers generally know about the individual components of PCK, they often fail to integrate those into teaching. They often do not have specialised content knowledge (SCK) they need to use with other strands of PCK (Aydin et al., 2015). They found that highly skilled mentors were able to improve PCK organisation and to stimulate integration between assessment and instructional knowledge when mentoring teachers. Aydin et al. (2015) recommended that teacher preparation courses provide opportunities for teaching under the guidance of a mentor within suitable school placements, for the teachers to reflect on their learning so as to enhance their own learning. They also recommended that those teachers be provided with supportive mechanisms such as scaffolded resources and the CoRe matrix to nourish teacher learning.
2.11 Practiced-Based Opportunities

Traditionally, teachers in preparation learn in passive “’get and sit’ stand alone workshops” (Klingner, Ahwee, Pionietta, & Mendendez, 2003, p. 411) or lectures rather than learning in the field. Science, mathematics and technology education are more likely to be taught in the field with teaching and learning occurring at the same time (American Association for the Advancement of Science, 1990).

The specialised conceptual and procedural knowledge for teaching reading as a specialised science is rocket science (Moats, 2000). Field-study is used in the current study to provide a ‘science approach’ to provide for quality teaching and learning. When introduced to new material learners connect this learning to what they already know to make sense of it. At times the learner will have to change their thinking drastically to incorporate new learning and discard some held beliefs. When learners have the opportunity to teach and learn at the same time they grow in understanding abstract concepts, reason logically, manipulate symbols and generalise their learning. Feedback from peers, mentors and lecturers facilitates adjustments in that learning (American Association for the Advancement of Science, 1990).

Enhanced specialised knowledge leads to more confident teachers, and setting of higher expectations. Students respond to teacher expectations and their own expectations and very quickly detect if they are learning progression is different to others. They grow in confidence with continued progress in a quality program. When failure is repetitive the student looses confidence and resists or does not believe they can learn as their peers have. They do not readily engage in learning. It is crucial then that teachers demonstrate high expectations of the students learning and portray confidence the student will learn (Saffignam, Church, & Tayler, 2011).

Learning the specialised knowledge for teaching reading is not easy. This type of knowledge is not developed by reading from a book or listening to a lecture (Phelps, 2009). This teaching knowledge grows through high quality opportunities to practice, being given feedback and being provided with consistent and reliable support. Expertise is developed through well-structured repeated opportunities to use the knowledge in instructional contexts while receiving valuable feedback (Benedict et al., 2016). Practice based experience matters as it allows the teachers the time and opportunity to gradually learn, internalise and use the metacognitive strategies to reflect on their own learning and growth in their teaching practice. To gain real life experience, to understand school based relationships and to work with students under the guidance of a mentor brings learning to life (Benedict et al., 2016).
This study examines the use and interactions of the pedagogical content knowledges required to teach reading. It details the use of differing PCK within teaching lessons that address specific student learning outcomes. Given that there is minimal literature on the specialised procedural knowledge for the teaching of reading available (Snow et al., 2005; Department of Education, Science and Training (DEST), 2005; Department of Education (DoE), 2015), there is a need to investigate how teachers gain the knowledge required to teach reading to support those who struggle to learn. It is reflective therefor that this research seeks to address aspects related to the acquisition of the specialised content knowledge that teachers require to teach reading. The questions asked are as follows:

Question 1: To what extent does a field-based unit of study prepare pre-service teacher to use specialised content and pedagogical knowledge to enhance student literacy outcomes?

Question 2: To what extent does a field-based unit of study enhance pre-service teachers content knowledge of reading?

Question 3: To what extent do pre-service teachers gain the specialised content and procedural knowledge required for teaching reading as represented on the Snow et al. framework?

2.12 Conclusion

The literature provided a guide to understanding acquisition of teacher knowledge, instructional expertise and the development of reading proficiency (Lyon & Weiser, 2009). It considers the types of knowledge required to teach reading and has a focus on specialised content knowledge. Research clearly identifies the causal impact university educators who have acquired the knowledge required to teach reading, have on teachers, and subsequently, on the primary school students who are learning to read (Binks-Cantrell et al., 2005). It also identifies the value of an expert lecturer and mentor who can apply complex sub-skills that will ensure primary teachers within where they can put what they are learning during lectures, tutorials and into practice. In this setting, they use specifically designed resources and strategies for teaching and learning, and get to identify the passion and drive that strong teachers have for teaching.

The literature identifies the necessity for teachers to understand the causal impact of poor instruction on students learning, that can be directly attributed to reading difficulties and cause lifelong problems. Reviews of the reading research reported in this review have identified what type of scientifically-based reading instruction is most likely to ensure all students, including those who may be at risk of not meeting national benchmarks in
reading, become skilled readers. These factors, and the construct of engagement must be examined. That is, the behavioural/social involvement, affective attachment to others (relationships), and the cognitive application to the learning experience (DEST, 2010). Students learning to read, when engaged, and presented with a program of instruction that address their learning needs, regardless to leaning difficulties can make positive gains in learning. This however, requires the teacher to have expertise in the specialised conceptual and procedural knowledge to teach reading.

This study aims to investigate how and to what extent teachers construct the specialised conceptual and procedural knowledge for the teaching of reading, and engage students in learning. It is all encompassing of pedagogical content knowledge that facilitates the type of instruction that is required for students to become skilled readers.
Chapter 3
Methodology

In Chapter 3, the methodology of the pilot study of this exploratory study has been described in detail. Following a discussion of the research design for the study, the participants who were part of the pilot study have been outlined. The chapter will give an overview of the phases of the research, measures and procedure. The final section of the chapter highlighted management of data, and ethical issues. Chapter 4 has provided a discussion of the pilot study results, and conclude with recommendations of changes and adjustment that are required for the main study.

3.1 Research Design

A research design is an essential component of the research process. It is the overall strategy of how the research will address the research questions. It is the blueprint for the collection, measurement and analysis of the data (Tashakorie & Teddlie, 2008). In this study, a Fully Integrated Mixed Model Design was utilised as the study blueprint (Tashakori & Teddlie, 2003)

The task of examining how teachers construct procedural and content knowledge for teaching reading is a complex professional task (Moats, 1999; 2015). The research design for the study requires multiple ways of addressing the research questions through the collection and analysis of qualitative and quantitative data to produce a richness and depth of data that demonstrates the interactions between the teachers who are teaching and learning the specialised knowledge to teach reading at the same time as the school students are learning to read (Tashakkori & Teddlie, 2003). Mixed methods research has a logical and intuitive appeal that provides a bridge between the qualitative and quantitative paradigms that facilitates the answering of the research questions (Onwueghbuzie & Leech, 2006).

There has been much contention and debate between researchers over the combining of quantitative and qualitative methods as they are often viewed as polar opposites (Frazer, 1995). Hammersley (1993) expressed his concern about the lack of consensus on methodological issues and that ‘paradigm wars’ may have serious implications on the function and nature of educational research.

Qualitative research has the capacity to tap into the richness of human experience, that is normally the arena of individuals, and carry it into the public domain (Tashakkori & Teddlie, 2010). It allows individuals to tell their experiences and contribute to what is already known. A key strength of qualitative research is its ability to explore the
complexity in people’s lives, and examine the multiple influences and experiences that have shaped their experiences and knowledge. It offers teachers as learners an opportunity to share their own learning experiences and contribute to the world in which they live and work (Tashakkori & Teddlie, 2010).

Quantitative research is a formal, objective, systematic process in which numerical data are used to gain evidence about the world. Quantitative research methods are used in educational studies to describe variables, examine relationships among variables, and determine cause-and-effect interactions between variables (Burns & Grove, 2005). Cohen et al. (2007) described quantitative research as controllable, predictive, consistent and replicable. Yin (2014) described it as useful for studying large numbers of participants, relatively independent of the researcher (statistically significance).

Mixed methods research design, the third methodological approach, involves the researcher purposefully combining quantitative and qualitative research techniques, approaches, methods, concepts or language into a single study and extracting the best qualities out of both methods to determine a finding (Bryman, 2008; Burke, Johnson, & Onwuegbuzie, 2007; Symonds & Gorard, 2010; Onwuegbuziea & Teddlie, 2005). Mixed methods designs differ in analytic logic, timing, priority, point of interface and can be single or multiphase programs of inquiry.

Through employing elements from both research methods, the strengths of each approach can make up for the weaknesses of the other (De Lisle, 2011). Additional strengths include the notion of a more complete and comprehensive understanding of the research problem, than either qualitative or quantitate approaches alone can offer. It explains and elaborates on findings or how causal processes work, and facilitates the development of an instrument with greater construct validity. Disadvantages and limitations of mixed methods research include complexity; time and resources required to plan and implement; difficult to plan and implement one method by drawing on the findings of the other; and possible indistinct notions on how to resolve discrepancies that arise in the interpretation of findings (Tashakorie & Teddlie, 2008).

Symonds and Gorard (2010) proposed a subset of the mixed methods design, referred to as multilevel mixed methods approaches. These approaches include qualitative data (e.g., student behaviour, teacher interviews) collected in one level while quantitative data are collected on another (e.g., teacher survey data; students reading scores) in a sequential or concurrent way to answer different aspects of the same question. Both kinds of data are analysed and the results are used to make inferences. The questions and inferences are in one approach. That is, predominately qualitative or quantitative with
some supplementary components. These questions are most often, qualitative and quantitative (mixed methods) (Tashakorie & Teddlie, 2008).

This subset of mixed methods designs are multi-strand designs. They are distinguished on three dimensions: (a) taking single or multiple approaches; (b) stages or integration across all stages or method only; and (c) procedures for linking strands. In this current study, the use of a multi-strand design will permit teacher and student data to be integrated, while also allowing teacher and student knowledge of reading (quantitative) and efforts to understand the skills of reading (qualitative) to be integrated.

A concurrent mixed model design, shown in Figure 3-1, is often a parallel design with two pre-planned and relatively independent procedures employed to answer the research questions. The inferences (both a process and an outcome) are drawn together to reach a meta-inference, the overall understanding, or explanation developed through the integration of the inferences gained from the qualitative and quantitative strands of the study (Tashakorie & Teddlie, 2008). It is important to note that inferences do not determine questions or procedures of the other stage. While the model involves quantitative and qualitative, the questions are answered by corresponding data that is relatively independent. The current study seeks to examine the development of teacher knowledge when learning to teach reading to students at-risk. While it could be studied independent of each other, it is hypothesised that there is limited independence between the teacher developing conceptual and procedural knowledge about the teaching of reading, using this knowledge, and student learning. Hence the concurrent mixed model was not considered suitable for this study.

![Diagram]

*Figure 3-1. Concurrent Mixed Model Design (Tashkori & Teddlie, 2003 p. 688)*
There are two different types of this multi-strand design (i.e., the concurrent mixed methods design and the concurrent mixed model design). The concurrent mixed methods design allows for one question to be simultaneously addressed by qualitative and quantitative collection and analysed, and one inference made on the basis of both data sets. In the concurrent mixed model design there are two strands of research, both types of questions, both types of data and analysis and both types of inferences contribute to forming a meta-analysis and include triangulation. Given the multi-question focus of this study, this design would not facilitate the opportunity to answer the questions being asked.

Figure 3-2. Sequential Mixed Model Design (Tashakori & Teddlie, 2003 p. 688)

The sequential mixed model design (Tashakori & Teddlie, 2003) has two phases that have separate questions answered by one approach (e.g., quantitative or qualitative). The distinguishing attribute of this design is that the second phase arises as a result of the first phase. The first phase is often an exploratory study and the second a confirmatory study (Tashakori & Teddlie, 2003). There are two variations of the design based on the stage of integration. The first phase involves data collection, analysis and inference in one approach (e.g., quantitative) and the second, new data analysis, further analysis, and inference in the approach (e.g., qualitative). Sequential Mixed Method Design is mixed in its data collection and analysis phase only. Each strand ends with an inference leading into one meta-inference. On examination, this model was also inappropriate given the sequence of the model. The current study galvanizes both strands as the study processes, informal and formal reference between the strands (Tashakori & Teddlie, 2003).
In the multistrand conversion mixed methods there are two designs. They are the multistrand conversion mixed methods design, and the multistrand conversion mixed. The multistrand conversion mixed model design predominately represents qualitative or quantitative study in which the data is transformed and re-analysed, then transformed to another approach for making the final inference. The multistrand conversion mixed model design, has one method of study and one type of data (i.e., qualitative or quantitative). The data can be converted from quantitative to qualitative or visa versa and analysed accordingly. Inference is made on both sides and a meta-inference is made using the stand inferences. The current study was using raw data and no conversion from type of data to another was deemed necessary.

Figure 3-3. Conversion Mixed Methods Designs (Tashakori & Teddlie, 2003 p. 689)

Figure 3-4. Fully Integrated Mixed Model Designs (Tashakori & Teddlie, 2003 p. 690)
Tashakkori and Teddlie (2010) describe the fully integrated mixed model (FIMM) as the most advanced and dynamic of all of the mixed methods designs. In this design, questions are asked and answered through the gathering and analysis of both qualitative and quantitative data. The two types of data may also be converted (i.e., quantitised or qualitised) and analysed appropriately. Inferences are made on the basis of data analysis, and are combined and integrated together at the end to form a meta-inference (Tashakkori & Teddlie, 2010). At every stage there is chance of modifying one of the approaches based on the input from the other (i.e., changing the qualitative data based on a quantitative analysis) (Tashakkori & Teddlie, 2010).

The FIMM is an interactive design that allows for concurrent and sequential collection and analysis of data (Bryman, 2008; Maxwell & Loomis, 2003). While this design incorporates triangulation, it is not possible to decide before hand if the triangulation and agreement will occur or need to be subsumed under a meta-analysis (Tashakkori & Teddlie, 2010).

Several controversies exist regarding the use of mixed methods design. Sandelowski (2003) suggested that there might be studies were one part of a study might not be considered mixed or multi-methods designs. This consideration regarding mixed methods should not apply to the more complex designs that include the multi-strand conversion mixed model designs and the fully integrated mixed model design used for this study. The researcher in designing the study was alert to the possibility of the full capacity of the design not being used. The risk is minimal and is slightly greater than those ordinarily encountered in daily life.

A strength of the FIMM is the ability to customise the research design to enhance the ability of addressing the research question fully. In addressing the research questions set, the project was developed using five phases (see Figure 3.5). Phase 1 involved the collection of pretest data. Phase 2, or main intervention phase, involved a process where qualitative and quantitative data acted in an integrated manner on a day-by-day basis. The use of the FIMM research design allowed for the interactive nature of the data to be investigated on a regular basis forming triangulation. Phase 3 was a posttest component of the study. Phases 4 and 5 involved analysis, and the drawing of inferences from the data collected.
Figure 3-5. Custom Fully Integrated Mixed Model Design (FIMMD) – Current Study.

Due to the complex nature of the design, a pilot study was conducted. The pilot study was a small-scale study that allowed the examination of the likely success of a main study and gives warning regarding potential weaknesses in the proposed study. It allowed the researcher to examine and improve internal validity, identify potential limitations, reflect on ethical obligations, and consider the research results in regards to the research questions posed. A pilot study can be used to test study hypotheses, but its primary role is to test the feasibility of the study, the usefulness and implications for research methodology (Sammons & Bakkum, 2012). A pilot study can examine the appropriateness of the measures proposed in specific conditions and locations, populations, participant effects, cost, drop out rate and other issues that may arise (van Teijlingen & Hundley, 2001). It also provides opportunity to consider avenues for reporting study results.

The pilot study conducted in this study was undertaken to achieve four aims. The first aim was to examine the validity, (i.e., does the test really measure what it is supposed to measure,) of the measures. The purpose of the measures being applied to the teacher participants included: checking the appropriateness and usefulness and usability of the research instruments; checking for ambiguities, redundant, inappropriate or misleading questions and administrative difficulties; checking the suitability for use in Australian conditions; and identifying adaptions or improvements that needed too be made for the
main study (Tashakorri & Teddlie, 2003). The second pilot study aim was to check the efficacy of the measures and to make changes as necessary to ensure gains in learning were reliably identified. The specific objectives for measures applied to students include: checking effectiveness of the quantitative and qualitative measures used; and checking the administration of the measures across the three schools and identify adoptions or improvements needed (Tashakorri & Teddlie, 2003). The third aim was to examine the research design and to identify process or content changes required to maximize the opportunities to answer the questions. The final aim was to identify mechanisms for reporting of data analysis findings. The specific objectives for reporting the results included identifying appropriate analysis of data and identifying valid and reliable reporting mechanisms in visual and text form (Leon, Davis, & Kraemer, 2011).

3.2.1 Grounded theory approach. The interview data were analysed using a grounded theory approach (i.e., the general methodology for developing theory, which is based on data systematically gathered and analysed) (Tashakkori & Teddlie, 2003). Grounded theory has its own criteria for assessing the rigor or quality of the study, namely fit, relevance, workability and modifiability (Glaser & Strauss, 2012). Fit and relevance refer to how well the categories connect to the data through comparing and interpreting thinking and observations within the category. Workability refers to the integration of the categories into the emerging main category, and modifiability denotes the merging of all the concepts that are important and that are subject to constant comparison.

The use of a grounded theory approach allowed the researcher to reveal an in-depth understanding of the research domain and context. In this study, it was to garner a deeper understanding of the learning that was occurring within the dyad, and to contrast it with existing theories of learning to read (e.g., Snow et al., 1998), and learning to teach reading (i.e., Snow et al., 2005). These understanding can change or be confirmed when relevant data are compared and contrasted (Glaser & Strauss, 2012).

3.2 Participants: Pilot Study

The pilot study and the main study involved two separate unrelated groups of participants. Two sets of participants were central to the pilot study: teachers and primary school students (students). Teachers were drawn from a University in the Sydney metropolitan area in the final semester of a Bachelor of Education (Primary) degree. Each of the teachers was enrolled in a unit of study that focused on supporting students with
additional learning needs. The students were drawn from local primary schools within close proximity the University.

There were 84 teachers enrolled in the unit of study on the first day of the semester. All teachers were invited to be part of the study in the first lecture (i.e., first day of semester). Participation was voluntary, and teachers could withdraw from the study at any time. Sixty-four teachers were included in the final pilot study analysis. The teachers included in the study had all completed the pre and posttest measures, and comprised 58 females and 6 males. Teachers who did not complete both of the pre and post surveys or did not volunteer to participate were not included in the study. The proportion of teachers enrolled in the unit of study and who completed the pre and posttest surveys was 76.2%.

The students were drawn from schools within the ten kilometers from the University campus. These schools were located within suburbs consisting primarily of families of low to mid socio-economic status. The sixty-four school student participants were identified by their school Learning Support Team (LST) as experiencing significant difficulties in learning to read and were referred for support by the Regional Learning and Assistance team. Fifteen female and forty-nine male students enrolled in Years 1 (2nd year of school) through Year 6 (7th year of school). The students were at least 12 months behind in Years 1-2, or 24 months or more in Years 3-6 when tested by the school Learning Support Team against Specific Level Assessments Tasks battery, PM Benchmark and Spache. These assessments were used in schools as directed by Disability Programs. The participating students had received whole class instruction (Tier 1); they had also received targeted small group instruction (Tier 2) before participating in this program. All students were considered to fall within the Disability Discrimination Act 2005 requiring an adjustment to their educational program.

Table 3-1 provides a summary of the students whose parent/guardian agreed for them to participate in the study. The group consisted primarily of male students (i.e., 49 students or 76.6%). Further, 25 students (39%) were from a background where English was a second language; four students were Aboriginal.

Table 3-1

<table>
<thead>
<tr>
<th>Student numbers</th>
<th>F</th>
<th>M</th>
<th>Yr1</th>
<th>Yr2</th>
<th>Yr3</th>
<th>Yr4</th>
<th>Yr5</th>
<th>Yr6</th>
<th>ESL</th>
<th>Aboriginal</th>
<th>Other Australians</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
<td>15</td>
<td>49</td>
<td>18</td>
<td>16</td>
<td>13</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>25</td>
<td>4</td>
<td>36</td>
</tr>
</tbody>
</table>
Ten teacher participants volunteered to participate in the case study section of the study. A case study is defined as an intensive study of a single unit with the aim of generalising the information gained across a larger set of units. Case studies rely on the same type of covariational evidence used in non case study research, and is a specific way of defining cases (Gerring, 2004; Koslowski, 1996)). They require in depth examination and description of the phenomena that asks how teachers acquire the knowledge required to teach reading (Yin, 2014).

One case study was conducted as part of the pilot study. One teacher Cathy with her student Ned was selected at random to participate in the case study. The names of the ten teachers who volunteered to be part of a case study were written on slips of paper and one drawn from a hat.

The details of the student participant are shown in Table 3-2.

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Grade</th>
<th>School year</th>
<th>Age in months</th>
<th>ESL</th>
<th>Aboriginal</th>
<th>Other Australians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ned</td>
<td>Male</td>
<td>Year 1</td>
<td>2nd</td>
<td>112</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

3.3 Description of Measures

A number of measures were used to examine the knowledge development in teachers, and the development of reading skills in students. Each of these measures is described in the order they were implement across the study.

3.3.1 Student measures: Pre and post-test.

3.3.1.1 Student measures. Pre and post study measures were used to examine each student’s reading skills prior to and on completion of the study. Observations of learning and engagement for the case study students have also been described. Those measures and analysis methods are described as follows.

3.3.1.1.1 Woodcock Reading Mastery Tests-Revised (WRM) sub-tests.
The students completed two pre and post study subtests from the *Woodcock Reading Mastery Tests-Revised* (American Guidance Service [AGS], 1998) battery. The internal consistency of the *Woodcock Reading Mastery Test-Revised* sub tests, (first through third grades) ranged from .91 to .98 \((M = .94)\) (Pae, Wise, Cirino, Sevivcik, Lovett, Wolf, & Morris, 2005 p. 351).

The *Word Identification* sub-test measured the student’s ability to identify and pronounce isolated high frequency words. The *Word Attack* sub-test measured the student’s ability to decode either nonsense words or words with very low frequency of occurrence in the English language. It measures the student’s ability to apply phonic and analytical skills to pronounce unknown words.

A trained research assistant administered the subtests 1:1 with each student in a quiet location within the student’s school. Discontinuation occurred on each subtest when four consecutive errors were made. Errors were recorded next to the word being read and correct words ticked correct. (See Appendix 3.2 for the full assessment.) Each measure provided a raw score and reading age that could be used as part of pre- and posttest comparisons.

### 3.3.1.2 Comprehension and fluency reading measures.

All students completed a fluency measure pre and post the study while reading a basal series decodable text. These texts were measured by the Spache’ readability generator and a grade level provided for comparison of book complexity. The student was required to read with an accuracy of 97% with a fluency rate of 80 to 100 correct words per minute (cwpm) as is expected of a student in Year 4 (DET, 2006).

The informal PM levels have been provided for classroom teachers who may wish to read this thesis and gain additional clarity about the complexity of the texts read. Initially, a trained research assistant administered the reading fluency and accuracy assessment. Proper nouns and self-corrections were not counted as errors. Multiple errors in reading the same word were counted as one error. The assessment results were also used to inform the student’s continuous reading level at the beginning of the study. Each teacher measured fluency while the student read. Their student had two opportunities to read the passage. The first time the student read the text through, and familiarised themselves with the text. The second time, the teacher timed the student for one minute and on completion, recorded the number of words read correctly in one minute.

The Spache readability formula (Spache, 1953) was applied to the basal series decodable texts to provide formal readability measurement of gains made over the study.
The Spache readability formula was established using computer based generator software provided by Intervention Central (Spache, 1953).

Comprehension questions were posed to the student verbally at the completion of practice reading. This included answering literal, inferential and creative questions, and retelling the story. The design of these questions was based on the work Howell and Nolet (2000). These questions were developed prior to the study and piloted for suitability and reliability of question types, and found suitable for the purpose of the study.

3.3.2 Teacher measures.

3.3.2.1 Teacher knowledge of reading: Pre and posttest. The Comprehensive Survey of Language Knowledge (Moats, 2000) was initially considered for use in this study as the measure of teacher knowledge of reading. It was chosen due to its comprehensiveness and rigor in assessing the knowledge of teachers required for teaching literacy and specifically reading.

The survey was specifically designed for use with post-graduate teachers who have experience in teaching language structure (Moats & Rosow, 2003). This quantitative survey could be administered to a large group of teachers and was reported to have a strong internal consistency (alpha = .87). The measure was piloted with a group of undergraduate teachers and deemed unsuitable for use in the current study on a number of grounds. First, the stated target group of postgraduate students with experience teaching appeared to be essential given the difficulty the undergraduate teachers with little classroom experience had in completing the survey. Second, undergraduate teachers who completed the survey reported that the survey lacked a focus on comprehension and vocabulary. As a result of this feedback from the 24 undergraduate students who completed the trial, it was decided to use another survey to examine teacher content knowledge about literacy and the teaching of reading.

A search of the literature located the Teacher Knowledge Survey (TKS; see Appendix 3.1) developed by Piasta et al. (2009). The TKS measures the specialised content knowledge and skills for teaching reading. This survey was initially designed for use with teachers participating in the Child-Instruction Interactions in Early Reading: Individualizing Student Instruction Project (Connor, 2007). The TKS includes 27 multiple-choice questions and two blind comprehension maze statements. The multiple-choice questions provide four choices for each question with one choice only to be circled to indicate a correct answer. The two blind comprehension maze statements required the participants to identify words to meaningfully complete a sentence.
The 27 multiple-choice questions comprised eleven that addressed decoding and sixteen that addressed comprehension. The decoding questions examined participant’s knowledge of the alphabetic principle, phonological awareness skills and knowledge of word pronunciation. The knowledge and skills included single and multiple letter sound knowledge and pronunciation, manipulation of sounds in words, blending, segmenting, and word building knowledge, skills and pronunciation. The questions outlined in Table 3-3 are examples of questions judged to assess decoding knowledge.

Table 3-3

*Example of Survey Questions Assessing Decoding Skills*

<table>
<thead>
<tr>
<th>A schwa sound is found in the word:</th>
<th>Count the syllables for the word <em>unbelievable</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) resume</td>
<td>(a) four</td>
</tr>
<tr>
<td>(b) bread</td>
<td>(b) five</td>
</tr>
<tr>
<td>(c) look</td>
<td>(c) six</td>
</tr>
<tr>
<td>(d) about</td>
<td>(d) seven</td>
</tr>
<tr>
<td>(e) flirt</td>
<td></td>
</tr>
</tbody>
</table>

Mrs Funke is teaching her students to identify multi-syllabic words. Which is an appropriate first step for her to do?

(a) model analyzing words for familiar prefixes and suffixes
(b) show students how to blend individual letter-sounds left-to-right
(c) model how to look for little word in big words
(d) demonstrate sequentially blending onsets and rimes

Circle the word that is a real word when you sound it out:

| (a) zapanewnew                      | (b) agrtontal                      |
| (c) bewtiphul                      | (d) isengraneeal                   |

Source: Piasta et al. (2009)

A number of elements of the TKS were associated with comprehension. Survey questions included those that address teacher knowledge of decoding fluency of connected text, vocabulary, background or prior knowledge and specific comprehension content knowledge. Survey questions also examined the skills and knowledge required to teach reading comprehension. A sample of survey questions is shown in Table 3-4. (See Appendix 3.1 for a copy of the full survey.)

Table 3-4

*Sample of Survey Questions that Address Features of Comprehension*

According to research, the least effective way to teach vocabulary to students is through the use of:

(a) ask students to write definitions of new vocabulary words
(b) teach new terms in context of subject-matter lesson
(c) identify examples related to the word’s meaning discuss synonyms for new vocabulary
Mrs. Pink has assigned her students a short story to read independently. She wants to practice a strategy with her students in order to enhance their comprehension during reading. Mrs. Pink should instruct her students to:

(a) ask her a question when they do not understand
(b) when they come across a word that do not know, stop reading and look it up in the dictionary
(c) scan the text and prewrite questions that they want to have answered as they read
(d) write a reflection in their literacy journals immediately after reading the text

You plan time during your literacy block for students to engage in a reading activity that will improve fluency. Which of the following activities would be most effective in achieving this goal?

(a) Students independently read a text and then answer a series of literal and inferential comprehension questions.
(b) As a whole class, each student will take a turn reading a paragraph from a text related to your current curriculum. While one student in reading, the other students listen and read along silently in their own text. (Strategy: Round-robin reading)
(c) The teacher reads a passage aloud to model fluent reading and then students reread the text independently. (Strategy: Guided oral reading)

"Read the following passages and write in the missing word. There may be more than one appropriate word. You only need to provide one.

The tropical rainforest is earth's most complex biome in terms of both structure and diversity. Rainforests are home to two-thirds of all the living animal and plant species on Earth. This occurs under optimal growing conditions: abundant precipitation and year round warmth. However, sunlight is a major limiting factor. A variety of strategies have been successful in the struggle to reach light or have been able to adapt to the low intensity of light beneath the canopy.

Source: Piasta et al. (2009)

This survey was trialled informally with a group of teachers and selected as being suitable for the study. All teachers including case study participants completed the survey prior to and again at the conclusion of the student intervention.

3.3.2.2 Case studies. A key strength of a case study is that it provides the facility to focus on a single situation in detail, and to explore the study in depth. Further, it provides the opportunity to be sensitive to the specific nature of that context. This allows the researcher to examine a contemporary phenomenon in its real-life context that is similar in some ways to an experiment, without divorcing the context from the evidence (Yin, 1981). Examination using case study for this research provided a view that exposes in fine detail what was taught, how it was taught, and the engagement of the learners (i.e., teachers and students). Case studies were analysed using a grounded theory approach.

3.3.2.2.1 Case study teacher interview. The purpose of the interview was to investigate the teacher’s thinking, conceptual knowledge and skills required for assessing, planning and teaching reading. Semi-structured interview questions allowed the researcher
to guide the data collection process towards answering the research questions. The interviews also provided the interview a degree of freedom as to what they talked about, how much they wished to say, and how to express their answers and opinions (Drever, 1995).

Table 3-5

*Potential Questions and Topic Areas for the Pilot Study Interview*

<table>
<thead>
<tr>
<th>Potential questions</th>
<th>Domain specific content included by the questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prior to the study, how would you have assessed for teaching children to read?</td>
<td>1. Practical use of domain specific assessments required to identify individual learning need.</td>
</tr>
<tr>
<td>2. How would you assess now?</td>
<td>2. Evidence of assessment data use and knowledge of content required to teach reading.</td>
</tr>
<tr>
<td>3. What skills would you teach for comprehension development?</td>
<td>3. Knowledge and skills for teaching the elements of comprehension.</td>
</tr>
<tr>
<td>4. Can you describe the specific skills and knowledge to teach reading?</td>
<td>4. Domain specific knowledge for the teaching of reading to all students.</td>
</tr>
<tr>
<td>5. Tell me about your knowledge of language and reading?</td>
<td>5. Knowledge of language development, processing and impact on the teaching and learning of reading.</td>
</tr>
<tr>
<td>6. Are you confident that you have the knowledge and skills to teach reading to students in the early years?</td>
<td>6. Confidence in knowledge and skills for teaching students to read.</td>
</tr>
<tr>
<td>7. Could you walk me through your program and explain why you have programmed this way?</td>
<td>7. Having the knowledge and skills to use assessment data and ongoing assessment to program a research-based reading program for intervention of student’s experiencing difficulties in learning to read.</td>
</tr>
</tbody>
</table>

The case study teacher completed a semi-structured interview that was recorded on digital video, transcribed and analysed for theme and content by the researcher and verified by an expert in the field and a peer with experience in research analysis (Lincoln & Guba, 1985), for complexity of concepts captured and suitability of the questions. A trained research assistant who had no relationship with the researcher conducted the interviews in a quiet room at the student’s home school pre and post the study. It was planned that the thinking and learning discussed by the teacher would assist show development in knowledge required to teach literacy and to provide data that would enrich the knowledge on the subject.

3.3.2.2.2 Observations. The observations were undertaken at the commencement and conclusion of the lesson set and digitally recorded on video. The sessions recorded
were completed in a quiet location within the school, but near where the remainder of the students and teachers were working. A video camera was set up a short distance from teacher and student dyad, but close enough for conversations to be recorded. The angle of the camera was set to capture non-verbal cues and behaviours that may form part of the communication between the teacher and student. The revised edition of the *School Observation Coding System* (Bagner, Boggs, & Eyburg, 2010) focused on the elements for reading taught and learned, the instructional strategies used, and the use of learning strategies, social interaction and attitude of the teacher and learner. Further details of specific observational content are displayed in Figures 4-5 and 4-6.

A key aim of the pilot study was to find a mechanism to secure an understanding of the fine grained interactions that occur through analysis of the video data that would establish the nature of the teacher-student teaching and learning and engagement.

### 3.3.3 Intervention measures for students.

The assessments used were the *Specific Level Assessments Tasks (SLAT)*. SLAT comprised a number of assessments that included the *Sutherland Phonological Awareness Test, Johnsons Basic Vocabulary Test*, and the *Educheck*. Further assessments included the *Port Jackson Single Sounds and Digraph Test (SSDT), PM benchmark measure and reading measures of decoding fluency.*

#### 3.3.3.1 The Sutherland Phonological Awareness Test (Neal, 1988) (SPAT).

The SPAT assesses phonological awareness skills during K-3, that is, the ability to hear and manipulate sounds in words (Evans, 2006). It comprises three levels:

- **Level 1** skills include the Syllabic and Sub-Syllabic skills: syllable counting; rhyme detection; rhyme production and identification of onset.
- **Level 2** skills, Phonemic Level (CVC) that involve: identification of final phoneme; segmentation; blending (VC, CV and CVC) and deletion of final phoneme.
- **Level 3** skills are Phonemic Level (Blends): segmentation; CC blends; delete first phoneme CC blends: delete second phoneme skills.
- **Level 4** skills included: grapheme, phoneme correspondence skills of non-word reading and non-word spelling.

#### 3.3.3.2 Educheck (Neilson, 2003).

The purpose of this assessment is to examine the ability of the student to use letter-sound knowledge and phonological awareness to process and say the words presented to them. This assessment specifically examines the
student’s skills and knowledge to process words of differing complexity. These words are hierarchically organised from easiest to hardest. An overview of the skills assessed within the Educheck is shown in Table 3-6. The results of this assessment were used to assist initial planning, and selection of instructional text.

Table 3-6  
Overview of Skills Assessed within the Educheck

<table>
<thead>
<tr>
<th>Skill</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vowel Consonant (VC) words</td>
<td>of</td>
</tr>
<tr>
<td>Consonant, Vowel, Consonant (CVC) words</td>
<td>shop</td>
</tr>
<tr>
<td>Consonant digraphs</td>
<td>swam</td>
</tr>
<tr>
<td>Consonant blends (CCVC), double consonants</td>
<td>lamp, less</td>
</tr>
<tr>
<td>Consonant blends, 3 consonant digraphs</td>
<td>pitch, lunch</td>
</tr>
<tr>
<td>Long vowels (CVCC), consonant blends (CCVC)</td>
<td>cube, vice</td>
</tr>
<tr>
<td>Vowel digraphs/diphthongs</td>
<td>seen, gout</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>gnaw, various, physics</td>
</tr>
<tr>
<td>Pseudo words</td>
<td>shol, whid</td>
</tr>
</tbody>
</table>

3.3.3.3  **Johnsons Basic Vocabulary Test.** The *Johnsons Basic Vocabulary Test* (Johnson, 1971; New South Wales Department of Education and Training, 1969) requires the student to read and pronounce the words presented. Words within the list were selected on the basis of two criteria: “high degree of frequency within the English language, occurrence within the spontaneous speaking vocabularies of kindergarten and first grade children.” (Johnson & Barrett, 1971-72, p. 1). Students were asked not to sound the words out and were expected to reading the words without support (e.g., the and with are common words), and words that are more difficult to decode (e.g., because and people).

3.3.3.4  **Reading measures.** Fluent accurate reading was carefully monitored throughout the study. Deliberate selection of basal series texts ensured controlled introduction of words with consideration to complexity (Cooper, 2001). Using these texts allowed for deliberate practice of the decoding elements at the students level of independent learning. The researcher provided the initial text, and the teachers were instructed on how to carefully monitor student progress and change the texts when the student was able to read the text at the appropriate fluency rate for the students grade with
no more than 3 errors in 100 words read. The teachers were taught how to complete a record of reading that enabled them to identify when students reached the criteria to move to a more complex text.

3.4 Procedure

Teachers participating in this project were all enrolled in a unit of study in the final semester of a Bachelor of Education (Primary). The following discussion will outline the preparation of teachers for the project reported in this thesis.

3.4.1 Teacher preparation. A unit of study was designed by the university and school personnel for the purpose of preparing teachers to teach students with learning differences to read. This unit of study, approved by the NSW Board of Studies and Teaching and Educational Standards, was designed using rich evidenced based practices as identified by Cook and associates (e.g., Cook & Cook, 2016; Cook, Tankersley, & Landrum, 2009; Torres, Farley & Cook, 2014) that built on the studies the teachers had completed within their first three years preparation as generalist primary school teachers. They had taken part in practicums within primary schools, fieldwork in settings catering for students with disabilities and taught various subject lessons under the supervision of an experienced classroom teacher that required the use of the components of PCK. They however, had not participated in preparation that provided the specialised content and procedural knowledge to teach reading to students experiencing difference in learning to read. Darling-Hammond (2007) reported on the effectiveness of preparing teachers to teach students who were the hardest to teach, in view of being able to teach all students to read. That is, that if one were able to teach students whom were significantly behind their peers and struggled to read, that teacher would be able to provide instruction that would provide success for all students in the classroom. This ideal is also the belief of the researcher.

The study required the teachers to attend weekly lectures, and complete two 3-hour workshops, at the university. Teachers attended a local school twice a week for two hours where they participated in weekly tutorials based on assigned readings. They implemented pre and post study assessments and continued to assess the students for progress, programmed lessons and taught the same student throughout the study. The teachers completed their fieldwork placement over eight weeks. The assigned readings included a range of published articles on the five big ideas of reading and how they interacted together to enable students to read texts.
It was hypothesised by the researcher that the teachers would gain a level of specialised content and procedural knowledge for teaching reading by the end of the study. The level of knowledge gain was unknown and the Snow et al. (2005) adapted matrix was developed to provide some insight to the knowledge gain. It was expected, however, that the teachers would at a minimum, be able to identify the essential elements of reading. Further, they would know how to assess reading using a battery of assessments, analyse the data and write a program of instruction based on the data. It was expected that the teachers would be able to engage their student in learning while delivering an intervention based on the students individual learning needs.

It was also hypothesised that participant teachers who were learning the specialised knowledge for teaching reading while working with lower primary (Years 1-3) students would learn more than those teachers who taught upper primary (Years 4-6). In this study, 36 teachers taught students in Years 1-3, and 45 taught students in Years 4-6.

The on-campus lecture series was built around a learning support philosophy. Through using whole school, tiered support structure, teachers became aware of their role in supporting students experiencing difficulties learning to read. They were also made aware of the importance of intensive interventions needing to be supportive of the whole class experience. Building on this learning support model, teachers were introduced to the principles of learning to read, with a focus on the big ideas of reading. As they worked through these features of an evidence-based approach to teaching reading they moved to the in-school experience.

During the first lecture of the course were invited to be part of the study. The teachers were provided with a Participant Information Statement approved by the University of Sydney Human Research Ethics Committee outlining the study to read, and were given the chance to ask questions. It was reiterated to the teachers that their participation was voluntary, and that responses to the survey would not be examined until after the completion of the study and submission of the results (to ensure that no link could be made between the two assessments). Teachers were then asked to complete the Teacher Knowledge Survey or TKS (Piasta et al., 2009). The teachers were asked not to discuss or collaborate in deciding their response. If they were not sure they were asked to give their best answer. The survey took approximately 20 minutes to complete at which time they were collected, sorted, coded, and the names of teachers wishing to participate in the case study were recorded. Surveys were then locked in a filing cabinet in the office of the supervisor.
During the first workshop the teachers met their mentors they would work within schools. They were employed as Regional Learning and Support Teachers in the fields of language, reading and numeracy for a minimum of five years and within their teaching role delivered professional development to schools staff on reading science. The mentors attended the workshops with the teachers and participated in debriefing sessions twice weekly. They also participated in continuous weekly professional development and professional dialogue sessions with the researcher to ensure common knowledge and understandings were delivered. The mentors attended every in school session with the teachers for length of the study. The tutor (researcher) visited each school weekly and worked with the mentor and pre service teachers to ensure the same message was delivered across schools. There were three mentors, one tutor and one academic in total.

A key part of this first workshop was learning to assess reading. The teachers were taught how to identify, administer and analyse reading assessments regularly used in New South Wales’ schools. They learned the purpose of the assessments and the procedure for administration. Teachers were required to conduct these assessments on a peer under the supervision of the mentors they would work with in schools. The mentor answered questions and coached the teachers to implement the assessments reliably. The teachers learned how to analyse the data gained from those assessments and use it to write an individualised lesson for reading instruction. The teachers used the assessments taught during the study. During this workshop the teachers found they were able to hear and segment the sounds, but this awareness had become tacit. At this point they were required to learn the single and digraph phonemes with accuracy, ready to assess and teach the students. They had to re-activate knowledge that was not aware in their own thinking, and had become automatic in becoming a skilled reader.

During the second workshop, the teachers were introduced further to the mechanics of reading, and guided through creating an instructional program for reading instruction based on the assessment data. A scaffold was provided to ensure the teachers used evidence based practice for programming. The program elements included modelled reading; vocabulary, phonological awareness; alphabetic principal: spelling: oral language: word study (big word little word): fluency reading and journal writing. A lesson was demonstrated and taught explicitly and systematically using the model provided. A review of what new knowledge was learned during the session highlighted the value of considering what was learned.

During week 2 of the study the teachers began working with their paired school student in school. They completed the assessment battery during the first visit and using
the data collected wrote the lesson for the following visit. The teacher presented a lesson during each visit to their mentor with exception to the post assessments completed during the last week of the study.

After every lesson, the teachers reviewed the student’s progress and wrote the lesson for the following session under the watchful eye of the mentor. The teachers were instructed to implement the instructional lesson in a set routine using explicit and systematic instruction to provide an ethos of safety, and reduce the anxiety of students. They were also instructed to include the use of variety of texts that were read aloud by the teacher and to use basal series text for instruction in new content, for decoding practice, and fluency reading. Oral language was considered to be of prime importance during instruction in learning to read (Kennedy, 2014). Just as Cassidy, Brozo, and Cassidy (2000) recommended, that skills were taught explicitly, systematically and consistently, including the use and structure of language of what was being taught. Further it was essential for students to gain the author’s intended meaning from diverse texts being read (Zygouris-Coe, 2001).

3.4.2 Details of university academic team

One academic with more than 15 years experience preparing teachers participated in the study and provided the lectures on campus. The researcher had teaching qualifications at executive level (Snow et al., 2005), and ten years experience mentoring and leading teachers in learning the specialised knowledge for teaching reading. The researcher also has more than fifteen years experience teaching and mentoring pre-service teachers in teaching the specialised knowledge in teaching reading.

3.4.3 Student interventions.

Students participating in the study did not receive instruction in reading from school staff. Reading was taught to the non-participating students while the participating students were being tutored.

The recommended format for the student intervention is laid out in the Table 3-7. This format was introduced to teachers as part of the initial workshops, and they were guided through its development and use. The initial development of this format was based on data collected from the specific level assessments data.
### Table 3-7

**Format Used by Teacher to Develop Tutoring Sessions**

<table>
<thead>
<tr>
<th>Time Allocation</th>
<th>Suggested Activities</th>
</tr>
</thead>
</table>
| 5               | **Modelled Read:** Use a short interesting age appropriate picture book (paper and/or electronic form)  
1. HSIE, Science, fact or literacy text with visual are ideal  
2. Pre-teach vocabulary and background knowledge  
3. Develop comprehension skills/strategies (retell, key words, grammatical knowledge e.g., adjectives). Explore visuals and link to words |
| 10              | **Comprehension:** Explicitly and systematically teach comprehension skills and strategies.  
Begin with teaching the meaning of words “who (person or character), when (a time, o’clock, month, a date, specific celebration, part of day-evening, morning, etc.) for answering questions. Retell, answering literal, inferential and creative questions as identified as a need by assessment. Resource suggestions: The Programming and Strategies Handbook, 2006; SRA Specific Skills Series. |
| 1-2             | **Big word/Little word:** Underline the little words found in the word, then count and record next to the word. Identify syllables, morphographs, prefix, root and suffix |
| 3               | **Phonological Awareness:** Teach the student to hear and manipulate sounds in words (Evans, 2012)  
1. Teach specific knowledge and skills identified as a learning need for your students (see SPAT and letter-sound awareness sections in the scope and sequence of phonological and graphophonological skills from the NSW K-6 English syllabus).  
| 5               | **Alphabetic Principle:** Naughts and Crosses Sounds – Use this game to practice single phonemes and digraphs/trigraphs then morphographs. Use ratio of Known to Unknown 4:1. |
| 6               | **Fluency Reading:** Use a Basal Series decodable text until independent in decoding (then and move to include other books such as readers theatre in pairs or with teacher with agreement of mentor).  
1. Student on left hand side have a 3 minute practice read with buddies supporting, then swap so that the students on the right have a turn.  
2. Student seated on the left hand side returns to the beginning of the text and read for 1 minute with buddies counting any errors (on fingers under the table). Swap with buddy. |
| 5-6             | **Skills Practice (games):** Initially select a game from the games box provided. Make or download available resources from the internet that meet the student’s needs. Pair of group students so they practice learning needs. Sight words, blending games, identifying onset or rime, segmenting, vocabulary clines or as indicated by the assessments. There are many resources available including Programming and Strategies Handbook, A Sound Way (Love & Reilly), Adrainbruce.com, and other e-resources. Mentor is available to assist. |
| 4-5             | **Word Study:** Explicitly teach specific skills identified by *Educhek* as a learning need before playing the game or completing the activity. Mentor is available to assist. |
| 5-6             | **Spelling:** Teaching four family words from the fluency text and two or three from sight words the student is experiencing difficulties with when writing or reading. Check Johnson’s Sight Word List or *Educhek* to identify which part of the words the student is requiring assistance with. For example, is the rime being guessed and is attention drawn to this? |
| 4-5             | **Talking/Speaking and Listening and Writing:** Teach strong speaking and listening skills. Teach taking and listening rules (see [www.pjlanguagelearningassistance.com](http://www.pjlanguagelearningassistance.com) for free coloured posters.  
Have students tell what they had learned that day and write in their ideas in their journal. (Scribe for students experiencing handwriting difficulties on an e-tablet or load and send to the printer). |
| 5               | **Book for Enjoyment:** Read a book together. Examine the visuals and discuss. This book should be an interesting enjoyable high quality book. Initially this will be a modelled read and progress towards being a student read book (with support as required) as appropriate. |

**NOTE FOR TEACHERS:** Please ensure that every young person has the opportunity to read aloud every day. The text should be an independent level unless supported by the teacher is a teaching situation.
Ongoing development of the needs-based interventions was based on the results of the assessment data collected. Continuous monitoring of gains made in learning to read occurred within each session. The teachers made decisions about planning under the guidance of the school mentor who verified the programs responded to the students learning needs. On completion of the study the teachers re-administered the same assessments. The results were analysed and the continuous data examined for gains made by the student in learning to read. The pre-post assessment results were compared to establish gains made and subsequently reported.

3.5 Data Analysis

The analysis of data occurred at the completion of the eight-week intervention. This analysis examined teacher data, and student data. Within this analysis, Phases 4 and 5 of the Fully Integrated Mixed Model Design were also completed. Overviews of the analyses undertaken are shown in Table 3-8.

3.5.1 Analysis of data: Teachers. Analysis of the Teacher Knowledge Survey (Piasta et al., 2009) occurred in two stages. First an analysis of the pre-test data and post-test data analysis was undertaken to establish a descriptive overview of teacher knowledge. Second, a comparison of these data was undertaken to establish difference in the results. The analysis applied included two way t-test and ANOVA to establish differences due to gender.

The teacher interview was analysed using thematic content analysis (Patton, 2002; Ryan & Bernard, 2003). Manual analysis of the interview data was conducted with words, phrases and paragraphs sorted in accordance to intended meaning. Conversations, phrases and comments were used as a whole to ensure the speaker’s intended meaning was retained. Identification of categories and themes was based on consensus reached by the researcher and a peer not associated with the project. Open codes found through sorting words and sentences. The themes were quantified for analysis.
### Table 3-8

*Descriptions of Data Analysis Methods in Relation to Each Research Question.*

<table>
<thead>
<tr>
<th>Question</th>
<th>Phase</th>
<th>Measure</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Q1.</strong> To what extent does a field-based unit of study prepare pre-service teacher to use specialised content and pedagogical knowledge to enhance student literacy outcomes?</td>
<td>Phase 1 – pre test</td>
<td>The Teacher Knowledge Survey Complete Co-hort Pre and post test</td>
<td>IBM SPSS Statistics Software • Two-way T-test Difference between Pre and Post Surveys • Gender difference</td>
</tr>
<tr>
<td></td>
<td>Phase 3 – Post test</td>
<td>Observation of teacher and instruction provided Case Studies only</td>
<td>Behavioural Coding REDSOC (adapted) method (6 second Coding converted to one minute spans of time for reporting)</td>
</tr>
<tr>
<td></td>
<td>Phase 2</td>
<td>Interview Case Study only</td>
<td>Grounded theory approach. • Thematic content analysis.</td>
</tr>
<tr>
<td><strong>Q2.</strong> To what extent does a field-based unit of study enhance pre-service teachers content knowledge of reading?</td>
<td>Phase 1 – pre test</td>
<td>WRMWA Complete Cohort and case study</td>
<td>IBM SPSS Statistics Software • Two-way T-test Compare the 2 related observations to see if the variables differ from one another</td>
</tr>
<tr>
<td></td>
<td>Phase 3 – Post test</td>
<td>WRMWR Complete Cohort and case study</td>
<td>IBM SPSS Statistics Software • Two-way T-test</td>
</tr>
<tr>
<td></td>
<td>Phase 1</td>
<td>PM Benchmark Accuracy and Fluency measure Focus pairs</td>
<td>IBM SPSS Statistics Software • Two-way T-test</td>
</tr>
<tr>
<td></td>
<td>Phase 3 – Post test</td>
<td>SPACHE Accuracy and Fluency measure (using same texts as PM accuracy measures) Case studies</td>
<td>IBM SPSS Statistics Software • Two-way T-test</td>
</tr>
<tr>
<td><strong>Q3.</strong> To what extent do pre-service teachers gain the specialised content and procedural knowledge required for teaching reading as represented on the Snow et al. framework?</td>
<td>Phase 4</td>
<td>Framework for developing the skills and knowledge required for teaching reading (Snow et al., 2005) adapted. Case studies</td>
<td>Framework elements matched to evidence in: • The Teacher Knowledge Survey (Connor et al., 2009). • Interview data and Observation data</td>
</tr>
</tbody>
</table>
3.5.2 Analysis of video observations: Teachers and students. At the completion of Phase two, a detailed analysis of the instructional sessions was piloted to explore the conceptual and procedural knowledge of teachers. The researcher developed a behavioural coding protocol, based on the work of Jacob et al. (2000) to identify the content elements for the teaching of reading.

Jacobs et al. (2000) examined the psychometric properties of using an interval coding system to assess external behaviours in the classroom. They reported a high inter-observer reliability and concurrent validity in their instrument, the *Revised Edition of the School Observation Coding System* (REDSOCS). Bagner, Boggs, and Eyburg (2010) reported that the inter-observer reliability on REDSOCS categories was moderate to high, with percent agreement ranging from 47% to 90% \((M = 67\%)\) and Cohen’s kappa coefficients ranging from .69 to .95 \((M = .82)\) when used in a large efficacy trial. A modified version of the REDSOCS was also found to have high convergent and divergent validity with teacher report measures of student behaviours (Filcheck, Berry, & McNeil, 2004).

A modified version of the REDSOCS (Bagner et al., 2010) was employed during the data analysis for this research. A six second coding was implemented in place of 10 second coding resulting in 10 codes per one minute instead of six in one minute of coding. The category names used by Bagner et al. (2010) were exchanged for those applicable for this study and included two domains. Domain 1 included the big ideas or content elements for teaching reading (i.e., phonological awareness, alphabetic principle, fluency, vocabulary and comprehension; Snow et al., 2005). During the six-second intervals, the researcher recorded all occurrences of the content elements in the teaching of reading. These content elements for the teaching of reading were discussed in the literature review, and are strongly supported as being a necessary in addressing the needs of students learning to read (Carson, Gillon, & Boustead, 2013; Hoover & Gough, 1986; Konza, 2006; Snow et al., 2005).

All content elements that contributed to the activity were recorded in each interval. For example, during one interval the teacher was using the learning activity ‘big-word, little-word’. In this word study activity, students look for smaller words within a larger word (e.g., within ‘grandfather; there is and, grand, father, the). Within this activity, the teacher may engage with the element of vocabulary, alphabetic principle, phonological awareness, and spelling (see Figure 3-6 for how differing activities could link to one or more elements). One or more of these content elements may be observed in a six second
interval hence each is recorded. In this way the specific skill is being observed, within context.

Once this coding was undertaken, the data were collapsed into one-minute slices. Within a one-minute slice, a number of differing elements may occur, together or consecutively. The following tables provide a guide of how elements were integrated during the data analysis.

<table>
<thead>
<tr>
<th>Program Element links</th>
<th>Phonological Awareness</th>
<th>Alphabetic Principle</th>
<th>Fluency</th>
<th>Vocabulary</th>
<th>Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modelled read</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocabulary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big word little word (integration strategy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alphabetic principal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phonological awareness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice and fluency read</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spelling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word study (Integration strategy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talking and listening</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Journal writing</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Revision</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 3-6. Example of interactions that occurred during the six-second observations.*

Domain 2 consisted of the engagement elements relating to curriculum interaction, behaviour and social interaction observed during each interval. The same coding process was used to analyse the engagement data collected concurrently with the elements required to teach reading. Research (Wigfield et al., 2008) into the role of reading engagement, in mediating effects of reading comprehension instruction on reading outcomes, proposed that engagement is multidimensional and includes behavioural engagement (e.g., actively participating in academic tasks), cognitive engagement (e.g., using high level strategies to foster learning), and emotional engagement (e.g., enjoying tasks and expressing enthusiasm).
Based on this work, three processes of engagement were considered within this pilot study. The first processes *cognitive engagement*, referred to what was happening within the student’s head. It included investing in learning, self-regulation and the desire to master skills. *Behavioural engagement* referred to positive conduct and involvement in learning that included effort, persistence and persistence. *Emotional and relational engagement* involved interest, happiness, respect and affective attitudes towards the teacher. The three components are dynamically related within the individual (see Figure 3-7).

For the purposes of the current research, engagement was coded from the digital recordings within the dimensions of curriculum, behaviour and social engagement with due consideration to the teaching and learning discussions that occurred and are quoted within the results of the study.

<table>
<thead>
<tr>
<th>Engagement Code links</th>
<th>Curriculum</th>
<th>Behaviour</th>
<th>Social (Relational/Emotional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Initiating or responding curriculum</td>
<td>initiating or responding curriculum</td>
<td>* Attending to work</td>
<td>* Smiling</td>
</tr>
<tr>
<td>* Wanted to learn new skills</td>
<td>wanted to learn new skills</td>
<td>* Was prepared to take risks</td>
<td>* chatting</td>
</tr>
<tr>
<td>* wanted to continue working</td>
<td>wanted to continue working</td>
<td>* Was more confident in reading</td>
<td>* touching</td>
</tr>
<tr>
<td>Student Curriculum</td>
<td>* Stoped or modified neutral behaviours</td>
<td>* shows respect</td>
<td>* positive attitude</td>
</tr>
<tr>
<td>Teacher Curriculum</td>
<td></td>
<td>* joking</td>
<td>* affirmation</td>
</tr>
<tr>
<td>Teacher Curriculum strategy use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher alerts strategy (renew focus)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affirmation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher social</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student social</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student neutral behaviours</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 3-7. An example of the application of more than one engagement type occurring in an interval.*

The conversations between the teacher and student during the teaching sessions were transcribed for selected minutes to examine more closely the teaching and learning and engagement behaviours that occurred at the same time. The purpose of the observation...
was to capture in fine detail how the teacher learned the specialised conceptual knowledge for teaching reading and the procedural knowledge for implementing a lesson with a student experiencing difference in learning to read.

To ensure integrity of the analysis, a peer, who had expertise for working within human behaviours, also coded 10% of the observational times. Agreement in the observations indicated 99% accuracy. Visual figures demonstrate the findings and are reported in Chapter 4.

3.5.3 Analysis of data: Students. On completion of the data collection using the Woodcock Reading Mastery: Word Attack subtest and Woodcock Reading Mastery Word: Identification subtest, data were entered onto an Excel spreadsheet, readied for analysis using SPSS software. Following a cleaning of data, a t-test analysis was undertaken of pre and posttest differences.

3.5.4 Phase 4: Analysing the data from the Snow et al. (2005) matrix. Development of teacher knowledge was a key focus of the unit of study undertaken by teachers. To explore how teacher developed as a result of the in-school experience, the researcher develop a data matrix based on the Snow et al. (2005) framework for learning the knowledge for teaching reading (see Figure 3-8). A data matrix is a two dimensional table based representation of data in which data can be organised by rows and columns. The point of intersection between a row and column is called a cell (Miles, Huberman, & Saldana, 1994; Nadin & Cassel, 2004). Using a matrix is a means of integrating large amounts of qualitative data to facilitate understanding of it’s meaning. The matrix also enables readers to examine how the interpretation is reached. In this research project, the rationale for using the matrix was to identify the level of knowledge and skills the teachers have acquired for teaching reading to students experiencing difficulties learning to read.

The matrix rows were labeled with levels projected by Snow et al. (2005) and outcomes that contributed to meeting the original framework were scored between 1-5 assigned according to the strength of the evidence. A peer with expertise in preparing teachers with the knowledge and skills for teaching reading examined the matrix. They considered the information input to be in the spirit of the authors intended meaning and within the Snow et al. framework discussed.

The matrix was sent to the original author, Professor Snow, to confirm that it was within the spirit of the proposed framework. Based on email feedback received the matrix was further refined. The matrix was then subject to informal trials resulting in the
outcomes being further amended, and making the outcomes more data sensitive so that it is grounded more contextually and empirically (Miles et al., 1994).

The data collected throughout the study was used to complete the matrix with at least two points of data entered into each cell to enable consideration to the construction of knowledge. The data were examined by phase and thought was given to achievement within the desired outcomes (e.g., TKS, Q2 post; Interview, category (c) themes (t); observation, pre/post, minute x.)

The impact evaluation adopted for this research, was based on the ‘Theory of Change’ approach. The evaluation has been embedded within a participative, holistic, reflective and reflexive approach to examining the level of skills and knowledge for teaching reading was acquired by teachers being prepared to teach reading (Connell & Kubisch, 1998).
<table>
<thead>
<tr>
<th>Data Source</th>
<th>LEVELS OF KNOWLEDGE FOR TEACHING</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post study data</td>
<td>5. REFLECTIVE, ORGANISED, ANALYSED KNOWLEDGE The Master Teacher. Has highly developed expertise for integrating conceptual and procedural; knowledge for teaching reading</td>
<td>Is well versed in historical and current research and considers theories. Has extensive knowledge of concepts, and theories. Designs integrated reading programs specific to students needs. Understands what is easy and hard for students and is able to present concepts so that they are understood. Evidenced through:</td>
<td>Evidence of deep procedural knowledge for engaging students in learning to read. Engages teachers in learning the knowledge required to teach reading. Evidenced through:</td>
<td>Integrates resources (for example: games, basal series text level of difficulty) to teach reading to all student including the hardest to teach Evidenced through:</td>
<td>Is considered to be an expert in reading and literacy and is responsible to mentor school staff and lead professional development at school, conferences, universities and through written materials. Evidenced through:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pre-post Survey</td>
<td>Interview data</td>
<td>Observations</td>
<td>Pre-post Survey</td>
<td>Interview data</td>
</tr>
<tr>
<td>Post study data</td>
<td>4. EXPERT ADAPTIVE KNOWLEDGE Knowledge to promote literacy across the school programs (Snow et al, 2005)</td>
<td>Demonstrates acquired conceptual knowledge for teaching reading to diverse students. Knows and integrates micro and macro skills for reading. Shows evidence of student gains in reading. Evidenced through:</td>
<td>Demonstrates acquired procedural knowledge for teaching reading to all students regardless to diversity. Integrates elements and knowledge for reading. Shows evidence of student gains in reading. Evidenced through:</td>
<td>Selects resources (for example: games, basal series text level of difficulty) to teach reading to all students including the hardest to teach. Evidenced through:</td>
<td>Demonstrates sophisticated level of conceptual and procedural knowledge required to teach reading. Provides professional development for peers. Evidenced through:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pre-post Survey</td>
<td>Interview data</td>
<td>Observations</td>
<td>Pre-post Survey</td>
<td>Interview data</td>
</tr>
<tr>
<td>Post study data</td>
<td>3. STABLE PROCEDURAL KNOWLEDGE</td>
<td>Identifies and implements some micro and macro skills of the elements required for literacy. For Example: Pure phonemes &amp; retelling oral story, knowing how to find the answer (of a question) in text. Evidenced through: Pre-post Survey, Interview data, Observations.</td>
<td>Recognises appropriate procedural knowledge to teach reading that includes micro and macro skills and strategies (for example; systematic and explicit teaching of the concepts) Evidenced through: Pre-post Survey, Interview data, Observations.</td>
<td>Selects technologies to support the teaching of the micro and macro skills of the elements required for reading. For example, leveled texts, fluency graphs, strategy sheets, e-thesaurus, games, books (e-books or paper), visuals. Evidenced through: Pre-post Survey, Interview data, Observations.</td>
<td>Engages students in learning. Monitors gains and adapts teaching programs to facilitate learning. Evidenced through: Pre-post Survey, Interview data, Observations.</td>
<td></td>
</tr>
<tr>
<td>Post study data</td>
<td>2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE</td>
<td>Aware of the big ideas within reading and recall some information Evidenced through: Pre-post test TKS, Interview data, Observations.</td>
<td>Selects appropriate procedural knowledge (strategy) to plan a reading activity that provides success in learning. Evidenced through: Pre-post Survey, Interview data, Observations.</td>
<td>Identifies, implements and analyses reading assessments to inform programming needs. Plans a reading program that includes the Big Ideas, strategies and resources. Evidenced through: Pre-post Survey, Interview data, Observations.</td>
<td>Identifies, implements and analyses reading assessments to inform programming needs. Implements a reading program that includes Big Ideas, strategies and resources. Teach a small group of 1 to 3 students. Evidenced through: Pre-post Survey, Interview data, Observations.</td>
<td></td>
</tr>
<tr>
<td>Pre study data</td>
<td>1. DECLARATIVE KNOWLEDGE</td>
<td>Acquired disciplinary knowledge about a range of issues within education. Evidenced through: Progression through University study.</td>
<td>Acquired some disciplinary knowledge about promoting literacy. Evidenced through: Progression through University study.</td>
<td>Acquired some disciplinary knowledge of resources that support the teaching of reading Evidenced through: Progression through University study, Pre-post Survey, Interview data.</td>
<td>Acquired and recall some procedural and content knowledge about teaching reading Evidenced through: Progression through University study, Pre-post Survey, Interview data.</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3-8. Framework for learning the knowledge for teaching reading adapted from Snow et al. (2005).
3.5.5  Phase 5: Forming inferences.

Inferences are subject to two points of view. That is, that mixed methods improves the quality of inferences as either qualitative or quantitative data contribute to inferences; alternatively, that mixed methods may be susceptible given two designs contribute to the inference. The second point of view questions the quality to enable strong and credible inferences. Design quality refers to the degree the researcher has used the most appropriate design and implemented it effectively this is equally appropriate for both strands

Establishing meta-inferences within a mixed methods research design is susceptible to possible validation issues (Venkatesh, Brown, & Sullivan, 2016), or “problems of integration” (Onwuegbuzie & Johnson, 2006, p. 48). The research design addressed a number of the issues raised by Onwuegbuzie and Johnson (e.g., sample integration, sequential, inside-outside). Participants for the qualitative case studies were drawn at random from those participants in the quantitative element of the study. The fully integrated mixed model design accounted for the impact that phases could have on conclusions drawn (i.e., constant interaction between phase elements). Further, data collected provided opportunity for participants to have direct input into results recorded, as well as having people external to the study examine and critique conclusions drawn.

Other elements of the study design and data analysis that were considered as part of legitimising the meta-inferences are drawn from the work of Miles et al. (1994). Adequacy/fidelity was considered as part of the study design, where the measures were implemented according to the procedures planned or required. Inferences were established as a result of the matrix, and made through a series of deliberate acts including eyeballing the rows and columns and looking for pathways and trends, and then to revise verify and check accuracy. Patterns were noted, themes and contrasts made, comparisons established, and information clustering and counting occurred, before an analysis was finalised.

The meta-inferences for this study were formed through the collection and careful consideration of all data. These inferences were checked for potential limitations through examining the mixed methods legitimization types posed by Onwuegbuzie and Johnson (2006).

3.6  Managing the Data

3.6.1  Ethical considerations.  Ethics was applied for and approval given by the University of Sydney Human Ethics Committee including approval from the New South Wales public school sector.
3.7 Conclusion

The purpose of the pilot study was to “test drive” the procedures and to identify any possible difficulties within the data collection procedures, to check the feasibility of the study and validate the research instruments (Gerard & Symons, 2010) used in this exploratory study. The next chapter presents the results of the pilot study and provides findings and recommendations to improve the quality of the study.
Chapter 4
Pilot Study Results

This chapter presents a discussion of the pilot data that were analysed to explore the suitability of the proposed research design to address the research questions posed for this project. The chapter commences with a brief discussion of the methodology, and outlines the results of the participant and case studies. Following the contextualisation of the data analyses, results are discussed in relation to the research questions posed for the project.

A mixed multiple methods approach was used in this research study. Morse (1991) described mixed methods research as very solid and whole. Further Symonds and Gorard (2010), described a sub-set of the mixed methods approach as a multiple methods approach in which both methods used are complete in themselves. Mixed multiple methods approaches occur when the researcher mixes or combines the qualities of both quantitative and qualitative research techniques, methods, approaches, concepts and or language within a single study and chooses to use the best qualities of both to support the research (Symonds & Gorard, 2010; Johnson & Onwuegbuzie, 2004).

4.1 Overview of Analysis

A fully integrated multiple methods research design (Nastasi, Hitchcock, & Brown, 2010; Tashakkori & Teddlie, 2003) was used for the current research. Quantitative and qualitative data were collected and analysed to construct a picture of the dynamic intertwining of teaching and learning that occurs when teachers are learning the knowledge and skills for teaching reading, and school students (students), who have been experiencing difficulties, are learning to read.

In Phase 1, two sets of data were collected as separate yet interactive measures. One set of data was collected from teachers using qualitative and quantitative measures. A second set of data was collected from the school students, again using qualitative and quantitative measures.

In Phase 2, the focus was on one teacher-student dyad. Data on specific teaching and learning behaviours, and on elements of reading taught, were collected to closely examine the interactions that occurred between the two for the purpose of establishing the suitability of the data collection methods, of the representation of the results, and for ensuring that the questions could be answered using the proposed methodology. This phase provided a snapshot at a deeper level, which could not be provided using only quantitative methods. The data provide the opportunity to cross-reference between transcripts of discussions, to
consider social behaviours, and to carefully examine the impact of a research-based program of reading instruction on the teacher’s and student’s learning development.

The pilot interview data were analysed using a grounded theory approach (i.e., the general methodology for developing theory, which is based on data systematically gathered and analysed) (Tashakkori & Teddlie, 2003). Grounded theory as described in the Methods chapter has its own criteria for assessing the rigor or quality of the study, namely fit, relevance, workability and modifiability (Glaser & Strauss, 2012).

Phase 3 brought together results of the student’s and teacher’s pre- and post-study measures for comparison, and considers the suitability of the measures for drawing conclusions about difference in outcomes over time. Phase 4 drew inferences from the two data sets about the learning of the teachers and of the students. The qualitative and quantitative data sets contributed to the inferences made (Nastasi et al., 2010).

Phase 5 examined the inferences discussed in Phase 4 and a meta-inference is formed and reported. The outcomes culminate in a discussion of strengths and weaknesses of the design and performance measures, and suggestions are proposed of how the identified weaknesses and limitations can be addressed within the main study.

4.2 Phase 1: Pre-Study Tests for Teachers and Students

Phase 1 involved administration of pre-intervention assessments to teachers and students. The results of each of these measures are discussed separately. The TKS measured the teacher’s content and procedural knowledge including the big ideas of reading (i.e., phonological awareness, alphabetic principle, vocabulary, comprehension). This assessment was analysed as a single measure with a total score (Connor, 2013). The teachers scored a mean of 19.48 on the TKS pre-study (SD = 3.37).

Table 4-1 shows the pre-test results for the student group on the Woodcock Reading Mastery Tests-Revised. While the results provide evidence of variation in decoding knowledge, the distribution of the results indicated the need for parametric analysis.
Table 4-1

Student Group Pre-Study Woodcock Reading Mastery Tests-Revised Raw Scores

<table>
<thead>
<tr>
<th>Subtest</th>
<th>n</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodcock Reading Mastery subtest – Word Attack pre-test</td>
<td>79</td>
<td>9.94</td>
<td>5.46</td>
</tr>
<tr>
<td>Woodcock Reading Mastery subtest – Word Identification pre-test</td>
<td>79</td>
<td>35.76</td>
<td>14.89</td>
</tr>
</tbody>
</table>

4.3 Phase 2: Qualitative Results for Teachers

The teachers participating in this study were all enrolled in the unit of study *Teaching Children with Special Needs*. The unit of study was designed by the researcher and lecturer to maximise the teachers’ learning experience through integrating the on-campus university component with an in-school experience. While the lectures were held on campus, the tutorials and the in-school teaching and learning experience with students experiencing difficulties in learning to read occurred in schools. Working in schools enabled teachers to learn the specialised conceptual and procedural knowledge required for teaching reading by teaching students with identified difficulties with learning to read.

The lecture series addressed learning to read through a Response to Intervention model. Using the teaching of reading as the context, teachers learned about the need for strong core reading programs, supported through a robust learning support structure. In this unit of study, teachers took on the role of the learning support teacher, working intensively with one student with identified needs in learning to read. During the lecture series teachers were introduced to universal design for learning, the differing elements of reading (i.e., phonemic awareness, alphabetic principle, automaticity of code, comprehension, vocabulary), the practices to intensify instruction (e.g., explicit and systematic instruction), and systematic monitoring of student learning.

The theoretical approach for teaching reading in the unit of study, and for the research project, is based on the work synthesised by Snow et al. (1998), and supported by other sources (e.g., Foorman et al., 2016; Hempenstall, 2016; Snow & Griffin, 2005). At all stages of the university-school partnership, this theoretical approach was reinforced, revised and actively enabled through professional discussions.

The data collection during this phase focused on the case studies. A visual representation was chosen that displays how the elements of reading were enacted and integrated within tutoring sessions. The visual representation provided by Prescott, Bausch, and Brunder (2013) was used as a model (i.e., web of knowledge representation), but
found to be limiting. For example, in a short period of time a number of reading elements could be seen in use, but the web did not allow for the dynamic representation of skill use. The analysis used was quite coarse and did not allow for a fine-grained examination of the teacher-student interaction.

An alternate option for appropriate presentation of results was to undertake a fine-grained analysis of video data. Video sessions were analysed in one-minute slices to examine the teaching and learning exhibited by the teacher and student, as a medical practitioner would examine the soft tissue on a medical Magnetic Resonance Imaging (MRI) film. The time within each one-minute slice was divided into six ten-second intervals. During these six intervals the dominant element of reading was noted and recorded. This is explained in the example shown in Figure 4-1.

Each line represents one minute in time as labeled underneath. All elements of reading are represented by different colours. For example:

**Key**
- Blue – alphabetic principle
- Purple – phonological awareness
- Green - word study

*Figure 4-1*. Visual representation used to demonstrate the differing reading elements taught within a tutoring session.

Minute 14 demonstrates only alphabetic principle (blue) instruction during the observation. Minute15 indicates instruction occurred in two elements of reading (i.e., phonological awareness (purple) and alphabetic principle (blue). Minute 16 shows that students were instructed in phonological awareness, alphabetic principle, and big words/little words, while Minute 17 illustrates the time spent on big word/little word instruction and phonological awareness.

**4.3.1 Case study: Cathy and Ned.**

Cathy was a final year pre-service teacher who had briefly worked as a teacher’s aide in a small primary school. Cathy reported that during that time she had delivered a small number of in-reading sessions using a commercial program that utilized the principles of direct instruction. She had watched a peer volunteer deliver a lesson previous
to doing so herself, yet had not received any professional development in the specialised knowledge for teaching reading.

Cathy was paired with Ned, Year 1 student who struggled to learn to read and demonstrated a range of challenging behaviours. The pre-study *Woodcock Reading Mastery Tests-Revised* (Woodcock, 1998) Word Attack (WRMWA) and Word Identification (WRMWI) results indicated his strength lay in identification of sight words (Word Identification) rather than in the decoding (Word Attack). These results are reported in age and grade rather than percentiles as more commonly used in literature. The formal assessment analysis as provided by Woodcock, (1998) was adhered to ensure accuracy in results.

Table 4-2
Ned’s Pre-Study Woodcock Reading Mastery Tests-Revised Results

<table>
<thead>
<tr>
<th></th>
<th>WRM Word Attack Raw Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
<th>WRM Word Identification Raw Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
<th>Chronological Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-study</td>
<td>2</td>
<td>6.9</td>
<td>1.0</td>
<td>35</td>
<td>7.0</td>
<td>2.5</td>
<td>7.4</td>
</tr>
</tbody>
</table>

The initial session between Cathy and Ned was spent getting to know one another, and implementing a series of assessments known as the *Specific Level Assessment Tasks* (Neale, Johnson & Neilson, 1969) and the *Port Jackson (PJ) Letter-Sound and digraph test* (Moore, 2006). Ned had read a text at an independent reading level that had been assessed for readability using the Spache readability generator (Spache, 1953), and the research assistant prior to the study recorded his accuracy and fluency. The results were provided for Cathy to use to support Ned in reading continuous texts at an independent level.

Table 4-3
*Pre-Study Reading Assessments Used by Cathy to Establish Ned’s Individual Learning Needs*
While Cathy was awkward in carrying out the assessments, observation of her assessment processes found that she carried out the assessments with good fidelity. Cathy used the assessment results to design the first formal teaching session with the help of the school mentor.

Figure 4-2 and Table 4-2 provide an overview of Ned’s reading strengths as gathered by Cathy during the initial assessments. Ned was able to accurately identify a small number of phonemes from upper and lower case letters (e.g., c, C, e, f, l, k, m, r, R, O, s, and S) and name them correctly. Some phonemes were not pronounced accurately and a schwa was added. For example ‘ruh’ for the letter sound for R/r, and ‘purrh’ for the letter sound for P/p. These responses where marked as incorrect and identified as needing to be taught and learned. Digraphs known to Ned were those used frequently in words and included sh, ch, th, ck, ee, ss, ir and er.

Results from the *Sutherland Phonemic Awareness Test* (SPAT) (Neilson, 1965) showed that Ned had achieved some early phonemic awareness skills (e.g., syllable counting, rhyme detection, rhyme production, identification of onset and onset rime). The *Educheck* assessment addresses the skills and knowledge to decode words of increasing complexity. The skills are presented in hierarchical order of easiest to hardest for a beginning reader. Students experiencing difficulties in learning to read may have developed skills in a haphazard manner. The assessment provided an insight into knowledge of word types, and errors patterns.
Figure 4-2. An overview of the results Ned achieved on the Specific Level Assessment Tasks.

Ned had acquired the phonological awareness skills expected of a student typically enrolled in Kindergarten. Ned had skills in syllable counting, rhyme detection and production and identification of onset. His skills were incomplete regarding identification of rime, with low level segmenting and blending scoring poorly, but he was able to hear
and delete the first sound of a word as expected of a student in Year 2. He was able to read four words from the non-word reading list and spell three of the words in the form of vowel-consonant (cv) and consonant-vowel-consonant (cvc), but was unable to read or spell words that required him to blend ccvc or cvcc words. Ned demonstrated a diverse set of skills that did not fit the hierarchical order of achievement generally expected of a student of his age and stage. This was further evidence as to why he had been recommended for additional support with his reading.

The results indicated that Ned’s strength lay in the recognition of high frequency sight words as shown in the results for the Johnson Word List (Johnson, 1971). His ability to decode unknown words and to generalise skills and knowledge necessary for reading continuous texts was poor as shown by the pre-intervention phonemes, SPAT and Educheck results (Table 4-2).

Cathy struggled with her new learning and its implications for programming reading sessions that would challenge but not overwhelm Ned. With the guidance of her school mentor, and using the planning rubric provided in the workshops (see Figure 4-3 she planned her first full teaching session using the assessment data based on the big ideas of reading (Figure 4-3).

The lesson plan in Figure 4-3 shows that Cathy was planning to address both decoding and comprehension, intending to spend about an equal amount of time on each component. The activities included in the plan were structured to be fun, and motivating for Ned. Cathy was aware that Ned did not have a good disposition towards reading, and that she would need to work hard to engage him for the planned 50 minute session.

4.3.1.1 Observation 1: Cathy and Ned. The first tutoring session undertaken by Cathy for Ned was video-recorded. The data collected from this session (Observation 1) were prepared for analysis as outlined in Chapter 3.

A key feature of the observations was exploring the proportion of time given to each big idea or element of reading. Figure 4-4 shows the proportion of time allocated to each of the elements of reading in Observation 1. While all elements of reading were included in the lesson, 52% of the time was spent on the code of reading and 48% to comprehension skills and knowledge. This representation reflected the lesson plan Cathy had designed in response to Ned’s assessment results.
<table>
<thead>
<tr>
<th>Reading Elements</th>
<th>What to teach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modelled Read</strong></td>
<td><strong>Book</strong>: The Way to the Zoo</td>
</tr>
<tr>
<td>Vocabulary- explain meaning of</td>
<td>Teach: Features of a literary text</td>
</tr>
<tr>
<td>Paper book or iPad</td>
<td><strong>Vocabulary words</strong>: messy, smelly, emotional</td>
</tr>
<tr>
<td>Teacher Reads only</td>
<td></td>
</tr>
<tr>
<td><strong>Comprehension</strong></td>
<td>Explain: When we read a story we need to listen to the story we are reading.</td>
</tr>
<tr>
<td>Retell, key question words,</td>
<td>When the teacher reads to us we hear more than words. We think about things</td>
</tr>
<tr>
<td>Literal, Inferential and Creative</td>
<td>we have experienced and have pictures in our heads. Reading is like listening</td>
</tr>
<tr>
<td>See PASH Book (Dept. Ed and</td>
<td>to a story…</td>
</tr>
<tr>
<td>Communities, ND.)</td>
<td>Teach meaning of <strong>who</strong> - a person or character</td>
</tr>
<tr>
<td></td>
<td><strong>Question</strong>: Who cooked dinner?</td>
</tr>
<tr>
<td><strong>Big Word/Little Word:</strong></td>
<td><strong>Word</strong>: Queensland</td>
</tr>
<tr>
<td>Smaller whole words, prefix suffix</td>
<td>Focus: finding small real words in big word</td>
</tr>
<tr>
<td><strong>Phonological Awareness (SPAT)</strong></td>
<td><strong>Word List</strong>: Identify and take off end of words</td>
</tr>
<tr>
<td>Teach explicitly first</td>
<td>and segmentation 1</td>
</tr>
<tr>
<td>Oral exercises</td>
<td>Set 1: lend, limp, rhyme, trim, land, churn, time,</td>
</tr>
<tr>
<td></td>
<td>been &amp; steam</td>
</tr>
<tr>
<td></td>
<td>Set 2: Segmentation – 2 words only</td>
</tr>
<tr>
<td><strong>Alphabetic principle – Phonemes</strong></td>
<td><strong>Known</strong>: A, a, C, c, l, i, g, r,</td>
</tr>
<tr>
<td>Single letter, digraphs and tri-graphs</td>
<td><strong>New</strong>: D, d, F, f, ee, B and b</td>
</tr>
<tr>
<td>Ratio 4:1 known to unknown in isolation then in context of a word</td>
<td></td>
</tr>
<tr>
<td><strong>Fluency reading</strong></td>
<td>Basal series text book number 16</td>
</tr>
<tr>
<td>Explain the importance of punctuation</td>
<td>Explain why fluency is important.</td>
</tr>
<tr>
<td>and meaning. Student reads through</td>
<td>Discuss purpose of punctuation.</td>
</tr>
<tr>
<td>text, then for one minute, count and</td>
<td></td>
</tr>
<tr>
<td>graph CWPM.</td>
<td></td>
</tr>
<tr>
<td><strong>Games for skills practice</strong></td>
<td><strong>Game</strong>: Concentration</td>
</tr>
<tr>
<td>Focus on areas of need and skills for</td>
<td>Focus: Identifying rime</td>
</tr>
<tr>
<td>generalisation</td>
<td></td>
</tr>
<tr>
<td>i.e. Phonological awareness, sight</td>
<td></td>
</tr>
<tr>
<td>words, vocab etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Word study</strong> – generalization of</td>
<td>Blending: teach explicitly how to drag phonemes together to create a word</td>
</tr>
<tr>
<td>skills and knowledge</td>
<td>Blend: [a t = at]</td>
</tr>
<tr>
<td>Focus on learning need (see Educheck)</td>
<td></td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
<td>Explain that we can have different words that have the same meaning</td>
</tr>
<tr>
<td></td>
<td>Car, far, bar and star</td>
</tr>
<tr>
<td><strong>Spelling</strong></td>
<td></td>
</tr>
<tr>
<td>Family words from Basal Series text</td>
<td></td>
</tr>
<tr>
<td>may add 1 or 2 sight words</td>
<td></td>
</tr>
<tr>
<td><strong>Oral Language</strong></td>
<td>Talk about what it means to learn</td>
</tr>
<tr>
<td></td>
<td>“Tell me about what you learned today”</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Journal writing</strong></td>
<td>Ask Ned to write his answer in his own journal</td>
</tr>
<tr>
<td>Scribe for student if required</td>
<td></td>
</tr>
<tr>
<td><strong>Shared Reading</strong></td>
<td>Share a book for enjoyment</td>
</tr>
</tbody>
</table>

*Figure 4-3.* The first reading session prepared by Cathy to support Ned, and to enhance his reading skills and knowledge.
Figure 4-4. Proportion (%) of time spent by Cathy teaching Ned specific elements of reading during Observation 1.

Throughout Observation 1, Cathy appeared unsure of herself and frequently checked the programming scaffold for direction. During this first teaching session, she focused on the specific reading knowledge elements individually, and appeared to work hard to integrate these differing elements. Cathy was careful to address all elements required for teaching reading as modelled during the workshops. She also addressed procedural knowledge for reading by learning to plan and implement reading sessions. For example, during modelled reading Cathy referred to the illustrations in the picture book to reinforce comprehension of the author’s intended meaning. While Cathy was learning to teach the specific content knowledge for reading, she also developed a rapport with Ned, a student who had expressed his displeasure of attending the sessions. Developing a rapport with Ned was a difficult yet necessary task. A strong trusting relationship was essential for engagement brings the teaching and learning of reading to life (Markwell, 2007)

The skills of reading were practiced using games and the reading of continuous texts. These activities reinforced Ned’s learning and generalisation of skills through the practical application of either the code or comprehension. The time allocated to comprehension was focused around providing him with the basic knowledge for answering comprehension
questions, learning to retell a story and the beginning levels of literal, inferential and creative questions. while much of the decoding skills were pitched around the instructional text that had been chosen for the tutorial session. These general ideas about how Cathy taught the skills and knowledge for reading provide only a surface level picture of her engagement with Ned.

Further exploration of how Cathy engaged with the big ideas of reading was undertaken through analysis of the video. Figure 4-5 illustrates the first teaching and learning session in one-minute slices. Each slice of time represents key elements in teaching reading that were included by Cathy when teaching Ned. While some slices were dedicated to one big idea (e.g., minutes 16, 17 and 18 were committed to phonological awareness), other slices integrated a number of big ideas (e.g., minute 33 contained games, alphabetic principle, spelling and revision).

![Figure 4-5. Examination of reading elements during Observation 1 in one-minute slices for Cathy and Ned.](image)

While Figure 4-5 shows several minutes solely taken up by individual elements, other slices showed that Cathy was integrating and intertwining a number of elements within a minute. As Cathy was in her first full teaching session, and attempting to understand how each of the elements contributed to teaching reading, evidence of the
integration of elements was quite rudimentary. There were periods where one element of reading was addressed (e.g., minutes 9 to 15 were focused around modelled reading) or multiple elements were individually addressed (e.g., minutes 6, 7 and 53), while on occasion Cathy integrated 3 or 4 elements within a minute slice (e.g., minutes 3 and 4, and 33-36).

An examination of Figure 4-5 shows that some elements were distributed across the 54 minutes of the session. The alphabetic principle, for example, was observed across differing parts of the session; while not given a sustained focus at any one time except minute 36, it was continually reinforced alongside other elements (e.g., modelled reading in minutes 5, 6 and 7; oral language and spelling in minutes 18, 19 and 20; vocabulary in minutes 48 and 49).

A transcript was made of each observation to allow the discourse between the teacher and student to be examined closely. The following transcript details the discourse that occurred during minute 16. The elements of reading being addressed are indicated in brackets. The elements of engagement occurring concurrently are addressed in Figure 4-6.

Cathy: I'm going to say some words, and I want you to say them after me. I'm going to say this word first. Recall (oral language, teacher curriculum, explicit instruction and strategy)

Ned: recall (phonological awareness, student social [smile] and student curriculum)

Cathy: If I say call, which part of the word did I leave out? (phonological awareness, teacher curriculum and strategy)

Ned: re (phonological awareness and student curriculum)

Cathy: Now put them together (teacher curriculum, strategy)

Ned: (think time) Recall?

Cathy: Good work! (affirmation and teacher social [smile])

Ned: (student social [smile])

Cathy: Now say, paper (teacher curriculum)

Ned: paper (oral language and student curriculum)

Cathy: Now say per (teacher curriculum)

Ned: per (oral language and student curriculum)

Cathy: Which part of the word did I leave out? (phonological awareness, strategy, and teacher curriculum)

Ned: pape (phonological awareness and student curriculum)

Cathy: Listen again! Paper, if I say per, which part of the word did I leave out? (phonological awareness; teacher curriculum and strategy)

Ned: silence

Cathy: Pay, is the part of the word we left out. When we put pay and per together it says, paper (phonological awareness, curriculum correction, and teacher curriculum, and revision).
As Cathy proceeded, other elements of phonological awareness (i.e., onset rime, blending and segmenting) were addressed. Cathy used explicit and explicit Ned instruction to guide Ned when practicing the phonological awareness skills of segmenting, then blending. She showed evidence of breaking the task down to include repeating a word, identifying onset and rime, and blending two segments to form the one word. Within this slice of time the elements were shown as separate elements, with evidence emerging that Cathy was trying to intertwine or mesh them together.

Cathy also demonstrated her inexperience in teaching reading. She selected a difficult example for Ned to segment using the word paper. She was not yet able to select and sequence the tasks into manageable pieces of information. Ned attempted to answer with some success. When Ned had difficulty completing a task, Cathy provided immediate feedback and correction to assist him to succeed.

During Observation 1, curriculum elements were reported in Figure 4.5. Cathy delivered the address the elements required for teaching reading and provided practice of those elements for generalization. While Cathy taught Ned the necessary curriculum elements as discussed, the engagement elements that occurred concurrently were identified and are shown in Figure 4-6. During the conversation that was reported for minute 16 of Observation 1, the following engagement behaviours occurred. During minute 16 Cathy taught curriculum elements to Ned, made curriculum corrections. She affirmed correct answers to questions and demonstrated or explicitly modelled tasks.

Cathy exhibited relationship-forming and social behaviours. For example, Cathy said ‘good work’ and smiled when Ned gave the correct answer (e.g., response to the word recall) and Ned responded by smiling and continuing to work. During minutes seven and eight his response was different. When Cathy made a correction, Ned showed a shame response as described by Munro (2009) by crossing his arms, looking away and having an angry expression on his face. Cathy at this point assured Ned that his attempt was a good one, and mistakes can be used to help us learn. Ned responded differently in Minute 16 by smiling and continuing to work. It would seem that a trusting relationship between Cathy and Ned had begun to form. No evidence of shame response with curriculum correction was observed in the second half of the lesson.

Cathy attempted to teach new concepts, and retaught concepts with corrections. In minutes three and four she explained the meanings of the military words Captain, General and Sergeant before a modelled read of a story that included those words. Cathy and Ned discussed those words in minutes five and six. During the discussion Ned associated those words with the word soldiers and shooting a gun. When teaching vocabulary explicitly,
Cathy explained the concept (within shades of meaning, semantic groupings, morphographical knowledge) clearly, and where appropriate modelled the concept or developed hand signals as a visual cue to the meaning of the word (as recommended by Marzano, 2010). She was careful to listen and/or watch for Ned’s correct use of the words. This behaviour was repeated or revised by her during the lesson. For example, during minute three, Cathy provided explicit instruction on specific vocabulary (i.e., danger and warning). Ned repeated the meaning and used the two words during minute four. The same words were used and reinforced later in the teaching and learning session during oral language and journal writing.

![Figure 4-6](image)

*Figure 4-6.* Engagement elements in one-minute slices of time recorded between Cathy and Ned during Observation 1.

While the specific reading and engagement data have been reported separately, they are concurrent, intertwined and reactive. The analysis of Observation 1 shows that Ned and Cathy were engaged in learning throughout the session. Cathy used explicit instruction and taught simple strategies for learning while teaching Ned. For example, in minute four she reminded Ned to look at the book being read and used a finger to track the words so that Ned could more easily follow her reading. This strategy provided a means for assisting Ned to become more independent in his learning. Another strategy used by
Cathy to assist Ned in his learning included the use of supportive illustrations in picture books to assist in comprehension (Minute nine), additional think time in minute 20, and wriggle and stretch time in Minute three. Agee (2000) highlighted appropriate strategy selection and use as required meeting learning expectations and goals (e.g., mechanisms that assist in attention retention and alerts to refocus and think the task through a second time).

During the first half of Observation 1, the relationship between Cathy and Ned appeared to be quite tense. Cathy had planned a task using a book she hypothesised would interest Ned based on information she collected in the assessment session. She maintained a consistent routine in addressing the teaching elements so that Ned knew what was happening next, to reduce anxiety related to the unknown, and to minimise the risk of failure and surprise. During the second half of the story the tension appeared to dissolve, with exception of one incident when Ned demanded to play games. Cathy explained that the work needed to be completed first and games could be played if time permitted. Ned complied and went on with the reading task. While neutral behaviours occurred for 6% of the time (Table 4-4), these arose during the first half of the lesson. Cathy appeared to gauge the tone of her relationship with Ned; she also regularly checked what element to teach next and had asked for help from her mentor to ensure she was addressing the alphabetic principle component of the lesson correctly.

Table 4-4
Percentage of Engagement Elements Observed During Observation 1 for Cathy and Ned

<table>
<thead>
<tr>
<th>Teacher Curriculum</th>
<th>Explicit Instruction</th>
<th>Curriculum Correction</th>
<th>Student Curriculum</th>
<th>Strategy</th>
<th>Affirmation</th>
<th>Teacher Social</th>
<th>Neutral Behaviour</th>
<th>Student Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>6</td>
<td>5</td>
<td>18</td>
<td>11</td>
<td>11</td>
<td>12</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

Cathy demonstrated that she had achieved the foundational level of content and procedural knowledge required for teaching reading from the workshops, the first two lectures and her reading, and was applying this when teaching Ned. Observation 1 showed that Cathy was beginning the journey towards integrating the procedural and conceptual knowledge required to move into the Situated, Can-Do Procedural Knowledge Phase described by Snow et al. (2005). The collection of evidence using Revised Edition School
Observational Coding System (REDSOCS) (Ginn, Seib, Boggs, & Eyberg, 2009) methods, analysis of the data and reporting by visual reporting allowed the researcher to gain an understanding of what was occurring when teachers have attended lectures and workshops on the use of assessments, on writing lesson plans from the data collected and on teaching students experiencing difficulties in learning to read. A second observation was planned for the end of the teachers’ tutoring program to capture the changes in the use of conceptual and procedural knowledge that ensued from the program.

4.3.1.2 Observation 2: Cathy and Ned. Observation 2 was conducted towards the end of the tutoring program. Coding skills (i.e. alphabetic principle, phonological awareness, big word-little word, fluency, reading practice, revision, games, and spelling) then comprised 47% of the session (as shown in Figure 4-7). Comprehension (i.e., modelled reading, vocabulary, talking and listening, revision, and comprehension) totalled 53% of the session. Whereas the proportion of time spent on coding and comprehension did not differ quantitatively between Observations 1 and 2, there appeared to be qualitative difference between the two observations (e.g., greater confidence by Cathy in teaching decoding skills; use of word structure to access word and passage meaning).

Figure 4-7. The percentage (%) of time spent by Cathy and Ned on each reading element during Observation 2.
Observation 2 also provided evidence that Cathy had become confident in monitoring Ned’s reading skills, programming instruction, and in teaching the intertwined elements for learning to read. Cathy appeared much more at ease with teaching the coding skills while also addressing key comprehension skills. In Figure 4-8, the fine-grained analysis of the big ideas of reading in Observation 2, during Minutes 20 and 21, Cathy addressed multiple aspects of learning to read from decoding and comprehension. This includes vocabulary and comprehension, as well as phonological awareness and the alphabetic principle. When this shift occurred is unclear, and consideration was given for an additional observation period in the case studies for the main study, to allow for greater understanding of the changes achieved by the tutoring sessions.

Figure 4-8. Observation 2 - Examination of reading elements during in one-minute slices for Cathy and Ned.

Minute 20 highlights the usefulness of routine and of making high expectations clear to students. Ned, while expressing his distaste for spelling, willingly co-operated when he reminded himself and Cathy that spelling came later in the session. Having the routine in his mind appears to have settled any anxiety related to knowing when it would happen. This routine also provided efficiency in integrating the differing elements of learning to read.
read. This is further shown in the transcript from minute 20, where Ned is seen to use a range of higher order phonological awareness micro skills fluently.

Cathy: *It’s time to talk about some spelling words just here.* (oral language, strategy and teacher social [smile]).

Ned: [Disapproval noise] (student neutral behaviour)

Cathy: *You still need to do them, but you don’t have to write them down just yet.* (oral language and teacher social [smile])

Ned: *We do that at the end?* (oral language and student social (smile)).

Cathy: *“That’s right, how do we spell seed?”* (spelling, oral language, teacher affirmation and teacher curriculum)

Ned: *“S/e/e/d”* (alphabetic principle) (spelling, alphabetic principle, and student curriculum)

Cathy: *What does this sound say? Do you remember?* [Teacher points to /ee/] (alphabetic principle, revision, teacher social)

Ned: *ee* (spelling, alphabetic principle, and student curriculum)

Cathy: *Good, I want to spell ‘free’. What do we need to put at the beginning to make ‘free’?* (spelling, affirmation, teacher curriculum, teacher social –(smile) and strategy)

Ned: *Fr* (alphabetic principle, phonological awareness and student curriculum)

Cathy: *And how do I make the ‘fr’ sound?* (spelling, alphabetic principle and teacher curriculum)

Ned: *An ‘f’ and ‘r’ at the beginning.*” (spelling, alphabetic principle, phonological awareness and student curriculum)

Cathy: *Now what do we need to put at the end?* (spelling, strategy)

Ned: *ee* (spelling; alphabetic principle; phonological awareness; student curriculum)

Cathy: *What is this word now?* (teacher curriculum, strategy)

Ned: *free* (phonological awareness, spelling and student curriculum)

Cathy: *Good, what if I wanted to use the same ‘ee’ sound to make ‘green’, the colour. What do I need?* (spelling; alphabetic principle; phonological awareness; teacher social [smile]; affirmation: strategy and teacher curriculum)

Ned: *Gr* (spelling; alphabetic principle; phonological awareness; student curriculum)

Cathy: *How do I make a ‘gr’ sound?* (spelling; alphabetic principle; teacher social [smile]; strategy and teacher curriculum)

Ned: *You have to put a ‘g’ and ‘r’ to make ‘gr’.…* (spelling, alphabetic principle, phonological awareness and student curriculum)

Cathy: *What is the last sound in green?* (Phonological awareness and teacher curriculum)

Ned: *n... green* (blended) (alphabetic principle, phonological awareness and student curriculum)

Cathy: *Good work*

Cathy was able to teach the full session without constantly checking documentation for the order and nature of content. She appeared to be confident in teaching the specific elements for reading and in engaging Ned as per the framework adapted from Snow et al. (2005).
Although Ned was obviously unhappy at the prospect of spelling, he completed the task. Establishment of a lesson routine allowed Ned to feel safe and know the expectations required of him. The lesson moved at a brisk pace and covered more content, provided challenge, and facilitated success in learning. Minute 16 provides further evidence about the enhanced efficiency of instruction that took place within the teaching sessions. Cathy sequenced the activities and used instructional strategies to enhance Ned’s learning. For example: (a) “how do I make a fr sound”, “f and r at the beginning” - Ned not only knew the letter-sounds, he correctly located the position of those sounds in the word free; and (b) Cathy sequenced the task by addressing the spelling task orally from easiest to hardest before attempting written requests. She used the word seed before presenting the more complex word free, a word beginning with a double consonant.

As Ned learned new skills and knowledge for reading, greater emphasis was placed on learning to generalise his learning to fluent decoding and comprehension. The books read during the modelled read were most often factual texts that were of interest to Ned. They were age-appropriate and had an ever-increasing depth of vocabulary. As the books became more complex, diverse words with the same meaning were introduced providing the opportunity to examine groups of words using shades of meaning. Morphographical knowledge was introduced and expanded during the ‘big word-little word’ feature of the reading program. Cathy taught Ned to find known words within larger, more complex words to assist in decoding and meaning. When he was able to do this, Ned was provided with explicit instruction of detect affix and root word meanings within selected words (i.e., part of word that gives meaning). For example it was highlighted and discussed that ‘bi’ as in bicycle means ‘two’. The syllables of bi and cycle were discussed and interpreted as two-wheel cycle. This discussion was then taken to tricycle; ‘tri’ within tricycle means ‘three’, tricycle is a three-wheeled cycle.

The basal series of decodable texts as recommended by Chard, Simmons, and Kame’enui (2006), and Cooper (2001), was chosen by Ned to read for practice and fluency. These texts were selected purposely as they were approximately 82% decodable, had a controlled level of vocabulary difficulty, word introduction and repetition. The first book Ned read emphasised the digraph “oo”. This diagraph was, as diagnosed by the reading assessment, unknown to Ned. The same digraph was also taught as a new sound in his knowledge of the alphabetic principle, when blending, and during spelling within the same session.

Ned demonstrated during Observation 2 that, compared to Observation 1, he could decode words with greater complexity accurately and fluently while reading more complex
texts. This was confirmed in the weekly fluency measure (Figure 4-10). Further, Ned demonstrated he could generalise his reading to other less complex texts when he read a book of his choice for enjoyment at the end of the session.

Revision and practice of knowledge for reading, oral language and journal writing were completed during each session. As Cathy built a greater understanding of Ned’s skills and knowledge of reading, and developed a greater understanding of how to systematically analyse text for skills and knowledge, she was able to plan for maintenance and revision. This was achieved during modelled reading, as well as opportune moments during the observation. So while the proportion of time spent on the modelled reading material was similar between Observation 1 and 2, the quality of the engagement had improved in the latter.

Data from Figure 4-9 and Table 4-5 demonstrate that Ned was engaged in learning, and his neutral behaviours were confined to rocking on his chair (in Minutes 3 and 20). Ned smiled or laughed often during the session (e.g., student social; Minute 16), signaling his enjoyment in learning. This enjoyment was also represented in the amount of content that was covered within a session as reported in Figure 4-8.

![Figure 4-9](image-url)

*Figure 4-9.* Engagement elements recorded between Cathy and Ned in one-minute slices of time during Observation 2.
As Cathy presented the curriculum elements with diverse approaches, she used explicit instruction when presenting new vocabulary and new learning. With that, learning affirmations for attempts as well as success were given. With the development of a rapport there was greater integration of reading elements as seen in figure 4-8. During the time they worked together, Ned and Cathy smiled and socially interacted, creating an appearance of enjoyment of learning. This interaction resulted in a relationship, social interaction and learning behaviours while the elements for reading were presented and practiced through games and reading fluently with accuracy. Ned made strong gains in learning to read as reported in Table 4-5 and Figure 4-10 helped by Cathy, who had gained a working knowledge of the entangled, intertwined specialised conceptual and procedural knowledge required to teach reading.

Ned’s neutral behaviour of rocking on his chair only occurred during the post-study assessment.

Table 4-5
Proportion (%) of Time for Each of the Engagement Elements Exhibited Cathy and Ned During Observations 1 and 2

<table>
<thead>
<tr>
<th></th>
<th>Ob 1</th>
<th>Ob 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Curriculum</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Explicit Instruction</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Curriculum Correction</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Student Curriculum</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>Strategy</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Affirmation</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Teacher Social</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Neutral Behaviours</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Student Social</td>
<td>9</td>
<td>17</td>
</tr>
</tbody>
</table>

When comparing Observation 1 and Observation 2, time given to curriculum remained the same. The observations showed that Cathy used fewer words when providing curriculum-related instructions. The teacher spent less time on explanations based on the curriculum while the student spent more time practicing. For example during Observation 1 Cathy introduced fluency reading

Cathy; *We are going to read. This is called The Cat, The Dog and The Vet...*

[Vocabulary instruction]

*I need to get my timer out and you need to read to me for three minutes.*

Ned: *I don’t want to read, I want a sticker.*

Cathy: *When you have read to me you can have a sticker. I want you to read to me for about three minutes. Just because we are sitting in different seating doesn’t mean you can be silly. You need to sit still and read to me The Cat, The Dog, and The Vet.*
Ned: *Book, Book* ...(10 times)
Cathy: *That's enough of that. Stop now and read to me.*
Ned: *I want to move now.*
Cathy: *Later thank you. Now read to me*
Ned began reading

Observation 2: *Ned. It’s time to read now.*
Ned began reading.

Ned knew the routine of the lesson and what reading fluency entailed. Cathy had learned how to support Ned’s neutral behaviour needs and engage him in learning. Ned experienced language-processing difficulties (as reported by the school learning and support team). Cathy, during observation 2, used the minimum number of words to give Ned a greater opportunity to comprehend the instructions.

4.3.1.3 Interview with Cathy. The semi-structured interview questions were designed to collect in-depth information from Cathy about the skills and knowledge she had acquired to teach reading to students experiencing reading difficulties. It aimed to explore her understanding of the process, and how this may fit with the model of knowledge outlined by Snow et al. (2005).

4.3.1.3.1 Categories and codes. A thematic content analysis (Patton, 2002; Ryan & Bernard, 2003) of the interview data was independently undertaken by the researcher and a peer to develop a collective sense of the information provided by Cathy during the interview. The process included familiarising oneself with the data, coding (labeling) the information that may be useful for answering the research questions and collating the data into categories. The categories were reviewed and redefined into themes.

Following the development of the open codes, the researcher and independent coder arrived at six categories and three themes. The interview data themes were developed through revisiting and continuous comparison of codes for consistency, to see where specific data points could apply. Some codes were subsumed into others to create three themes centering on the knowledge of the student, the domain-specific knowledge for teaching reading, and teacher’s knowledge and calibration of their own learning (Cunningham, 2004). Table 4-6 provides an overview of the interview data analysis. The numbers on the far left-hand side represent the levels of analysis, moving upwards from the base of the figure. The two-directional arrows indicate non-linear links among the items.
Table 4-6

*Overview of the Thematic Analysis of the Interview with Cathy*

<table>
<thead>
<tr>
<th>4. Theory</th>
<th>Complex sets of diverse knowledge are required for the teaching and learning of reading with students not meeting National Benchmarks. Predominant contributors include teacher preparation for teaching reading, acquisition of <em>Specialised Content Knowledge</em> (SCK) required to teach reading, practical application of integrated new and accumulated knowledge, calibration of the teacher’s own learning, common content knowledge (CCK), knowledge of the student and content (KSC), content and teaching (KCT) and horizon content knowledge (HCK).</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Themes</td>
<td>Student’s individual needs for learning</td>
</tr>
<tr>
<td>2. Categories</td>
<td>Knowledge of student and content (KSC) (Assessment and curriculum related)</td>
</tr>
<tr>
<td></td>
<td>↑</td>
</tr>
<tr>
<td></td>
<td>External knowledge of student</td>
</tr>
<tr>
<td></td>
<td>Knowledge of student characteristics</td>
</tr>
</tbody>
</table>

| 1. Open Codes | based on an interview for Case Study 1 - Cathy |

The thematic analysis demonstrated that Cathy had learned and used the specialised content and procedural knowledge when teaching Ned to read. Other knowledge content for teaching and learning experienced and learned throughout Cathy’s teacher preparation, during practicums and work placements, were part of this learning. Adding specialised content and procedural knowledge provided the mechanism that enabled Cathy to teach a young child with difficulties learning to read. She demonstrated conceptual and procedural knowledge and skills to implement a complex set of reading assessment measures and to initiate constant monitoring of Ned’s progress, resulting in information that guided her reading instruction to accommodate Ned’s changing learning needs. She analysed the results, designed individual specialised instruction and engaged Ned in learning to read.
4.3.1.3.2 Interview data

Cathy spoke openly about her learning throughout the study and demonstrated that she gained confidence in using the big ideas of reading within her teaching. At a general level, she explained:

*Teaching reading to Kindergarten students next year was something I was concerned about. I knew little bits about reading but I never learned about teaching… and how to put it all together [discussing pre-study knowledge].

I think that if I had to teach reading I would have done a reading record… then try to find the books they matched and were able to read.

I learned about assessment and identified from the testing what Ned didn’t know, so that he could learn. Vocabulary, decoding, blending and segmenting words, alphabetic principle, sight words, fluency, and here, hidden and head questions. Ned has language disorder. Students with language [processing] problems have trouble reading and fall behind their peers because of it.

I am much more confident now as I can assess, program and teach reading.

In future I will teach them the same way as Ned. I will assess the children and explicitly teach the elements I have programmed for, used and learned in this study. That is, to model read, teach vocabulary, the alphabetic principle and develop single letter and digraph sounds [phonemes] I used the ratio of 4 known and 1 unknown sounds so that Ned didn’t get scared of being wrong or anxious. I taught phonological awareness so that he could hear and manipulate sounds in words.

I will use the big word-little word activity so my students are able to see that those long words are made up of short words they can read. They will practice fluency reading and I will teach comprehension skills. Like the literal, creative and inferential skills. I will also teach spelling and mark each letter so that they see success and have them write a journal so that they know what new skills they are learning each day.

It is important to teach decoding and make sure the children are able to read the words on the page fluently, so they can take in the sentence as a whole and paragraphs as a whole. I would also teach them to identify the meaning of where, when and why it happened [comprehension]. I want them to listen to themselves read. To look at the first word of the question so that they know what they are looking for and retell what they have read. It is actually very important as the student can sometimes read the words and not know the meaning.

4.3.1.3.3 Summary of interview.

The discussion demonstrated that Cathy had made positive gains in learning to teach reading. Before the study she had very little specialised knowledge for assessing and teaching reading. Her idea of teaching reading began with a student who could read. During the unit of study, Cathy learned a foundational level of conceptual knowledge for teaching reading, and the procedural knowledge to implement, interpret, and use the assessment data to create a research-based reading program that met Ned’s individual learning needs.
She discussed the specialised conceptual and procedural knowledge for reading. The external data provided by the School Learning Support Team prior to the study indicated that Ned was experiencing language-related learning difficulties and poor learning behaviour skills. Ned’s SPAT and Educheck results reflected poor phonological awareness, common in students with auditory processing difficulties as indicated by Gersten and Chard (2001). Cathy demonstrated a new awareness and understanding of disadvantage.

Initially, Ned had resisted engagement and the development of a relationship. He turned his head away and crossed his arms in defiance when Cathy attempted to communicate with him. The explicit teaching of the specialised elements of reading while being positive and social yet firm allowed him to learn. The teaching and learning of the specialised knowledge for teaching reading, applying that knowledge simultaneously, and engaging a student who was at risk of failing to learn to read resulted in her contemplating the possible future Ned may have faced without the intervention that assisted Ned to acquire the skills of reading. The results provided a glimpse of Cathy’s teaching and learning that resulted in this new awareness. The school Learning and Support Team reported that Ned had been diagnosed by a speech therapist as having a language delay and adherence to the Disability Discrimination Act (2005) was required.

Cathy revealed growth by learning the specialised content and procedural knowledge for teaching reading. Cathy had become aware of the need for more explicit instruction when teaching, for engaging Ned over the course of the unit of study, and for the provision of additional processing time to answer questions. For example, during Observation 1 (Minute 16), phonological awareness instruction, she left part of her instruction for the word recall out and appeared not to realize that Ned may have guessed the answer. In Observation 2 minute 20, Cathy provided well-sequenced, explicit instruction and additional language processing time that allowed Ned to think out his answers.

Cathy achieved the objectives from the Snow et al. (2005) adapted framework at the Stable Procedural Knowledge level. She increased her understanding of the reflective, organised, analysed knowledge and moved towards the level of expertise necessary for a master teacher (e.g., showing levels of expertise in assessing student’s reading skills and teaching a research-based reading program one-on-one, paired, small group or whole class).

Cathy was observed applying the conceptual and procedural knowledge while completing the subject Teaching Students with Special Needs. The quotes demonstrate the gains she made towards acquiring the specialist content knowledge for teaching reading, and the impact this had on her learning.
Cathy had grown beyond the Declarative Knowledge and Situated, Can-Do Procedural Knowledge levels expected of a beginning teacher.

4.3.1.4 **Ned’s assessment results.** The pre- and post-study assessment data shown in Table 4-7 and Table 4-8 provide evidence that Ned made gains in his reading ability over the course of the project. The pre-study reading assessments administrated by the teacher show that Ned made quantitative gains on all measures. His knowledge of single sounds (lower and upper case) grew from 15 to 46; Ned read 40 more words from the Johnson (Johnson, 1971) word list, an increase of nearly 150% over the eight weeks of intensive instruction.

Table 4-7  
*Pre and Post Study Reading Assessments Completed by Cathy to Establish Ned’s Individual Learning Needs*

<table>
<thead>
<tr>
<th></th>
<th>Upper and Lower case Single Letter Sounds</th>
<th>Digraph</th>
<th>SPAT</th>
<th>Educheck</th>
<th>Johnson Basic Vocabulary test</th>
<th>Basal series decodable text</th>
<th>Spache readability text by grade</th>
<th>Fluency</th>
<th>PM Comprehension %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-study</td>
<td>15</td>
<td>8</td>
<td>12</td>
<td>0</td>
<td>27</td>
<td>16</td>
<td>2.0</td>
<td>65</td>
<td>33</td>
</tr>
<tr>
<td>Post-study</td>
<td>46</td>
<td>27</td>
<td>48</td>
<td>1-5</td>
<td>67</td>
<td>30</td>
<td>3.4</td>
<td>79</td>
<td>75</td>
</tr>
</tbody>
</table>

Table 4-8 shows Ned made gains in the Word Identification and Word Attack sub-tests of the *Woodcock Reading Mastery Test* (Woodcock, 1998). Ned commenced the study reading at below his expected chronological age in both sub-tests, confirming his class teacher’s judgment that he was behind his expected age in coding and identification, and in pronunciation of sight words. On completion of the study Ned was close to meeting his age-related expectation in Word Identification and had surpassed his expected Word Attack age-related expectation by 5 months.
Table 4-8
*Ned’s Pre-Study and Post-Study Woodcock Reading Mastery Tests-Revised Results*

<table>
<thead>
<tr>
<th></th>
<th>Word Attack Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
<th>Word Identification Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-study</td>
<td>2</td>
<td>6.9</td>
<td>1.0</td>
<td>35</td>
<td>7.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Post-study</td>
<td>35</td>
<td>7.11</td>
<td>1.5</td>
<td>65</td>
<td>7.5</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Tables 4-7 and 4-8 show that Ned made noticeable gains in decoding knowledge. His improvements in reading isolated text (e.g. Word Attack, Johnson word list) were accompanied by a growth in reading continuous text. This is shown in Figure 4-10.

*Figure 4-10.* Ned’s weekly reading fluency rate, the Spache rating and PM reading level.

The expected Australian fluency rate for students in grades K-2 is 50-80 words per minute (Student Services and Equity Programs: Disabilities and Learning Difficulties Unit, 2006). Ned achieved this level of decoding fluency by the completion of the eight-week program through steady gains in reading achievement demonstrated by improved PM Benchmark and Spache readability scores (see Figure 4-10). The Spache readability scores indicate that Ned made a learning gain of one year and four months over the eight-week period.
The results of Ned’s post-study reading skills assessments illustrate the gains made in comprehension during the study (see Figure 4-11). Prior to the study Ned was able to answer a limited number of literal texts, yet was unable to retell what he had read or to answer inferential and creative questions. As shown in Figure 4-11, during the post-study assessments Ned demonstrated his ability to retell what he had read, and to answer literal and age-related inferential and creative questions.

![Figure 4-11. Ned’s pre-study and post-study comprehension results.](image)

4.3.1.5 Summary of Case Study 1

The data collection through the use of the TKS showed that Cathy made gains in her knowledge about the key elements of early reading development. She also demonstrated she possessed the level of specialised conceptual knowledge required for teaching reading. A ceiling effect was apparent for TKS comprehension related Questions 29, 30 and 31.

The interview analysis revealed further information relating to Cathy’s improved conceptual knowledge. She discussed how this was connected to the ability to read fluently and the steps [procedural knowledge] she would take to promote fluency in reading. Cathy also identified that language processing has an impact on how students learn to read, and make meaning from text. While she did not elaborate on the instruction required, Cathy demonstrated an awareness of differences in students’ learning ability. This insight informed the adapted Snow et al. (2005) adapted framework. Cathy knew the
five big ideas (elements for reading) and taught Ned how to intertwine and generalize the elements that allowed him to make gains in decoding, vocabulary building, reading fluently and comprehending the authors intended meaning of the text.

Packaging the observations into one-minute slices of time allowed the researcher to closely examine the differences pre- and post-study. However, it did not provide continuous evidence to allow reporting of progress over the course of the study.

4.3.3 Summary of Phase 2 Results. This case study provided the opportunity to examine if case study methodology yields data that level and depth of teacher knowledge to be assessed. The TKS (Table 4-9) provides a snapshot of evidence about the conceptual knowledge acquired by the teachers. The interview and observations add to this information about the specialised knowledge for teaching reading.

The interview allowed for an examination of the teacher’s experiences, ideas and thoughts and her student’s learning. During the interview, Cathy named the elements required for teaching reading, and discussed the assessments and programming she had developed. The effect of these programs on student learning as well as teacher knowledge was evidenced through the observations. Video data provided an opportunity to examine the use of resources; post-session informal discussions and interviews allowed for teacher use of student data to monitor progress.

Student Ned struggled to learn to read, and was significantly behind his peers at the beginning of the study. He had participated in a core reading program in his classroom (Tier 1), and had received additional support (Tier 2) prior to this study. Through the presentation and practice of the micro-skills within the elements of reading (e.g. blending, segmenting and manipulating the phonemes in words) he achieved strong gains in learning to read. This was shown through the Woodcock Reading Mastery subtests (Woodcock, 1998), the SPAT (Neilson, 2003) and Educheck (Neil, 1988).

Ned developed a strong relationship with Cathy. This aided their engagement with the teaching and learning of reading. Both student and teacher participated in curriculum and social interaction, demonstrated an enjoyment of the time together and learned from one another.

The pilot study included two observations only, one at the beginning and one at the end of the program. This only provided evidence the teacher and student learned at two time points. It was evident that additional observations would allow a finer understanding of the progressive view of learning.
Ned’s weekly reading and fluency data illustrated his gains in learning to read when engaged in regular one-on-one lessons within a trusting relationship where he actively participated in the learning to read process. These data show the constant monitoring and continuous change in the levels of accuracy and fluency of the texts being read.

This pilot study was undertaken to examine the validity of the measures applied; to verify the appropriateness, usefulness and usability of the instruments; to evaluate the interview questions for clarity; and to make any changes that may be necessary for the main study, based on these outcomes. It became clear that Question 7 of the interview (Could you walk me through your program and explain why you have programmed this way?) required adaption as the teachers answered the first part of the questions only, without giving their rational. The questions asked in the semi-structured interview required modification from compound to simple questions.

### 4.4 Phase 3: Post-Study Test of TKS and Student Data

The mean pre-study and post-study results on the Teacher Knowledge Survey are detailed in Table 4-9. The cohort of 64 teachers who consented to participate in the study increased their overall knowledge by four points. The results were analysed using paired t-tests, and show that this gain was statistically significant (p < .005). These total scores do not provide a breakdown of the components causing the change, thus more extensive analysis was considered for the main study.

<table>
<thead>
<tr>
<th>TKS Knowledge and Skills</th>
<th>Pre-Study Mean (SD)</th>
<th>Post-Study Mean (SD)</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>TKS Knowledge and Skills</td>
<td>19.48 (3.37)</td>
<td>21.70 (3.42)</td>
<td>64</td>
<td>5.26</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Cathy’s individual raw scores for the pre-study Teacher Knowledge Survey totaled 22. While Cathy showed lower level of knowledge about the teaching of reading at the beginning of the program, she achieved similar or higher scores at the end of the eight-week program with a score of 27. These scores are close to the ceiling for the Teacher Knowledge Survey.
Table 4-10 reports the pre-study and post-study scores for all students in the study on each of the measures administered. The paired t-test analyses show that the differences between pre-study and post-study scores were statistically significant (p < .0001) on each of the measures. It would appear that the reading programs, which were implemented based on the reading science literature (e.g., Snow et al., 1998), had a strong impact on students’ decoding skills. This enhanced ability to identify words extends to their ability to decode unknown words (i.e., non-sense words) at a higher level than previously. This outcome provides evidence that students were able to generalise their decoding knowledge to unknown pseudo-words, and are now in a better position to decode unknown words when reading (Kame’enui et al., 2002).

Table 4-10

Results of Reading Measures Taken from the School Student Group

<table>
<thead>
<tr>
<th>Outcome</th>
<th>n</th>
<th>Pre-test M</th>
<th>Pre-test SD</th>
<th>Post-test M</th>
<th>Post-test SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Measures</td>
<td>79</td>
<td>84.42</td>
<td>16.20</td>
<td>106.26</td>
<td>17.93</td>
<td>12.34</td>
<td>79</td>
<td>0.0001</td>
</tr>
<tr>
<td>Woodcock Reading Mastery subtest – Word Attack (WR-WA)</td>
<td>79</td>
<td>13.58</td>
<td>10.39</td>
<td>23.93</td>
<td>17.06</td>
<td>9.51</td>
<td>79</td>
<td>0.0001</td>
</tr>
<tr>
<td>Woodcock Reading Mastery subtest WR-WI Word Identification</td>
<td>79</td>
<td>38.94</td>
<td>16.41</td>
<td>48.46</td>
<td>14.74</td>
<td>7.94</td>
<td>79</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

### 4.4.1 Summary of Phase 3.

Phase 3 analysis allowed for comparison between pre-study and post-study results. The comparisons of the TKS evidenced the gains made by the teachers in learning the specialised conceptual knowledge for teaching reading. The WRM-WR and WRM-WI subtest assessment results (Table 4-10) revealed significant gains made by all student participants, as well as by Ned, in learning to read. Ned (Figure 4-11) significantly improved his skills for retelling and for comprehending the author’s intended meaning of the text during the program.

The pilot assessments and intervention informed the decision to use the same methodology for the main study, with adaptions made as discussed in the Summary for Phase 2 (4.3.3).
4.5 Phase 4: Inferences.

The data were mapped onto the adapted Teacher Knowledge Matrix (Snow et al., 2005) so inferences could be viewed and scores obtained. The evidence provided was ranked and served as a means to determine the degree of convergence, and for confirmation of the validity of the research results. The criteria for making judgments can be found in Table 4.11.

Table 4-16 shows the outcomes for Cathy on the Teacher Knowledge Matrix. Cathy achieved all indicators on Level 1- Declarative Knowledge; she had completed University studies and demonstrated in the TKS data analyses that she could recall some content knowledge for teaching reading. Cathy provided evidence of working towards all objectives of Level 2 - Situated, Can-Do Knowledge. Cathy implemented data collection and analysis to inform her programming and taught Ned in a one-on-one situation over the weeks of the study, as seen in the observations and discussed in the interview. During the observations she is using appropriate resources and modelled numerous strategies such as tracking her reading with her finger. Further, she used explicit and systematic instruction and provided thinking time to allow Ned to learn and to process communication in a timely manner.

Cathy demonstrated achievement of the indicators within the Procedural Knowledge, and of Level 3 – Stable Procedural Knowledge. Cathy explicitly taught using the macro- and micro-skills from within the big ideas (i.e., alphabetic principle, phonological awareness, fluency, vocabulary and comprehension) needed to teach reading. Ned learned how to generalise his knowledge to reading words and in continuous texts and made gains in reading fluently and accurately texts of greater complexity. Cathy selected specific games to practice Ned’s new learning and to intertwine and generalize that knowledge to reading and comprehending texts. She monitored his progress in learning to read and made changes to the reading program in response to his gains and current learning needs. These three levels comprise knowledge typical of a teacher at the end of their first year of teaching.

Cathy achieved three of the four indicators of level 4 – Expert Adaptive Knowledge at a minimal level (see figure 4-3). Cathy demonstrated that she was able to assess, analyse results for programming, plan instructional programs, engage, and teach a student with significant learning needs one-on-one, using evidence to inform the specific macro and micro instruction required to teach Ned to read. While initially struggling to manage Ned’s behavioural needs, Ned was shown to be engaged and was enjoying learning during observation 2 at the end of the study. As demonstrated in the continuous reading data
(Figure 4-10), he was making gains in learning reading. Cathy searched out and selected specific resources for practising and integrating the macro and micro skills Ned was learning.

Cathy, however, did not have the opportunity to demonstrate that she was able to meet the fourth objective of the Adaptive Expert Knowledge for teaching reading to a class of diverse learners as the opportunity was not available to do so. While she assisted her peers to develop the skills required to analyse and program, and participated in tutorials based on the recommended readings, Cathy did not formally provide professional development.
Table 4-11
*Cathy’s placement on the matrix adapted from the Teacher Knowledge Matrix* (Snow et al., 2005)

<table>
<thead>
<tr>
<th>Post-study data</th>
<th>5. REFLECTIVE, ORGANISED, ANALYSED KNOWLEDGE</th>
<th>Knowledge to promote literacy across the school programs (Snow et al., 2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Is well versed in historical and current research and considers theories. Has extensive knowledge of concepts and theories. Designs integrated reading programs specific to students’ needs. Understands what is easy and hard for students and is able to present concepts so that they are understood. Evidenced through:</td>
<td>Demonstrates acquired conceptual knowledge for teaching reading to diverse students, and including those with difficulties in learning to read. Knows and integrates macro and macro skills for reading. Shows evidence of student gains in reading. Evidenced through:</td>
</tr>
<tr>
<td></td>
<td>Evidence of deep procedural knowledge for engaging students in learning to read. Engages teachers in learning the knowledge required to teach reading. Evidenced through:</td>
<td>Demonstrates acquired procedural knowledge for assessing, analysis, programming and teaching reading to students regardless to diversity. Integrates elements and knowledge for reading. Shows evidence of student continuous gains in reading. Evidenced through:</td>
</tr>
<tr>
<td></td>
<td>Integrates resources (for example: games, basal series text level of difficulty) to teach reading to all students including the hardest to teach. Evidenced through:</td>
<td>Selects resources (for example: games, basal series text level of difficulty) to teach reading to all student including the hardest to teach. Evidenced through:</td>
</tr>
<tr>
<td></td>
<td>Is considered to be an expert in reading and literacy and is responsible to mentor school staff and lead professional development at school, conferences, universities and through written materials. Evidenced through:</td>
<td>Demonstrates sophisticated level of conceptual and procedural knowledge required to teach reading. Provides professional development for peers and teaches whole class to read. Evidenced through:</td>
</tr>
</tbody>
</table>

- **Post-study data**
- **Pre- and post-study survey**
- **Interview data**
- **Observations**
| Post-study data | 3. STABLE PROCEDURAL KNOWLEDGE | Identifies and implements some micro and macro skills of the elements required for literacy. For example: pure phonemes & retelling oral story, knowing how to find the answer (of a question) in text. Develops a positive relationship and engages student in learning. Evidenced through: □ Pre- and post-study survey □ Interview data □ Observations | Recognises appropriate procedural knowledge to teach reading that includes micro and macro skills and strategies (for example: systematic and explicit instruction of the concepts). Teaches generalization of knowledge and skills for decoding and comprehension. Evidenced through: □ Pre- and post-study survey □ Interview data □ Observations | Selects technologies to support the teaching of the micro and macro skills of the elements required for reading. For example: leveled texts, fluency graphs, strategy sheets, e-thesaurus, games, and books (e-books or paper) Evidenced through: □ Pre- and post-study survey □ Interview data □ Observations | Engages students in learning. Monitors gains and adapts teaching programs to facilitate learning. Evidence of student gains in learning to decode and comprehend. Evidenced through: □ Pre- and post-study survey □ Interview data □ Observations |
| Post-study data | 2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE | Aware of the big ideas within reading and recall some information Evidenced through: □ Pre- and post-study TKS □ Interview data □ Observations | Selects appropriate procedural knowledge (strategy) to plan a reading activity that provides success in learning Evidenced through: □ Pre- and post-study survey □ Interview data □ Observations | Identifies, implements and analyses reading assessments to inform programming needs. Plans a reading program that includes the five elements required to teach reading strategies and resources. Evidenced through: □ Pre- and post-study survey □ Interview data □ Observations | Identifies, implements and analyses reading assessments to inform programming needs. Implements a reading program that includes the five elements required to teach reading strategies and resources. Teaches 1:1 or small group. Evidenced through: □ Pre- and post-study survey □ Interview data □ Observations |
| Pre-study data | 1. DECLARATIVE KNOWLEDGE | Acquired disciplinary knowledge about a range of issues within education. Evidenced through: □ Progression through University study | Acquired some disciplinary knowledge about promoting literacy. Evidenced through: □ Progression through University study | Acquired some disciplinary knowledge of resources that support the teaching of reading Evidenced through: □ Progression through University study □ Pre- and post-study survey □ Interview data | Acquired and recalls some content knowledge about teaching reading Evidenced through: □ Progression through University study □ Pre- and post-study survey □ Interview data |

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4.6.1 **Level 1: Declarative knowledge.** The first level of achievement within the *Teacher Knowledge Matrix* (Snow et al., 2005) identified the teachers as having completed their university studies up to commencing this unit of study. Cathy met this requirement. Ned had struggled to learn to read at the same rate as his peers. The Learning and Support Teams personnel reported Ned as having a language processing diagnosis and being amongst the hardest to teach. Ned had received Tier one and Tier two support prior to commencing the teaching and learning sessions with Cathy.

4.6.2 **Level 2: Situation can-do procedural knowledge.** Level 2 was also achieved as Cathy identified, implemented and analyzed reading assessments (Figures 4-2 and 4-12). She used the data to construct reading programs that included the big ideas for reading (phonological awareness, alphabetic principle, fluency, comprehension and vocabulary) with consideration given to micro skills (Figures 4-2). Cathy demonstrated the use of strategies and resources while teaching her student one-on-one (e.g. tracking text during reading) as identified in Figure 4-3. Ned engaged in learning the specialised reading elements through the explicit instruction, repetitive fluency reading, and through games. Intertwining the macro and micro skills as presented in the reading program lesson plan (Figure 4-13) of the elements allowed generalisation to enable reading continuous text. Graphing the fluency ratings provided Ned with a visual picture of his own progress. The excitement generated from seeing his own progress appeared to generate courage, confidence and a trust that he would learn to read. Neutral behaviours were seen less in the second observation.

A trusting relationship and social interaction was evidenced during the observations, with Cathy providing explicit instruction of the curriculum elements (i.e., the macro skills of phonological awareness, alphabetic principle, vocabulary, fluency and comprehension) (Figures 4-5 and 4-8). Cathy and Ned were engaged in teaching and learning from each other (Figures 4-9).

4.6.3 **Level 3: Stable procedural knowledge.** Stable procedural knowledge is considered to be typical of a teacher in their first year of teaching. Cathy used a variety of technologies while providing instruction to Ned, as seen in the observations and mentioned during the interviews. Cathy spoke of presenting modelled reading (selecting a book to read was required), playing games (to practice skills), fluency reading (selecting correct basal series decodable texts). These strategies were essential to program creation, delivery and participation. She monitored Ned’s learning (Figures 4-10 and 4-20) and programmed
after each teaching session. Evidence of monitoring, programming changes and diverse technologies are evidenced in Figures 4-4, 4-7, 4-8 and 4-18.

4.6.4 Level 4: Expert adapted knowledge. The fourth level of the *Teacher Knowledge Matrix* (Snow et al., 2005) saw Ned making gains in learning to read. Although Ned was very hard to teach, he made progress in decoding and in comprehending the author’s intended meaning. Cathy demonstrated that she was able to teach Ned to read, but did not have the opportunity to fulfill the matrix outcome requiring that a teacher at this level is able to teach all students to read. While Snow et al. (2005) suggests that those who can teach those who are the hardest to teach will be able to teach all students to read, there is no evidence within this study that Cathy would be able to teach all students to read, irrespective of significant disabilities and learning differences. Neither did she have the opportunity to provide professional development beyond tutorial presentations during the study. Cathy demonstrated that she had learned elements of this level she had not met all outcomes of learning the specialised conceptual and procedural knowledge required for teaching reading.

4.6.5 Level 5: Reflective organised analysed knowledge. Reflective organised analysed knowledge, includes outcomes beyond Cathy’s learning. She demonstrated achievement of part of one outcome and had gained a foundational level of specialised content and procedural knowledge for teaching reading as described by Snow (2008).

Ned made demonstrated gains in learning to read and to answer literal, inferential and creative questions and in retelling the study being heard and read. He also made good gains in reading fluently with accuracy at increasingly more complex texts.

4.7 Discussion

The purpose of the pilot study was to gather information before the larger study to verify the quality and effectiveness of the study protocol. A pilot study can reveal limitations in the design, and these problems can be addressed before time and resources are expended on the main study. A good research design requires careful planning and a pilot study is part of this research.

This pilot study was small, but provided insight into the planned processes involved. It informed the suitability and accuracy of these processes for the main study, and provided information on the sources and magnitude of variation of response measures. The measures used within the pilot study were shown to be appropriate for gathering the
necessary data for analysis, with some modifications required to enhance the teacher opportunities to express their thinking. The required modifications will be discussed at the end of this Chapter.

Prior to outlining changes to the study methodology, based on the results of the pilot study, an examination will be made of the suitability of the measures and research procedures. This will be undertaken through examining processes to maximise reliability and validity of quantitative measures, and the trustworthiness of qualitative measures. In addition, the fully integrated mixed methods design will be examined in regards to the mixed methods legitimation types posed by Onwuegbuzie and Johnson (2006).

4.7.1 **Quantitative measures.**

### 4.7.1.1 Establishing reliability to ascertain rigor.

Quantitative methodology has clearly established concepts and procedures that allowed the researcher to deal with the issue of objectivity (Creswell, 2003; Rubin & Babbie, 2005). That is, the need to be precise, unbiased, honest and open to correction or constructive criticism. Discussions with the researcher’s supervisor and with the regional team required the researcher to make all aspects of the research visible.

### 4.7.1.2 Quantitative research and establishing validity to establish rigor.

Reliability is connected to the quality of measurement (Straub et al., 2002). A measure is considered reliable if it produces the same result over and over again. Without reliable measures, the validity of study can be diminished (Straub et al., 2002). Consequently, reliability is a precondition for validity in quantitative research.

Validity refers to the sincerity of the findings (Shadish, Cook, & Campbell, 2002) and includes (a) **measurement validity** (i.e., content and construct validity); (b) **design validity** (i.e., internal and external validity); and (c) **inferential validity** (i.e., statistical conclusion validity).

Measurement validity estimates how well an instrument measures what it intends to measure in terms of matching the construct. The TKS, for example, had been validated through research reported in peer-reviewed papers (e.g., Piasta et al., 2009) to address big ideas of reading. The researcher independently confirmed this focus. Design validity refers to the extent of the truth of inferences regarding cause and effect (Shadish et al., 2002). External validity is the extent to which the results can be generalised, and inferential conclusion validity refers to the appropriate use of statistics to infer if the presumed dependent or independent variables. Internal concurrent validity was established through the examination and experimentation of the measures to establish the
appropriateness and usefulness of the measures used. For example, the trial of and decision to use the TKS (Piasta et al., 2009) in place of the Moats (2000) as the measure was written for in service teachers rather than teachers. While the Moats measure was written for the same purpose it was judged on the basis of a trail to be beyond the capacity of the teachers to complete the survey.

The predictive validity of the TKS could not measure all aspects of teacher knowledge but did provide the researcher with the opportunity to examine trends pertaining to teaching the specialised knowledge for teaching reading. The interview questions were written to allow the teacher some freedom in their answers but within the confines of the specialised research. The interview questions were trialed informally at first and then formally prior to the main study.

Threats to internal validity included the number of absences a student or teacher might take due to illness or usual school processes that are subject to change. Testing students when tired, unwell or over excited can change them concentrating. The mentors and researcher listened to the child and control the environment against noise and factors that may distract.

4.7.2 Qualitative measures. 4.7.2.1 Increasing trustworthiness to establish rigor. Trustworthiness is established when findings possible reflect the meanings as described by the participants in the interviews and discussions (Guba & Lincoln, 1985). It is not something that occurs naturally, but is established through the use of defined procedures. Threats to trustworthiness can include problems such as reactivity and bias on the part of the researcher and the participant (Padgett, 1998). The strategies to avoid such threats include prolonged engagement, triangulation, peer debriefing, member checking, negative case analysis, audit trail and reflexivity (Creswell, 2003). Reflectivity is important for qualitative inquiry as it allows us to identify when we facilitate or hinder the co-construction of meaning.

Videos and interview results were scrutinised by expert practitioners in teaching reading to ensure the meaning intended by the participant when interviewed and observed was accurately captured. The regional team of Support Teachers Learning Assistance who provided extensive professional development for current teachers across 64 schools on the specialised content knowledge for teaching reading viewed the videos and discussed the content. All agreed that the teachers intended meanings had been kept, while also providing valuable feedback on refining processes (e.g., systematic feedback to all teachers).
Investigative discussion between the researcher and academic supervisor provoked reflection on both differences and commonalities, which sensitised the researcher to perspectives that may support and/or hinder the process, compelling the researcher to be more diligent with the data analysis, and thus strengthened the study. The supervisor would ask questions and challenge the quality of the findings on a regular basis during meetings.

A peer with expert knowledge required for teaching reading, engagement and coding also asked questions weekly about the REDSOCS (Ginn, Seib, Boggs, & Eyberg, 2009) data collection, during the data analysis, and completed a comparison analysis of that data to ensure accuracy. This peer was an expert in engagement and behaviour assessment, analysis and programming for engagement and behaviour.

4.7.2.2 Reflective journal. A reflective journal was kept by the teachers and written at the conclusion of each lesson taught. The action of writing a journal established the importance of reflection, of having an understanding of the knowledge each person holds, and to provide insight into the complex knowledge required to teach reading. It allows contextual information to be considered, facilitates analysis, and reveals connections.

4.7.2.3 Peer checking. Peer checking involved a team of teacher experts in the field of teaching reading reviewed the data collection procedures, analyses and reporting devices throughout the study. The regional team met weekly and discussed the data collection processes, videos evidence, data storage, permissions, privacy and the intent of the witnesses for quality and accuracy was carefully checked.

4.7.2.4 Maintaining a consistent chain of evidence. Throughout the observation process a chain of evidence for the collected data was kept up-to-date to maintain consistency in the meanings assigned to the data. An outside expert in data collection followed the trail of evidence from the beginning to the conclusion.

The case study data were checked and systematically maintained. A different outsider conducted a separate thematic analysis, and carefully considered the quotes to ensure the meaning and intent expressed by the interviewee was maintained throughout the study. A copy of the data and analysis was stored in a separate, password protected hard-drive for security reasons.
4.7.2.5 **Triangulation.** Mixed methods was used for data collection was used during this study. Consideration was given to the qualitative data collection, and maximising the quality of results that could be gleaned from these data. In this study five types of triangulation as described by Patton (2002) were considered.

*Data triangulation* involved using different sources of information to increase the validity of the study. The interviews and observations were used to establish knowledge relating to the teachers own theories, ideas, beliefs and opinions, and demonstration of practical use of the knowledge. Student data collected included formal and informal methods. That is the use of the fluency and accuracy measures using continuous texts analysed with Spache for complexity of text, and comprehension measures. The teachers used the *Specific Level Assessment Tasks* for data collection related to learning and programming of lessons.

*Investigator triangulation* required a team of various investigators to be involved in the evaluation process. The regional Learning and Support Team met weekly to examine the data collected, meaning intent during the interview and compare their own observations and ideas for checking case study sorting, survey results and intent of interview were kept.

An expert in behaviour coded the learning and behaviours as seen during the observational videos at the same time as the researcher to establish theoretical triangulation. In undertaking this coding they established that the theory of reading for this study was being interpreted in a robust and consistent manner.

The method of data collection used in this study was a mixed methods approach to allow for differing ways of collecting the data. Interview, case study, observation and survey completion were used to study the program and compared for similarity in findings. This ensured that the methodologies triangulation type was upheld.

*Environmental triangulation* was possible through the use of differing school sites to conduct the study. This allowed for data from differing environmental sites to included within the study. A possible limitation within this type of triangulation was that the schools were located within seven kilometres of the university, restricting the environment to an inner city perspective.

4.7.3 **Mixed methods legitimation.** Mixed methods research is a relatively new paradigm of research within education, and continues to be critiqued (e.g., the complexities in combining quantitative and qualitative data. (Tashakkori & Teddlie, 2003). Like any research, the use of mixed method designs need to result in research that is “defensible to
the research and practice communities for whom research is produced and used.” (Onwuegbuzie & Johnson, 2006, p. 48).

It was therefore important that this study, in using a mixed methods design, uphold the quality of research so that it could be defensible to the wider education community. In an attempt to achieve this quality, the typology of mixed methods legitimation types posed by Onwuegbuzie and Johnson (2006) and based on the work of Tashakkori and Teddlie (2003) was adopted. In reviewing the nine typologies, the following were considered important in establishing the quality of this study: sample integration, weakness minimisation, and multiple validities.

The participants in the quantitative and qualitative components of the study were drawn from the same population. In this case, the case study participants were drawn randomly from a group of volunteers who had completed the TKS. In doing so, it strengthens the meta-inferences that can be drawn from the study (Onwuegbuzie & Johnson, 2006). However, because of the small number of case studies used to generate qualitative data, care will need to be made in generalising conclusions beyond the study participants.

Weakness minimisation involves using the strengths of one approach to compensate for the limitations of the other (Onwuegbuzie & Johnson, 2006). The pilot study demonstrated the limitations of the TKS in providing in-depth data about teacher knowledge of reading, yet the interviews and observations in the case studies provided rich data about the depth of knowledge about teaching reading.

The third typology that was considered key to this study was multiple validities, “the extent to which all relevant research strategies are utilized and the research can be considered high on the multiple relevant ‘validities’.” (Onwuegbuzie & Johnson, 2006, p. 59). As discussed previously, the individual validities of the quantitative and qualitative methodologies were considered in designing and undertaking the pilot study and found to be sound.

4.8 Recommended Refinements for Main Study

As a result of the pilot study, a number of changes were undertaken to address methodological issues, and to enhance the opportunity to address the research questions, prior to the main study. The TKS analysis in the pilot study required the data to be analysed as one score. This provided little insight into the teacher knowledge about the individual big ideas within the measure. It was then proposed that the TKS would be examined as a total score, as well as through classification of items into the big ideas of
reading. While this poses some issues in regards to the small number of items in an element (e.g., vocabulary), it allowed for a finer grained examination of teacher knowledge.

The pre-study and post-study observations did not provide an opportunity to establish the nature of teacher knowledge change during the eight-week program. As a result, a third observation was scheduled at the mid point of the program. The three observations provided the desired opportunity to gain a more thorough understanding of how the teachers constructed the specialised content and procedural knowledge required for teaching reading. It also provided a mechanism to examine how the knowledge changed and grew over the period of the study.

The teacher interview and student data collection methodology remained as for the pilot study, with minor adjustments. In the teacher interview, Question 7 required change to two simple questions, rather than multi-part question. This was done to eliminate confusion or neglect in answering the second part of the question, and removed the need for teacher prompts provided greater opportunities for the interview conversation to flow smoothly.

The data generated from two case studies during the pilot study was substantial. The pilot case studies were reflective of each other in the data gathered. As a result, the number of case studies to be used in the main study was set at three as it would provide sufficient data to answer the research questions.

An additional pre and post study assessment for vocabulary (word meaning) was added as the Johnsons Vocabulary Test was designed for word recognition and pronunciation of the word only and did not include meaning (Johnson, 1971). Further examination using PM benchmark vocabulary questions was added to ascertain if the students understood the meaning of specific words (e.g., What does the word ‘inflammatory’ mean?).

The use of the custom fully integrated mixed model design (Tashakkori & Teddlie, 2003) in the pilot was considered appropriate to generate the data required for addressing the research questions. Using the design sequence or phases to conduct the pilot study allowed for the technical aspects of the study to be examined and reflected on. It was considered that the custom fully integrated mixed model design was appropriate for conducting the study (i.e., the sequence of phases was appropriate), and providing data to answer the research questions. This process was cumbersome for the researcher to address the research questions, as reporting phase by phase prevented a full integration of data. The final change, based on the results of the pilot study, was to report the findings through addressing the specific research questions posed for the study.
CHAPTER 5
Results of Main Study

This chapter presents the findings of the main study. The main study took into account the findings from the pilot study.

The results of the analyses address the three research questions posed for the study.

Question 1: To what extent does a field-based unit of study prepare pre-service teacher to use specialised content and pedagogical knowledge to enhance student literacy outcomes?

Question 2: To what extent does a field-based unit of study enhance pre-service teachers content knowledge of reading?

Question 3: To what extent do pre-service teachers gain the specialised content and procedural knowledge required for teaching reading as represented on the adapted Snow et al. framework?

The pilot study identified the need for changes to the main study data collection and analysis to allow questions to be answered in greater detail. The analysis of the TKS identified the necessity to examine teachers’ development in greater detail. Hence, responses within the TKS were clustered into specific elements of reading. These data and the total score were analysed to allow for greater understanding of teacher knowledge (Piasta et al., 2009).

The understanding of teacher knowledge development examined through the observations was limited by the observations being made at the beginning and the end of the program only, thus an intermediate observation was added.

The interviews undertaken with teachers provided additional insight into teacher understanding and knowledge construction. The questions used for the pilot study were too complex and were revised to focus on single ideas and constructs. It was anticipated that this would provide a greater opportunity to examine specific ideas, and to probe teacher responses.

Using these adjustments to the research methodology, this chapter is grouped around the research questions set for this study. Using the integrated mixed methods design, qualitative and qualitative data from the study will be provided, discussed and integrated to assist in answering these research questions. The discussion will initially focus on examining teacher and student outcomes; this will be followed by a close examination of student and teacher development via three, in-depth case studies.
Main Study Participants

The main study participants included 84 teachers enrolled in a unit of study on catering for students with learning difficulties in the final year of their Bachelor of Education (Primary). These teachers consented to be part of the study as per the pilot study.

When completing permission forms to participate in the study, they indicated their willingness to participate as a case study. The names of case study volunteers were written on a piece of paper and placed into a container. A person who was not involved in the study drew three case study names. The school students paired with the teacher prior to case study selection were kept as dyads. The teachers who participated in the case study were not included in the survey results, therefore, the total number of survey participants was 82.

5.1 Results of the Pre and Post Study Measures

5.1.1 Teacher outcomes. The Teacher Knowledge Survey (TKS; Piasta et al., 2009) was administered using paper and pencil under test conditions prior to the commencement of the program, and again at the end. The data were coded and entered into a SPSS data file and analysed on completion of data check and cleaning.

The TKS was analysed for the teacher cohort as a whole (n=82), and by groups of specific reading elements. The mean and standard deviation were calculated for the whole teacher group (n=84) and are presented in Table 5-1.

Teacher participants showed a significant increase in their total TKS score of four points across the duration of the program \((p < .05)\). Teachers increased their knowledge in each of the differing elements during the program. This improvement differed among elements, but was statistically significant for all except strategy knowledge. Caution must be used in examining these results for some elements (e.g., word study, strategy knowledge) due to the small number of items on the survey. Teachers made proportionally larger gains on phonemic awareness (50%) than for comprehension (13%).

5.1.1.1 Influence of learning in upper or lower primary tutoring. It was hypothesised that participant teachers who were learning the specialised knowledge for teaching reading while working with lower primary (Years 1-3) students would learn more than those teachers who taught upper primary (Years 4-6). In this study, 36 teachers taught students in Years 1-3, and 46 taught students in Years 4-6. A one-way analysis of variance was used to clarify differences in learning gains made by these two groups. The
The independent variable was the grade level, with two levels (upper primary, lower primary). The dependent variable was the post-intervention total score. The results of the ANOVA found no statistical significant difference on post-test scores $P(1, 81), F = .38, p= 0.53$.

Table 5-1
*Pre and Post-Study Scores of the Teacher Knowledge Survey by Question Groupings and as a Total Score*

<table>
<thead>
<tr>
<th></th>
<th>Maximum Score</th>
<th>Pre-study Mean (SD)</th>
<th>Post-study Mean (SD)</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonological Awareness</td>
<td>8</td>
<td>3.90 (1.50)</td>
<td>5.86 (0.97)</td>
<td>11.40</td>
<td>81</td>
<td>0.001</td>
</tr>
<tr>
<td>Alphabetic Principle</td>
<td>3</td>
<td>1.80 (0.68)</td>
<td>2.36 (0.90)</td>
<td>5.10</td>
<td>81</td>
<td>0.001</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>3</td>
<td>1.46 (0.84)</td>
<td>2.23 (0.84)</td>
<td>5.70</td>
<td>81</td>
<td>0.001</td>
</tr>
<tr>
<td>Word Study</td>
<td>2</td>
<td>0.53 (0.63)</td>
<td>0.83 (0.64)</td>
<td>3.10</td>
<td>81</td>
<td>0.003</td>
</tr>
<tr>
<td>Strategy Knowledge</td>
<td>3</td>
<td>2.00 (0.98)</td>
<td>2.12 (0.75)</td>
<td>1.05</td>
<td>81</td>
<td>0.29</td>
</tr>
<tr>
<td>Comprehension</td>
<td>11</td>
<td>7.20 (1.62)</td>
<td>8.17 (1.37)</td>
<td>5.05</td>
<td>81</td>
<td>0.001</td>
</tr>
<tr>
<td>Survey Total</td>
<td>30</td>
<td>19.85 (3.90)</td>
<td>23.85 (2.96)</td>
<td>9.91</td>
<td>81</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**5.1.1.2 Influence related to gender.** An analysis examining difference in teacher knowledge between genders was undertaken using the total score of the TKS. The number of male and female participants was uneven (14.6% male, 85.4% female), but was comparable to the male to female ratio of the general teacher population reported by the Australian Bureau of Statistics (2015) of 16.8% and 83.2%, respectively. An ANOVA showed no statistical difference in gains in total score by male and female teachers working with students learning to read.

**5.1.2 Student outcomes.** Student outcomes were examined through the *Woodcock Reading Mastery Tests-Revised* (Woodcock, 1998) sub-tests of Word Attack
(WRMT-WA) and Word Identification (WRMT-WI), and Spache readability data. The data were coded and entered into a SPSS data file, and a summary is shown in Table 5-2.

Table 5-2

Pre- and Post-Study Scores for Student’s Woodcock Reading Mastery Subtests and Spache Reading Measure

<table>
<thead>
<tr>
<th>Test Type</th>
<th>n</th>
<th>Pre-study Mean (SD)</th>
<th>Post-study Mean (SD)</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodcock Reading Mastery Tests-Revised</td>
<td>82</td>
<td>13.58 (11.4)</td>
<td>23.93 (0.84)</td>
<td>11.4</td>
<td>81</td>
<td>0.001</td>
</tr>
<tr>
<td>Word Attack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodcock Reading Mastery Tests-Revised</td>
<td>82</td>
<td>28.46 (10.00)</td>
<td>38.46 (0.84)</td>
<td>10.00</td>
<td>81</td>
<td>0.001</td>
</tr>
<tr>
<td>Word Identification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spache Reading Measure Fluency</td>
<td>82</td>
<td>1.46 (0.84)</td>
<td>2.23 (0.84)</td>
<td>12.34</td>
<td>81</td>
<td>0.001</td>
</tr>
</tbody>
</table>

The Woodcock Reading Mastery sub-test scores demonstrated significant gains in decoding and in word reading. This was reaffirmed in with the case study weekly reading scores (Figure 6-1). A repeated measures t-test showed that on the word attack and word identification subtest, the difference between the pre and post study scores was statistically different (p < .001).

In the Spache fluency measure the students made significant gains in learning to read as the students demonstrated an increase from pre-study to post-study levels. This was also reaffirmed with the case study student weekly scores (Figure 6-1). A repeated measure t-test was conducted pre- and post-study scores and the difference between these scores was found to be statistically significant (p < 0.001).

5.2 Case Studies

Three case studies was undertaken to examine the specific interactions between the students and their teachers. These case studies were informed through the TKS scores, observations of three teaching and learning sessions, and a semi-structured interview with the teacher. The school student measures included the Woodcock Reading Mastery Tests-Revised (Woodcock, 1998) sub-tests Word Attack and Word Identification, Spache
Readability Fluency (Spache, 1953), and PM Benchmark decoding, vocabulary (for word meaning) and comprehension levels (Smith, 2010).

5.2.1 **Case Study 1.** Case Study 1 participants were teacher Laura, and student Jericho. Laura reported that she had previously worked as a volunteer tutor teaching early reading for one hour per week in a local primary school. During this experience, she undertook no planning as the class teacher provided the program. Laura had received no professional development for delivering the reading program. Laura’s student participant, Jericho, was 11.9 years old, and enrolled in Year 6. The school learning and support team informed the researcher that Jericho was from an Aboriginal and Islander background, spoke English and Samoan languages at home and had been diagnosed as having a receptive language disorder and reading difficulties. The school learning and support team reported that Jericho was popular amongst peers, was good at sport, was physically taller than his peers and had a strong social group.

Pre-study TKS analysis produced scores in percentage of questions answered correctly for each element as shown in Figure 5-1. The TKS was repeated at the end of the study. Pre and post-study data are shown in Figure 5-1.

![Graph showing TKS analysis results](image)
Figure 5-1. Laura’s pre- and post-study TKS results as percentage of correct answers by element of reading.

The TKS pre-study results found that Laura responded correctly to at least 50% of items in each area of knowledge except of the area of alphabetic principle. After seven weeks of participating in the tutoring program, Laura scored at similar levels or greater on all elements. Greatest growth was in the area of the alphabetic principle, phonological awareness and comprehension. A ceiling effect in the pre-study vocabulary result was reached.

Table 5.3 provides Jericho’s pre-study and post-study scores on the Woodcock Reading Mastery Tests-Revised (Woodcock, 1998). His Word Attack subtest (i.e., the ability to read non-words) scores increased from 35 to 40, indicating an equivalent growth of four years and one month. This result showed that Jericho improved his skills in applying the alphabetic principle knowledge and phonological awareness knowledge and skills to decode unknown and non-words. His learning gains for reading everyday words grew by approximately two months (i.e., the duration of the study).

Table 5-3

Jericho’s Pre- and Post-Study Woodcock Reading Mastery Sub-Test Results

<table>
<thead>
<tr>
<th></th>
<th>Word Attack Raw Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
<th>Word Identification Raw Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Study</td>
<td>24</td>
<td>8.10</td>
<td>4.3</td>
<td>70</td>
<td>10.3</td>
<td>4.7</td>
</tr>
<tr>
<td>Post-Study</td>
<td>33</td>
<td>12.4</td>
<td>6.9</td>
<td>71</td>
<td>10.5</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Figure 5-2 reports Jericho’s PM benchmark comprehension pre- and post-study results taken after reading a text at an independent reading level. Prior to the study Jericho answered limited literal, inferential and creative questions about the texts read. He was unable to retell information from texts read. During the post-study assessments Jericho gave an accurate retell (100%), and correctly answered literal (100%) questions and age related inferential (100%) and creative (67%) questions. His background knowledge or life experience may have been a factor in answering creative questions and required attention.
Figure 5-2. Pre- and post-study scores on the PM Benchmark comprehension achieved by Jericho.

The Specific Level Assessment Tasks (SLAT) (Department of Education and Training, 2009) administered by Laura, provided the data required to write a program of instruction that would meet Jericho’s individual learning needs. Pre and post-study assessment results for the SLAT are shown in Table 5-4. Jericho’s strength lay in his knowledge of sight words and single phonemes; he demonstrated knowledge of the more common digraphs (e.g., th, sh, ck). He had acquired early phonological skills (e.g., blending and segmenting) often achieved by a student in early Year 1.

The pre-study results for the Educheck (Neale, 1988) revealed that Jericho was unable to generalise known reading elements. He relied heavily on sight word recognition and his minimal decoding skills. Jericho read words that were made up of a vowel (V) and consonant (C) (e.g., at) and CVC words (fat). Jericho demonstrated that he could not hear and manipulate sounds in words expected of a student in Kindergarten (Neilson, 1995), nor could he blend in a continuous stream that would allow him to identify the word.

Table 5-4

Specific Level Assessment Task Results and PM Benchmark Assessments for Jericho
Jericho still had to learn the overlay and necessary interplay between phonemes and phonological awareness skills when decoding. Jericho demonstrated minimal skills for blending CCVC (e.g., slip) and CVCC (e.g., cast) or words that included double consonants (e.g., cattle). He demonstrated that he had acquired the /s/ for the single letters within words. He was unable to blend phonemes together to make words or to segment words with three consonants (e.g., splat or hitch). Jericho read the word sat when reading the CVC words, yet could not use higher level phonological awareness manipulation skills that would allow him to add phonemes to form other words (e.g., splat). Jericho could explain the long vowel CVCC and consonant blend for CCVC words, yet failed to correctly read any of the 16 examples (e.g., gripe or mile) presented. He talked about learning the rule during Observation 2, yet was unable to apply that knowledge to reading. Jericho did not use the more complex phonological awareness skills of onset, rime and medial letters (as described by Ehri et al., 2001) to produce or decode words in texts.

During the assessment, Jericho read a limited number of words that included common digraphs known to him. He also read minimal morphographic sections of words (e.g., prefix, suffix and root words) within multisyllabic words. Jericho was unable to read words with miscellaneous combinations (e.g., various and vague) or minimal pseudo-words that required decoding (e.g., whid and quox).

Learning about, and administering the assessment was a unique experience for Laura. She indicated during Week 1 of the study that she had never encountered such assessments during her previous three and a half years within her teaching program. The content that was being addressed within the assessments was also new, and she had little understanding of how the big ideas of reading (i.e., alphabetic principle, phonological awareness, fluency, vocabulary and comprehension) would support students. As a result,
she found using the assessments challenging, and needed to refer to the instructions frequently.

Laura used the SLAT data with the assistance of her mentor to design a plan of instruction in reading that specifically targeted Jericho’s learning needs. The initial lesson plan is shown in Figure 5-3. The plan shows that Laura commenced by reading a book Jericho had indicated he was interested in during their first meeting. Laura used the book to model reading to provide Jericho with an understanding of the purpose of reading. Use of punctuation, fluency, pausing, expression, enjoyment in reading, and examination of visuals were demonstrated. The same book provided words for building vocabulary, and phonemic awareness skills (e.g., identifying onset and rime, blending or segmenting words) taught through explicit and systematic instruction.

The phonological awareness skills were taught in hierarchical order of difficulty, as Jericho appeared to have considerable gaps in his knowledge as evidenced through the initial assessments. During Observation 2, Jericho discussed the confusion he had experienced in discriminating the phonemes differences between his two cultural languages (Figure 5-9, Slice 33, p. 25). These confusions may have contributed to his inability to blend single letter and digraph phonemes to words.
### Table 5-5

**Pre-study SLAT Results and PM Assessments Used to Design Jericho’s Reading Program**

<table>
<thead>
<tr>
<th>Student Assessment Results</th>
<th>Generalisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Name: Jericho Grade: 6 Date of Birth:</td>
<td>PM level of difficulty, PM comprehension and vocabulary</td>
</tr>
<tr>
<td>Alphabetic Principle</td>
<td>C=consonants</td>
</tr>
<tr>
<td>Phonemic Awareness</td>
<td>B= blends</td>
</tr>
<tr>
<td>C=consonants B= blends</td>
<td>Dig=digraphs</td>
</tr>
<tr>
<td>Dig=digraphs Dip=diphthongs</td>
<td>Fluency, PM level of difficulty, PM comprehension and vocabulary</td>
</tr>
<tr>
<td><strong>Known single sounds (circle):</strong></td>
<td>PM level 10</td>
</tr>
<tr>
<td>a b c e f g h i j k l m n o p q r s t u v w</td>
<td>Decodable text book number (Start) 17</td>
</tr>
<tr>
<td>x y z</td>
<td>Fluency: 1 minute: 92</td>
</tr>
<tr>
<td>A B C D E F G H J K L M N O P Q R S T U V W X Y Z</td>
<td>Accuracy: 94%</td>
</tr>
<tr>
<td>Total Score 32/52</td>
<td>Self correction: Y/N</td>
</tr>
<tr>
<td><strong>Known digraphs (circle):</strong></td>
<td>Comprehension</td>
</tr>
<tr>
<td>ch sh wh th ck eg et it ur ea ay ai ei ee ey ou or aw ow oo ie igh ar au kn ph oi oy qu wa ce ss ff ue wa</td>
<td>- Retell Y/N</td>
</tr>
<tr>
<td>Total score 12/34</td>
<td>- Uses academic words when retelling Y/N</td>
</tr>
<tr>
<td><strong>Sight Words: Johnston’s Basic Vocabulary Test - Correct Words 70/100</strong></td>
<td>- literal Y/N 33%</td>
</tr>
<tr>
<td>Errors</td>
<td>- inferential Y/N 33%</td>
</tr>
<tr>
<td>Onset</td>
<td>- creative Y/N 33%</td>
</tr>
<tr>
<td>Y/N</td>
<td>Vocabulary 33%</td>
</tr>
<tr>
<td>Rime</td>
<td>Level 1 achieved</td>
</tr>
<tr>
<td>Y/N</td>
<td></td>
</tr>
<tr>
<td>Medial</td>
<td></td>
</tr>
<tr>
<td>Y/N</td>
<td></td>
</tr>
<tr>
<td>Vowels</td>
<td></td>
</tr>
<tr>
<td>Y/N</td>
<td></td>
</tr>
<tr>
<td>Long e</td>
<td></td>
</tr>
<tr>
<td>Y/N</td>
<td></td>
</tr>
<tr>
<td>Visual errors</td>
<td></td>
</tr>
<tr>
<td>Y/N</td>
<td></td>
</tr>
</tbody>
</table>

**Comment:**
- Uses punctuation
- Guesses words from onset
- Mixed Australian English and Samoan phonemes
- Kindergarten skills met for SPAT
- Scattered vocabulary skills
- Relies on sight word recognition
- Oral and written comprehension is poor
The letter-sound relationships were carefully integrated and supported across differing sections of the lessons. They were used in spelling and were within the basal series texts that were selected to generalise phonemes to the words being read. In this way the learning of the multilayered skills were brought together (e.g., phonological awareness sounds supporting word study and decoding skills) to support and strengthen the reading development.

Through explicit instruction in phonological awareness skills and the alphabetic principle, gains were evident (see Figure 5-4). These skills were supported through games used to practice known and new skills and tie them together (e.g., to link vocabulary to comprehension and word study, and spelling to written text). As part of the program Laura was required to deliberately plan the games and word study activities to facilitate practice of what was being learned. The games initially focused on phonemic awareness skills of identifying the onset (i.e., first letters in a word including the vowel) and or the rime (i.e., the letters after the vowel sound in a word) in words and syllabication during the beginning weeks of the study. These activities and instructions appeared to help Jericho to generalise the decoding process to more complex words in text. (See examples in following discussion.)

Identifying the level of text complexity Jericho read at an independent level had occurred prior to the study by the School Learning Support team and confirmed by a trained research assistant. Laura used the data provided to make a conscious decision to select a text that would provide Jericho with success in decoding from the first session. Laura used the results provided by the school learning and support officer to make a conscious decision to select a text that would provide Jericho with optimal success in decoding from the first session. Laura began teaching comprehension by focusing on retell and key question words (e.g., when, who and where) before moving to inferential and creative question instruction.

At all times Jericho’s interests in literature were considered when choosing texts for modelled and shared reading. This knowledge enabled Laura and her mentor to tailor instruction to help engage and motivate Jericho, and allowed Laura to purposefully work on building a relationship with Jericho that promoted trust, engagement and enjoyment of learning.
<table>
<thead>
<tr>
<th>Reading Element</th>
<th>What to Teach</th>
</tr>
</thead>
</table>
| **Modelled Read** | **Book:** Fox (Wild & Brooks 2004)  
Vocabulary  
Paper book or iPad  
Teacher Reads only  
Teach: Author and Illustrator  
Vocabulary words: chard, sapling, haunted and rage  
Phrase: the mouth of the cave |
| **Comprehension** | Teach: retell explicitly  
Modelled read text  
Posters from www.pjlanguagelearningassistance.com |
| **Big Word - Little Word:** Whole words, prefix suffix | **Word:** Grandparents  
**Focus:** Finding small real words in big word |
| **Phonological Awareness (SPAT)** | **Word list:** Identify end sounds:  
Set 1: lend, limp, rhyme, trim, land, churn, time, been & steam  
Set 2: Delete rime  
**Known:** b, d, w, r, t, s, g, j  
**New:** ea, ee and ey  
**Oral exercises** |
| **Alphabetic Principle** | **Basal series decodable text** - book number 16  
Check for vocabulary words  
Retell – teach explicitly – see posters  
**Known:** b, d, w, r, t, s, g, j  
**New:** ea, ee and ey  
Ratio for teaching 4:1 known to unknown  
Use same sound different look |
| **Fluency Reading** | **Segmentation 1:** teach blending explicitly beginning with VC and move to CVC and maybe CCCVC. At, sat, slat, splat  
Resource: set letter tiles (lower case)  
**Fluency Reading** | Read through text, then 1 minute read and graph.  
Retell, key question words - who, when, where  
Teach answering and asking literal, inferential and creative questions |
| **Games for Skills Practice** | **Game:** Who is in the last carriage or similar  
**Focus:** Identifying rime  
Focus on areas of need and skills for generalization i.e. phonological awareness, sight words, vocabulary, comprehension |
| **Word study** | **Segmentation 1:** teach blending explicitly beginning with VC and move to CVC and maybe CCCVC. At, sat, slat, splat  
Resource: set letter tiles (lower case)  
**Shades of meaning** – rage, temper, fury, fume and tantrum  
**Focus on learning need (see Educheck)** |
| **Vocabulary** | Words from reader (family words)  
And 2 theme or sight words  
**Semantic and syntactic grouping,**  
morphographical knowledge  
**Shades of meaning** – rage, temper, fury, fume and tantrum |
| **Spelling** | At, sat, splat  
**Words from reader (family words)**  
And 2 theme or sight words  
**At, sat, splat** |
| **Speaking and Listening and Journal Writing** | “Tell me about what you learned today”  
Scribe for student if required  
Jericho to write own journal |
| **Reading for Enjoyment** | **Picture book with hidden visual cues**  
**Unusual facts** |

*Figure 5-3.* The initial reading program prepared by Laura to support Jericho in learning to read.
The plan of instruction was changed or adjusted after each lesson with consideration to the achievements demonstrated during that lesson. These changes were made under the direction of the school mentor until Laura was able to plan her lessons independently. To ensure fidelity in the planning process, the mentor checked all lesson plans weekly and provided feedback.

Jericho’s reading progress was monitored through a weekly fluency probe and short comprehension assessment. He was asked to read a passage of work from his levelled reader, and answer comprehension questions (i.e., retell, factual, inferential). For each probe, the number of words decoded correctly in one minute was recorded. The results of the probe are shown Figure 5-4, including the level of the reader, and the Spache readability formula.

Evidence of steady gains in reading achievement was provided through gains made on key indicators of reading (e.g., decoding fluency). These gains are reported in PM Benchmark and Spache readability scores (Figure 5-4). While Jericho’s decoding fluency grew from 87 words per minute in Week 1 to 107 words per minute in Week 8, the level of reading text also grew (i.e., Spache score, level of text reading). It appears that the carefully developed reading strategies built and facilitated a reciprocal relationship between decoding and comprehension (Nag & Snowling, 2012).

![Figure 5-4. Jericho’s Spache, PM Benchmark level and passage-reading rate assessed weekly over the course of the study.](image-url)
During the program Laura and Jericho continuously learned from each other. They developed a trusting relationship and Laura taught Jericho the elements of reading and how to generalise the specific elements for reading. The following discussion will highlight how this relationship developed, and supported learning for each participant.

5.2.1.1 Observations Laura and Jericho. The following section reports on the three observations taken during the teaching and learning sessions across the intervention. The observations provided a means of gathering data on the specialised conceptual and procedural knowledge for teaching reading Laura demonstrated and developed in a real life situation. The video provided a record of communication beyond mere words, which occurred during the teaching and learning sessions. The body language, facial expressions and smiles portrayed vital information about engagement that would have been missed if the oral communication alone had been recorded.

During a one-minute slice of time a single element to a range of reading elements were observed and recorded. The complexity demonstrates the intricate, intertwining nature of the reading process and the multiple elements that are involved (e.g., alphabetic principle and comprehension; vocabulary and comprehension; or spelling, phonological awareness and alphabetic principle). Analysis of one minute slices in time indicated that the teachers became more able to intertwine and teach the elements required to teach reading with progressive observations displaying a greater number of incidences of elements observed (Figures 5-9 and 5-11).

The form of analysis described in Chapter 4, was refined for the main study. The data collected were reported visually, and are shown in Figures 5-5, 5-6 and 5-7. These data were supported and further informed by interviews undertaken with the teacher, Laura.

5.2.1.1.1 Observation 1. Observation 1 was undertaken during the first teaching session during week 1. Figure 5-5 provides an overview of the percentage of time spent on differing elements of reading at that time. While the quantitative analysis provides evidence how the 62 minutes of the session were allocated, the qualitative data shows that Laura worked very hard to include all elements. As a result, the session tended to flow quite slowly and purposefully. While Laura worked at building her relationship with Jericho, she attempted to include all features of the lessons developed with her mentor.

The greatest proportion of time was spent on comprehension (18%), phonological awareness (13%), alphabetic principle (12%) and spelling (12%). While 55% of the time was dedicated to these elements, other elements, while playing smaller parts,
proportionally, performed important rolls conceptually. Laura used oral language (9%) and vocabulary (6%) to bolster the comprehension elements of the lesson. In the decoding domain, she gave 3% of time each to word study, and to big - little word. The fine-grained, minute-by-minute analysis of data allowed for the juxtaposition of differing components to be examined (Figure 5-7).

![Pie chart showing the percentage of time spent on each reading element by Laura and Jericho during Observation 1.]

**Figure 5-5.** Percentage of time spent on each reading element by Laura and Jericho during Observation 1.

While Figure 5-5 gives an overall indication of how much time was allocated to differing elements of reading instruction, Figure 5-6 provides a fine-grained insight into the qualities of how this time was used. In the first nine minutes, for example, the teacher undertook a modelled read. This activity provided the chance for Laura to engage Jericho using a motivation text. Laura and Jericho were engaged in tasks that required him to demonstrate oral language use, comprehension and vocabulary meanings. The juxtaposition of these three components provided the chance for Jericho to demonstrate an overall understanding of the text as well as of specific words.

This first nine minutes also provided an example of how Laura attempted to develop a relationship with Jericho. She had given careful attention to his interests (e.g., insects), and to how Jericho would react to differing tasks (e.g., he liked to talk about various topics).
Figure 5-6. The elements used by Laura and Jericho in the teaching of reading during Observation 1.

An examination of minute 3 and the lesson transcript from Observation 1 further highlighted the interplay between differing components of reading. The text about insects captured his attention and engaged Jericho; he had the opportunity to listen to text, engage with new vocabulary, and use and enrich his oral language skills.

Laura (reading): *The sting of the honey bee kills more people that any other insect, but the deaths are due to an allergic reaction rather than the strength of the venom.* (Modelled reading, teacher curriculum, strategy (think time given and use of finger to track words whilst reading)).

Laura: *Do you know what an allergic reaction is?* (Comprehension, vocabulary, teacher curriculum)

Jericho: *No (Comprehension, student curriculum)*

Laura: *Sometimes people, when bitten by bees, have an allergic reaction so their body might go red, or sometimes they may find it hard to breathe. Different people’s bodies may have different reactions.* (Comprehension, vocabulary, oral language and teacher curriculum).

Jericho: *Oh yeh! I know what that is. (Comprehension, student curriculum and student social - smile).*

Laura: *nodding head in agreement - affirmation, teacher social – smile)*

Laura: *The Longest Insect. The longest insect in the world is the Phobaticus chaniare stick insects from the Malay Peninsula, it has a length of 55 centimetres. Its main rival is another stick insect. It is the Phobae/ tic/us kirb/yi, Phobatiecus kirbyi* (Modelled reading, teacher curriculum, strategy).
The beginning of a relationship between the teacher and the student was apparent with Jericho leaning in towards Laura, listening carefully, smiling and occasionally touching her hand without any apparent discomfort by either participant as they tracked words. Laura provided additional time for Jericho to think about his answers when she asked questions about the text.

Vocabulary development was a deliberate and planned focus. The words “allergic reaction” were unknown by Jericho. The verbal explanation given by Laura provided Jericho with the meaning of the word, activated his background knowledge and provided comprehension (Beck et al., 2002).

Figure 5-6 shows that Laura engaged Jericho in vocabulary on a number of occasions (e.g., minutes 5 - 9, 11, 17, 18, 31, 32, 36, 37). While this focus on comprehension was evident, the relationship with decoding was not lost on Laura. Jericho began the study with restricted decoding skills and was unable to decode complex words that he understood in spoken language. Laura used his interest in insects, and strengths in oral language, to promote decoding skills through modelling word parts through the use of phonemic awareness skills. With correct pronunciation of the word and vocabulary meaning Jericho’s comprehension grew as demonstrated in Figure 5-2.

Latter parts of the lesson showed that Laura focused on building decoding fluency (e.g., minutes 30-40), and using words in spelling and journal writing during minutes 24 - 29). Through providing these opportunities, Jericho was given the chance to hear words in context, decode and encode the words and to write them down. These multiple opportunities reinforced vocabulary and comprehension skills.

During Observation 1, engagement data shown in Figure 5-7 reveals that the greatest proportion of time was spent on teacher curriculum (25%) and student curriculum (27%). During her lessons, Laura provided explicit and systematic instruction (in Minutes 8, 15 and 28), asked questions and provided explanations. She encouraged Jericho to take time to think a little longer before providing answers to questions, and to formulate his thoughts and ideas before talking. Jericho talked about personal experiences that related to the story or activity, provided his ideas and thinking about what was occurring at the time, asked and answered questions, and discussed his knowledge and how this linked to new knowledge and skills. For example, Jericho discussed and compared the differences between the letter-sounds in his first language to English. He said, “a, e, i sounds. Like we write the same thing, but we use the other sound”. Further, he showed his trust in Laura by asking questions relating to spelling words without embarrassment (e.g. “Is it one g?”).
Figure 5-7. Analysis of engagement recorded between Laura and Jericho during Observation 1.

The social interaction of the lesson (e.g., smile, laughter, social chat) were important to building a positive relationship between Jericho and Laura. Jericho smiled and cooperated from the very beginning and demonstrated his enjoyment of the lessons within the growing relationship with Laura. The development of this relationship was essential to longer-term success within the tutoring program (Shaddock, 2012).

5.2.1.1.2 Observation 2. Observation 2 was conducted mid-way through the study. The 50-minute video recording was analysed and is reported in Figures 5-8, 5-9 and 5-10.
Figure 5-8. Percentage of time spent on each reading element by Laura and Jericho during Observation 2.

Observation 2 reflects the programming changes Laura made in response to Jericho’s changing learning needs. Laura continued to use stimulus books that interested Jericho (i.e., insects) for the modelled read. She and Jericho expanded the interest focus to include books on unusual animals and read those during the book for enjoyment section of the program. These books had vocabulary supports built into them (e.g., definitions within text) so less time was spent defining words, yet allowing Jericho’s vocabulary to grow. Less time was spent discussing the meaning of words in the modelled read, fluency and practice read, and texts read for enjoyment. As a result, the proportion of time spent on vocabulary changed from 16% of the instructional time during Observation 1 to 9% during Observation 2.

During the weeks Laura and Jericho worked together, Laura continued to learn the specialised conceptual and procedural knowledge required to teach reading. Laura attended lectures on campus, read research articles and participated in tutorials.

The instruction Laura provided to Jericho changed with the elements being integrated and intertwined with greater sophistication (Figure 5-9), associated with positive gains in learning decoding and comprehension of texts. The elements shown in one-minute slices, while represented as separate components within a minute interval, occur concurrently.
Jericho had made substantial gains during the beginning weeks of the study and by the second observation was reading with greater fluency and accuracy. He had moved from reading texts suitable for a student in the latter part of Year 2 (analysed by the Spache Readability generator) to Year 3 texts. The texts read where more complex yet the fluency continued to improve and grow. Fluency growth was not merely about decoding quickly, as expression, punctuation and parsing with word accuracy were also required and evident. In addition, Jericho demonstrated a greater proficiency and skills in comprehension.

Figure 5-9. The elements used in the teaching of reading by Laura and Jericho during Observation 2.

Figure 5-9 also shows Laura’s growing confidence in integrating differing reading components throughout Observation 2. During minute 33, for example, she included spelling, alphabetic principle, reading and fluency, and comprehension. To achieve this integration she utilised a range of teaching and engagement behaviours (e.g., teacher curriculum, strategy use, student curriculum and student social) as reported in Figure 5-11.

A closer examination of the transcript of minute 33 provides a detailed insight into the reading components and teaching and engagement behaviours:

Mentor: *a, b, c (letter names) are the letter names; a, b, c, (phonemes) are sounds they make.* (Alphabetic principle, oral language and teacher curriculum).
Laura: It’s something different is it? There are lots of different rules to remember (oral language, teacher curriculum).

Jericho. We, us, ummm, the umm, a, e, i sounds. Like we write the same thing, but we use the other sound. (Alphabetic principle, comprehension, oral language and student curriculum).

Mentor: So one letter can have different sounds. Does that depend on the word it is in? (teacher social, comprehension, oral language and teacher curriculum).

Jericho: No, its like the letters’ sounds, like the, the umm, what is it? The umm, vowel words or like, yeh! (Alphabetic principle, comprehension, oral language, student curriculum).

Mentor: It gets a bit confusing! Is it? (Comprehension, oral language, teacher curriculum, teacher social (smile)).

Laura: When they say ‘I’ (letter name), I think it’s like the ee or the ie. Is it because it is something different? (Alphabetic principle, comprehension, spelling, oral language and teacher curriculum).

Jericho: Yeh (Student social).

Mentor: It sounds tricky. (Oral language and teacher social).

Laura: It does sound tricky (Affirmation, oral language and teacher social).

Laura: This is your reading passage. We are just going to have a little read through. We are just going to get out my timer and read for 1 minute. (wait time) (Oral language, teacher curriculum and teacher social).

Jericho began reading.

The element being addressed during this time period was spelling (slices 33 – 38). Laura required assistance from the mentor with clarifying letter-sounds and letter-names during instruction. The mentor modelled the instruction of the letter-sounds and names explicitly to ensure learned error did not occur. The discussion disclosed the difficulties faced by Jericho while trying to acquire skills within the alphabetic principle and the skills and knowledge required to read English texts. Jericho, while struggling to learn the correct phonemes, demonstrated that he had begun to develop a strong understanding of the requirements for reading English texts. He identified differences in vowel sounds between his first and additional language, and he had developed the understanding that he was required to use the phonemes appropriate to decode English language words accurately. Laura, while teaching Jericho to read, demonstrated a strong understanding of the specialised knowledge for teaching reading that includes accuracy and fluency of the specific elements of reading, and the complexities faced by Jericho in learning them.
During Observation 2, Laura, as discussed during the interview and observed, learned the foundations of the specific knowledge for teaching reading and developed an understanding that Jericho, as all students, had an indisputable right to learn to read.

5.2.1.1.3 Observation 3.

Observation 3 revealed the continuous change of element focus taught in response to the student’s demonstrated learning needs. The lecture series and in-school tutorials had addressed a range of components in the teaching of reading, which facilitated Laura’s understanding of the role of fluency, how spelling and writing support reading strength, and the extended understanding of the impact of punctuation and word study. Figure 5-11 shows that Laura continued to emphasise reading for meaning through higher proportions of time allocated to comprehension (19%), oral language (10%) and vocabulary (9%). While more than a third of instructional time was allocated to meaning, the proportion of time given to reading skills and knowledge was still noticeable (i.e., word study – 8%; alphabetic principle - 5%; big - little word – 5%, phonological awareness – 5%).

Jericho continued to learn new vocabulary and examined words, asked questions about spelling and used the key words taught to answer questions. In Observation 3, seven
weeks into the program, Jericho could read texts that based on the Spache formula were suitable for a student almost two years older than where he began. Jericho’s decoding fluency had grown from 87 words per minute as expected of a student in Year 3, to reading at 107 words per minute as expected of a Year 6 student. At the same time, his comprehension of these passages continued to progress, with Jericho now starting to engage with higher-level questions (e.g., inferential, evaluative).

![Pie chart showing percentage of time spent on each reading element by Laura and Jericho during Observation 3.

The third observation highlighted a further shift in the time given to specific components required for teaching and learning to read than observed in the previous two observations.

As teaching skills and knowledge provided greater success in Laura and Jericho’s learning (Archer & Hughes, 2011), Laura, with the help of her mentor, deliberately chose to teach single phonemes and digraphs before teaching morphographical knowledge. During the big word/little word section (Figure 5-6, Slices 16-20) in Observation 1, Laura taught Jericho to examine longer words and find smaller complete words within the word. Observation 2 (Figure 5-10, minutes 17-21) saw Jericho examining complex words and learning what constituted a suffix, prefix and root word, and learning that these smaller parts of the words had meaning. Observation 3 (Figure 5-12, minutes 19-26) identified that Laura and Jericho, during big word/little word, focused on identifying a broader range
of morphographical meanings within words. New words within the texts being read were identified and examined for morphographical meaning before a formal definition was sorted. Oral discussion on morphographical knowledge, with revision and introduction of new vocabulary, provided new understandings. Modelling, integration, and interaction of the various elements of reading facilitated generalisation for reading words and continuous texts (e.g., identifying digraphs, suffix and prefix in isolation, before identifying them in isolated words to identifying them in words read within sentences).

![Figure 5-12](image)

The elements used in the teaching of reading by Laura and Jericho during Observation 3.

During post-intervention interviews, Laura briefly described the program of instruction and how it was executed. She had learned the macro and micro skills required (Figure 5-12), described the elements required to teach Jericho to read, and talked about knowing precisely what to teach to engage him in learning to read. Her confidence is shown in minute 16 from the Observation 3:

Laura: *We’ll do some spelling, when we have done them we will go through the words and see what’s happening with them? Manager’, I want to be the manager of a band. Wait time given.* (oral language, strategy use, teacher curriculum).

Jericho: wrote the word (Spelling, alphabetic principle, student curriculum).

Laura: *That’s perfect, spell ‘allowed’.* (oral language, affirmation, teacher curriculum)

Jericho: wrote the word.
Laura: *We have the two ‘l’s, that is correct. Can you put allowed in a sentence?* (Spelling, alphabetic principle, teacher curriculum, oral language).

Jericho: I allowed my brother to come into my room. (Student curriculum).

Laura: *That was nice of you.* (both participants laughed) (Oral language, teacher social, student social).

Laura: *Helmet* (Teacher curriculum).

Jericho: wrote the word (Spelling, alphabetic principle, student curriculum).

Laura: *That’s right* (affirmation and teacher curriculum).

Laura: *Beginners* (Oral language, teacher curriculum).

Jericho: wrote the word (Spelling, alphabetic principle, phonological awareness and student curriculum).

Laura: *Let’s look at the word ‘beginners’. You have the sounds right.* (Teacher curriculum, oral language).

Jericho: “*Is it one g?*” (alphabetic principle, comprehension, and student curriculum) (Laura nodded her head).

Laura: *And, actually, two ‘n’s. Write it again how you think it is. Now, let’s look in Word Spot.* (software list on iPad). “*Find the word beginners.*” (alphabetic principle, oral language, revision and teacher curriculum)

Laura and Jericho quickly scan the list of words.

Laura: *Word spot. Can you find the word beginners?* (oral language and teacher curriculum).

Laura: *There we are, you scanned the text. It’s a good skill to have.* (oral language teacher curriculum and affirmation).

Laura: *So when we look at the word, we have one ‘g’ and two ‘n’s. The sounds are right, you have the spelling or letter placement. Beginners. Manager is right as well, very good.* (alphabetic principle, oral language, teacher curriculum and affirmation).

During minute 16, Jericho was able to capture the sounds within words correctly and spell all words, with the exception of one, correctly. He demonstrated his knowledge of spelling complex words. This included identifying which digraph (e.g., ur, ir or er) to use in the appropriate position. He identified the need to include a double consonant but was unsure of which letter this should be. Laura included the skills required for scanning, which she had previously taught within comprehension instruction, and revisited the use of the skill as a strategy for checking the correct spelling in the written word. Integration of technology for verifying correct answers was also utilised.

During Observation 3, engagement data shown in Figure 5-13, Laura taught explicitly more often and provided affirmations to ensure Jericho knew he was succeeding and making gains as required. Laura and Jericho were observed smiling, laughing and joking indicting enjoyment in teaching and learning. Jericho used strategies modelled by Laura throughout the lessons without prompts.
5.2.2.1 **Interview data.** A semi-structured interview was used pre- and post-study to examine teachers’ knowledge required to teach reading. Working transcripts of each interview, which included verbal dialogue between the researcher and the teacher, were developed from the digital recordings for later axial coding. The discussion on pre- and post-study differences focused on the level of knowledge to teach reading pre-study to having gained the specialised knowledge to teach reading during the program, and the confidence associated with this acquired knowledge.

The purpose of these interviews was to understand the specialised content knowledge that teachers were using to teach a student to read one-on-one. The interview protocol attempted to gather specific information about the skills and knowledge being developed, while also being flexible enough to allow the teachers to provide evidence of their professional knowledge about the teaching of reading. The interviews, therefore, comprised a set of open-ended questions (Harry, Sturges, & Klingner, 2005). During the interviews, the researcher probed to establish the specific nature of the knowledge teachers were using during their tutoring sessions.

These interview data were analysed using a grounded theory approach. Grounded theory is a process where through constant comparison of the data a gradual advancement from coding to conceptual categories and theories emerges (Strauss & Corban, 1998). The
following process describes this constant comparison. The oral recordings were transcribed into cells on an Excel spreadsheet and printed on paper. The script was cut into strips of identified codes and sorted into category groups with aim of capturing key elements of what is being described. Constant comparison of the data identified common categories. Harry et al. (2005) described this as axial coding, as reflecting on notions of axes or points. Beyond the open coding process, selective coding occurred with consideration given to how the code clusters relate and integrate, within positive and negative themes. Table 5-6 reports the results of theme to category comparison and reporting.

These categories are reflected in the observations. Laura, during the interviews, described her own and the student’s learning and how that knowledge translated into quality teaching of a reading program that addressed Jericho’s needs. The gains in Laura’s knowledge for the teaching of reading were observed during the observation periods and the discussions that occurred during specific periods of time (Figures 5-7 to 5-13).

The open codes were sorted into categories as shown in Table 5-6. The categories are in bold italics text, and the themes extracted from the interview followed those headings. During the interview, Laura discussed Jericho and his learning needs. Laura identified Jericho’s individual comprehension learning needs through the pre-PM assessments for reading (commonly known as a reading record) (Smith, 2010) and applied knowledge from the lectures and tutorials to the situation. She explained:

*I now know that every child is different in their learning. The only assessment I had seen (pre-study) was a reading record.*

*My child was in Year 6. When I first started I presumed he would know a lot more than he does because of the grade he is in. I’ve had to strip away all of that out of my mind and teach small steps of information explicitly instead of the original way that I thought was appropriate for him because of his age.*

Laura had formed expectations of a student based on what she thought they should know. Laura at this point in time did not have the specialised knowledge to assess for teaching reading. While she had successfully completed units of study previously and gained limited conceptual knowledge as demonstrated in the pre-study TKS, Laura did not have sufficient knowledge to engage in “good practice” (Snow et al., 2005, p. 8)

Programming using the assessment data as also proved challenging for Laura, yet with the scaffolds that had been deliberately planned for she was able to use the knowledge to program for Jericho.

*Initially, I just looked at the first program example and how it fitted together (provided at the workshops). Then each time (programming occurred), I looked back to see the next step. I began with modelled reading and included big word little*
word, vocabulary, phonological awareness, alphabetic principle, fluency, comprehension, word study, games to practice the learning, spelling, oral language and journal writing as we were shown. We also had to look at single letter sounds, digraphs, morphograph, suffixes, pre-fixes and tier 3 vocabulary to give him some background knowledge to make meaning. It was a lot to take on at first. Fortunately, it is all written down (programming instructions) so we could go back and connect everything together... using the assessment results.

Laura gained substantial knowledge from having to implement the specialised conceptual and procedural knowledge for teaching reading. The practical experience of teaching a student 1:1 who was experiencing difficulties in learning appears to have developed and strengthened Laura specialised knowledge. She at this point was able to assess, program from assessment data to plan a program based on the big ideas for reading and teach a student 1:1.

I know what needs to happen for that child, even in big word little word. I know how to teach to his individual learning needs by looking at the assessment results and from what he has learned. I used the assessment results to work out what games and resources he needed to practice so we got it right for him.

I talked to the speech therapist who is working with him here in the school and she indicated he has a diagnosed receptive language disorder. Now I am aware I have had to change how I do things and teach him a different way. I have to use more explicit instruction than when we started.

It was... important that I go over the vocabulary and check his understandings to make sure he knew what I was talking about. I had to check words and the books he was reading and the books I used in the modelled reading as well.

By critically reflecting on the lectures, readings, in school tutoring sessions and tutorials it is now evident (to me) that all students are learners who possess the undeniable right to receive a quality literacy education regardless to whether they have a disability or learn a different way. I can do that now.

In the final sessions of the program, Laura demonstrated she could plan and teach the intertwining macro and micro-skills of the differing elements required to address the needs of a student experiencing difficulties in learning to read.
Table 5-6
An Overview of the Thematic Analysis Conducted with the Interview with Laura

4. Theory
Complex sets of diverse knowledge are required for the teaching and learning of reading with students not meeting National Benchmarks. Predominant contributors include teacher preparation for teaching reading; acquisition of Specialised Content Knowledge (SCK) required to teach reading; practical application of integrated new and accumulated knowledge; calibration of the teacher’s own learning; common content knowledge (CCK); knowledge of the student and content (KSC); content and teaching (KCT); and horizon content knowledge (HCK) (Ball, 2008).

3. Themes

<table>
<thead>
<tr>
<th>2. Categories</th>
<th>3. Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of student and content (KSC) (Assessment and curriculum related)</td>
<td>Student’s individual needs for learning</td>
</tr>
<tr>
<td>External knowledge of student</td>
<td>Conceptual and procedural knowledge</td>
</tr>
<tr>
<td>Curriculum knowledge for teaching reading</td>
<td>Demonstrated gains in the specialized knowledge and skills for teaching reading</td>
</tr>
</tbody>
</table>

1. Open Codes
Based on an interview with Laura - case study 1

Laura identified her limited knowledge on assessing and identifying the learning needs of a student before commencing the program. She acknowledged the struggles with her own learning and identified the strategy that assisted in learning (i.e., using the model provided as a prompt for what and how to individually program for Jericho).

Having acquired skills to teach reading, Laura recognised the inconsistencies in Jericho’s reading. While Jericho initially appeared to be confident in reading text, it became obvious that there were specific gaps in his knowledge and skills when reading (e.g., his vocabulary knowledge). Learning the specialised knowledge for reading has granted Laura the insight required to identify and interpret Jericho’s assessment data for programming and teaching reading.

5.2.2.2 Laura’s knowledge for teaching reading. Using the data collected from the observations, interview and Teacher Knowledge Survey, Laura’s knowledge for the teaching of reading was mapped onto the adapted Snow et al. (2005) matrix. Laura demonstrated her new knowledge by correctly identifying short vowel sounds, a diphthong and voiced digraphs in words that she had missed in the pre study TKS. She also identified morpheme, fluency, syllabification and a comprehension related questions
correctly post study but not in the pre-study TKS. While it is unclear when she learned these, Laura was observed teaching these elements to Jericho correctly.

Laura discussed and demonstrated gains in learning and applying the specialised knowledge to teach reading. The first level, Declarative Knowledge had been acquired during her period of study. She had attended lectures and tutorials and participated in in-school practicums and had successfully completed her assignments across three units of study in English.

Laura had acquired an understanding for teaching reading and this was evidenced by the TKS and through the observations and interviews. Laura had experienced success in teaching a student 1:1 to read while she was acquiring the specialised knowledge to teach reading herself. She had acquired a level of Stable Procedural knowledge (Snow et al., 2005). Laura had acquired the conceptual and procedural knowledge required to assess for reading (e.g., correct single and digraph phonemes and assessment administration requirements), and program for a student experiencing difficulties in learning as shown during the observations. This evidence was further enhanced by Jericho’s gains in reading.

Teachers at this stage are not expected to be able to program for those students whom are struggling the most. Laura had demonstrated her achievement in doing so by assessing, monitoring and programming as evidenced in Figures 5-5, 5-8 and 5-11. Laura demonstrated she had acquired and could implement areas seen within the Expert Adaptive Knowledge at a minimum standard. Laura while having made positive gains in learning she did not have a sophisticated level of conceptual and procedural knowledge to teach reading that is gained through research, reading research articles and recommendations, and professional development learned over time. Lara was unable to demonstrate she could fulfill the role of whole class teacher, as the situation did not lend itself to the situation. She did, however, have a solid foundation to begin to build the specialized knowledge for teaching reading on as evidenced through the TKS results, the interview, observations and Jericho’s gains in learning to read.

Teachers of many years experience and study achieve the final level of teacher development to teach reading, Reflective, Organised Analysed Knowledge. Laura had the beginnings of this level, being able to assess and program for students whom have difference in learning. While having assisted one child with complex learning needs she was yet to demonstrate she had gained the knowledge to assist all students with complex learning needs within a classroom. She had yet to gain the extensive experience that facilitates automatic understandings and knowledge that provides rapid and fluent reaction to complex learning needs of students with a range of needs.
Table 5-7
Laura’s Knowledge for Teaching Reading Represented on the Adapted Snow et al. (2005) Framework

<table>
<thead>
<tr>
<th>LEVELS OF KNOWLEDGE FOR TEACHING</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. REFLECTIVE, ORGANISED, ANALYSED KNOWLEDGE</td>
<td>Post-study data</td>
<td>Is well versed in historical and current research and considers theories. Has extensive knowledge of concepts, and theories. Designs integrated reading programs specific to students’ needs. Understands what is easy and hard for students and is able to present concepts so that they are understood. Evidenced through:</td>
<td>Evidence of deep procedural knowledge for engaging students in learning to read. Engages teachers in learning the knowledge required to teach reading. Evidenced through:</td>
<td>Integrates resources (for example: games, basal series text level of difficulty) to teach reading to all students including the hardest to teach. Evidenced through:</td>
</tr>
<tr>
<td>The Master Teacher. Has highly developed expertise for integrating conceptual and procedural; knowledge for teaching reading</td>
<td></td>
<td>Pre-post-study survey</td>
<td>Pre-post-study survey</td>
<td>Pre-post-study survey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interview data</td>
<td>Interview data</td>
<td>Interview data</td>
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<tr>
<td></td>
<td></td>
<td>Observations</td>
<td>Observations</td>
<td>Observations</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. EXPERT ADAPTIVE KNOWLEDGE</td>
<td>Post-study data</td>
<td>Demonstrates acquired conceptual knowledge for teaching reading to diverse students. Knows and integrates micro and macro skills for reading (for example: onset/rime). Shows evidence of student gains in reading. Evidenced through:</td>
<td>Demonstrates acquired procedural knowledge for teaching reading regardless of diversity. Integrates elements and knowledge for reading. Shows evidence of student gains in reading. Evidenced through:</td>
<td>Selects resources (for example: games, basal series text level of difficulty, ebooks or paper books) to teach reading to all students including the hardest to teach. Evidenced through:</td>
</tr>
<tr>
<td>Knowledge to promote literacy across the school programs (Snow et al., 2005)</td>
<td>Pre-post-study survey</td>
<td>Pre-post-study survey</td>
<td>Pre-post-study survey</td>
<td>Pre-post-study survey</td>
</tr>
<tr>
<td></td>
<td>Interview data</td>
<td>Interview data</td>
<td>Interview data</td>
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<td>Observations</td>
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<tr>
<td>Level</td>
<td>Knowledge</td>
<td>Details</td>
<td>Evidence Through</td>
<td></td>
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<td>-------</td>
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<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>1. DECLARATIVE KNOWLEDGE</td>
<td>Acquired disciplinary knowledge about a range of issues within education.</td>
<td>Evidenced through: Progression through University study</td>
<td>Progression through University study</td>
<td></td>
</tr>
<tr>
<td>1. DECLARATIVE KNOWLEDGE</td>
<td>Acquired disciplinary knowledge about promoting literacy.</td>
<td>Evidenced through: Progression through University study</td>
<td>Progression through University study</td>
<td></td>
</tr>
<tr>
<td>1. DECLARATIVE KNOWLEDGE</td>
<td>Acquired some disciplinary knowledge of resources that support the teaching of reading</td>
<td>Evidenced through:</td>
<td>Progression through University study</td>
<td></td>
</tr>
<tr>
<td>3. STABLE PROCEDURAL KNOWLEDGE</td>
<td>Identifies and implements some micro and macro skills of the elements required for literacy, for example: pure phonemes &amp; retelling oral story, knowing how to find the answer (to a question) in text</td>
<td>Evidenced through: Pre-post-study survey, Interview data, Observations</td>
<td>Pre-post-study survey, Interview data, Observations</td>
<td></td>
</tr>
<tr>
<td>3. STABLE PROCEDURAL KNOWLEDGE</td>
<td>Recognises appropriate procedural knowledge to teach reading that includes micro and macro skills and strategies (for example: systematic and explicit teaching of the concepts)</td>
<td>Evidenced through:</td>
<td>Pre-post-study survey, Interview data, Observations</td>
<td></td>
</tr>
<tr>
<td>3. STABLE PROCEDURAL KNOWLEDGE</td>
<td>Selects technologies to support the teaching of the micro and macro skills of the elements required for reading, for example: levelled texts, fluency graphs, strategy sheets, visuals</td>
<td>Evidenced through:</td>
<td>Pre-post-study survey, Interview data, Observations</td>
<td></td>
</tr>
<tr>
<td>2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE</td>
<td>Aware of the Big Ideas within reading and recalls some information</td>
<td>Evidenced through: Pre-post-study TKS, Interview data, Observations</td>
<td>Pre-post-study survey, Interview data, Observations</td>
<td></td>
</tr>
<tr>
<td>2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE</td>
<td>Selects appropriate procedural knowledge (strategy) to plan a reading activity that provides success in learning</td>
<td>Evidenced through:</td>
<td>Pre-post-study survey, Interview data, Observations</td>
<td></td>
</tr>
<tr>
<td>2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE</td>
<td>Identifies, implements and analyses reading assessments to inform programming needs. Plans a reading program that includes the Big Ideas, strategies and resources.</td>
<td>Evidenced through:</td>
<td>Pre-post-study survey, Interview data, Observations</td>
<td></td>
</tr>
<tr>
<td>2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE</td>
<td>Identifies, implements and analyses reading assessments to inform programming needs. Implements a reading program that includes Big Ideas, strategies and resources. Teaches a small group of 1 to 3 students.</td>
<td>Evidenced through:</td>
<td>Pre-post-study survey, Interview data, Observations</td>
<td></td>
</tr>
<tr>
<td>Pre-study data</td>
<td>Acquired and recalls some procedural and content knowledge about teaching reading</td>
<td>Evidenced through: Progression through University study</td>
<td>Pre-post-study survey, Interview data</td>
<td></td>
</tr>
</tbody>
</table>

Post-study data:

- This level is typical of a teacher in their first year of teaching.
- Identifies and implements some micro and macro skills of the elements required for literacy, for example: pure phonemes & retelling oral story, knowing how to find the answer (to a question) in text.
- Recognises appropriate procedural knowledge to teach reading that includes micro and macro skills and strategies (for example: systematic and explicit teaching of the concepts).
- Selects technologies to support the teaching of the micro and macro skills of the elements required for reading, for example: levelled texts, fluency graphs, strategy sheets, visuals.
- Selects appropriate procedural knowledge (strategy) to plan a reading activity that provides success in learning.
- Identifies, implements and analyses reading assessments to inform programming needs. Plans a reading program that includes the Big Ideas, strategies and resources.
- Selects technologies to support the teaching of the micro and macro skills of the elements required for reading, for example: levelled texts, fluency graphs, strategy sheets, visuals.
5.2.3 Case Study 2. Isla, the teacher, was absent from the initial workshops and the first teaching week of the course due to extending her mid-semester, overseas holiday. She assured the course staff that she knew how to teach reading and given there was a 90% attendance criterion she could afford to stay away longer. She volunteered to be part of the study, completed the initial TKS survey, and indicated on her signed consent form she would like to participate in a case study.

Isla’s results on the TKS are shown in Figure 5-14. The pre-study results show a relative strength in vocabulary (i.e., correctly responded to the one item in the survey), although there was evidence that Isla was not as strong in other areas (e.g., phonological awareness, alphabetic principle, comprehension).

![Figure 5-14. Isla’s pre and post-test TKS results in percentage of correct answers by element of reading.](image)

On the post-study test, Isla responded correctly to 22 of the 29 items, compared to 9 on the pre-study test. Areas in which she showed greatest growth include comprehension, phonological awareness and strategy. Isla still continued to experience relative difficulty with the area of word study.

Before and during the program, Isla was given individual lecturer and mentor support to acquire the content and procedural knowledge required to teach reading. This included research-based theory as provided in the first lecture and the workshops (e.g.,

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how to administer the reading assessments, analyse the assessment data, develop an individual program and teach the reading sessions). The mentor modelled each of these to ensure she had the base level of conceptual and procedural knowledge required for beginning to teach reading.

Isla worked with 11-year old Beau who was enrolled in Year 5. The school learning and support team advised his home life was disrupted through regular family upheavals, he had a formal diagnosis of language related learning difficulties and visual perception problems. Further, he avoided reading out of school time and did not like a noisy classroom. Beau was quite forthright in expressing his dislike for most forms of activities requiring reading.

Beau’s parents insisted he be a participant in the program so he could receive additional support with reading. In the first five years of schooling, Beau had received extensive support for his difficulties in learning to read. Through these differing intensive support mechanisms, he had achieved many of the skills expected from a student completing Kindergarten. During these intervention sessions, staff had become aware of Beau’s keen interest in vintage and high performance cars.

The pairing of Isla and Beau commenced with uncertainty. Isla, on commencing work with Beau, stated that he wouldn’t do as he was “told”; he yawned often, and seemed bored regardless of her carefully planned lesson. She went on to say he had a “bad attitude” which was why he couldn’t read, and that she was reluctant to teach him. Isla’s professional attitudes were addressed through ongoing consultation and discussions, and modelling of teaching strategies.

Beau on the other hand indicated he wished to be released from the reading sessions after each of the first two teaching sessions. In consultation with his parents, he agreed to give the sessions “one more go”. Beau agreed to genuinely participate if all future modelled reads were from books or magazines on vintage and high performance cars and he would not have to read lists of sight words.

Beau completed the pre-study measures with some grumbles. These pre study results, shown in Table 5-8, provided supporting evidence to the report prepared by the school learning and support team about his current reading ability. His WRMWA score was equivalent to a student in Year 2, while his reading WRMWI was equivalent to a student in early Year 1. Beau’s post-study results on the alternate form of the Woodcock Reading Test indicated a score equivalent to a student in Year 6. While his word identification score was not pronounced, he shifted to a score commensurate with a student close to the end of Year 2.
Overall, the results indicate a strong shift in teacher and student knowledge, as well as attitudes towards teaching and reading, respectively. The nature of this shift will be outlined in the following in-depth examination of teacher and student behavior during the case study observations.

Table 5-8

*Beau’s Pre-Study and Post-Study Woodcock Reading Mastery Sub-Test Results*

<table>
<thead>
<tr>
<th></th>
<th>Word Attack Raw Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
<th>Word Identification Raw Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-study</td>
<td>12</td>
<td>7.7</td>
<td>2.3</td>
<td>12</td>
<td>6.11</td>
<td>1.3</td>
</tr>
<tr>
<td>Post-study</td>
<td>33</td>
<td>12.4</td>
<td>6.9</td>
<td>55</td>
<td>8.8</td>
<td>2.8</td>
</tr>
</tbody>
</table>

The results of the SLAT assessment shown in Table 5-9 were collected after Isla was given specific support after missing the Week 1 workshops of the tutoring program. The results of Beau’s skills and knowledge in reading were key to Isla being able to develop an initial tutoring program.

Table 5-9

*Beau’s Pre-Study and Post-Study SLAT Assessments Scores*

<table>
<thead>
<tr>
<th></th>
<th>Upper and Lower Case Single Letter Sounds (52)</th>
<th>Digraph (34)</th>
<th>SPAT (50)</th>
<th>Educheck (10)</th>
<th>Johnson Basic Vocabulary Test (Word reading) (100)</th>
<th>Basal Series Decodable Text PM Level (1-30)</th>
<th>Fluency (100 cpmp)</th>
<th>PM Vocabulary Word Meaning %</th>
<th>Comprehension %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-study</td>
<td>43</td>
<td>34</td>
<td>43</td>
<td>0</td>
<td>68</td>
<td>30</td>
<td>21</td>
<td>92</td>
<td>50</td>
</tr>
<tr>
<td>Post-study</td>
<td>48</td>
<td>34</td>
<td>55</td>
<td>9</td>
<td>87</td>
<td>40</td>
<td>27</td>
<td>118</td>
<td>78</td>
</tr>
</tbody>
</table>

The results represent the big ideas of reading (i.e., phonological awareness, alphabetic principle, decoding fluency, comprehension). Beau’s ability to orally
manipulate the sounds of the English language showed he had acquired early phonemic awareness skills. He had difficulty blending sounds, and segmenting sounds from a word.

While Beau demonstrated sound knowledge of single-letters phonemes, and diagraphs, he demonstrated limited knowledge and skills of blending to decode common sounding words as shown on the Educheck. Shown within the generalisation section of Table 5-10, Beau had difficulty blending the sounds within CV and CVC words and decoding the word. He was, however, able to recognise many common words in the English language. His score on the Johnson’s word list provided possible evidence that he had many isolated skills, but had not become efficient and strategic in the use of these skills like a skilled reader.

In the initial assessment conducted by Isla in decoding, fluency and comprehension, Beau showed that he had difficulty bringing all the big ideas to the tasks of decoding and understanding connected text. He showed that as a Year 5 student he would experience considerable difficulty with typical grade level text, as he was still progressing through graded texts within the basal series decodable text series. His decoding fluency within this was low (i.e., 46 cwpm). Beau’s Pre study comprehension of connected text was limited to some skills in retelling of specific points within the story.

Overall, the results indicate a strong shift in teacher and student knowledge, as well as in some of their attitudes towards teaching and reading, respectively. The nature of this shift will be outlined in the following in-depth examination of teacher and student behavior during the case study observations.

Using these initial assessment data, Isla, under the guidance of her in-school mentor, developed a plan to implement within the first tutoring session. Given her initial meeting with Beau, Isla was given considerable support in how to overcome his adverse behaviour through the planning and use of evidence-based pedagogy (e.g., feedback, explicit instructions). The first lesson is represented in Figure 5-15.

This initial plan highlights how Isla was able to develop a plan that built on Beau’s strengths, while also enhancing the efficiency in his skills and knowledge use. It was a plan Beau displayed no interest in. Isla planned to enhance knowledge of the alphabetic principle, with a four to one ratio of known to unknown items that would bring success in learning in later lessons. The letters and diagraphs were also used in a later lesson with a new determination to engage Beau in learning the alphabetic principle with practice games developed by Isla.
Table 5-10
Detailed Pre-Study SLAT Results and PM Assessments for Beau Used to Design his Reading Program

<table>
<thead>
<tr>
<th>Student Name: Beau</th>
<th>Grade: Year 5</th>
<th>Generalisation</th>
<th>Assessor: Isla</th>
<th>Reading Fluency and Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alphabetic Principle</strong></td>
<td><strong>Phonemic Awareness</strong></td>
<td><strong>C</strong>=consonants</td>
<td><strong>PM level 22</strong></td>
<td><strong>Decodable text book number</strong></td>
</tr>
<tr>
<td><strong>Known single sounds (circle):</strong></td>
<td><strong>Educheck</strong></td>
<td><strong>B</strong>= blends</td>
<td><strong>(Start) 31</strong></td>
<td><strong>Fluency 1 minute:</strong></td>
</tr>
<tr>
<td>a b c d e f g h i j k l</td>
<td><strong>vc and cvc</strong></td>
<td><strong>Dig</strong>=digraphs</td>
<td><strong>46</strong></td>
<td><strong>Accuracy:</strong> 94%</td>
</tr>
<tr>
<td>m n o p q r s t u v w x y z</td>
<td><strong>C d</strong>ig</td>
<td><strong>Dip</strong>=diphthongs</td>
<td><strong>Self correction:</strong></td>
<td><strong>Y/N</strong></td>
</tr>
<tr>
<td><strong>Total Score: 32/58</strong></td>
<td><strong>PM level 22</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Known digraphs/tri-graphs (please highlight):</strong></td>
<td><strong>Difficulties with:</strong></td>
<td><strong>Comprehension</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ch sh wh th ck er ir</td>
<td>Onset Y/N</td>
<td>- correct 33%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>er ea ay ai ee ey ou or aw ow oo ie</td>
<td>Rime Y/N</td>
<td>- retell Y/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>igh ar au kn ph oi oy qu wa ee ss ff ue wa</td>
<td>Medial Y/N</td>
<td>- literal Y/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Score: 32/58</strong></td>
<td>Vowel confusion Y/N</td>
<td>- inferential Y/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sight Words:</strong> Correct words: 68/100</td>
<td>Digraph errors Y/N</td>
<td>- creative Y/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number attempted: 100</strong></td>
<td>Long e errors Y/N</td>
<td>Detail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Errors</td>
<td>Blends words Y/N</td>
<td>Retell - characters named only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onset Y/N</td>
<td>Blending fluently Y/N</td>
<td>Vocabulary 50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rime Y/N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medial Y/N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vowels Y/N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meaning Y/N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual errors Y/N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments
- Beau explained that the lines of words moved like waves. Mentor placed a sheet of paper along the top of the line being read. Beau said that it stopped the waving. The school LST was notified.
- Knows most phonemes
- Blending and segmenting an issue
- Beau was unable to complete all items.
- He used some strategies while reading - For example: Tracked with sheet paper
<table>
<thead>
<tr>
<th>Reading Element</th>
<th>Lesson Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modelled Read</strong></td>
<td>Book: The Shack that Dad Built</td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
<td>Explain: Vocabulary words (group meaning the same): shack, tin, enormous</td>
</tr>
<tr>
<td>Picture book or iPad</td>
<td>Explain phrase: little hairy men (Aboriginal myth)</td>
</tr>
<tr>
<td><strong>Comprehension</strong></td>
<td>Talk about wh question words</td>
</tr>
<tr>
<td>Retell, key question words. See</td>
<td><strong>Who</strong> represents a person or character</td>
</tr>
<tr>
<td><strong>PASH Book (Dept. Ed and</strong></td>
<td>Allow think time</td>
</tr>
<tr>
<td><strong>Communities, ND.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Big Word/Little Word: whole</strong></td>
<td>Word: Grandfather</td>
</tr>
<tr>
<td>words, prefix suffix</td>
<td>Focus: finding small real words in big words</td>
</tr>
<tr>
<td><strong>Phonological Awareness (SPAT)</strong></td>
<td>Teach manipulation of VC, CV and CVC words.</td>
</tr>
<tr>
<td>Teach explicitly first</td>
<td>Include onset rime and medial letters</td>
</tr>
<tr>
<td><strong>Oral exercises</strong></td>
<td>“Say at, take off the a and put in i (phoneme) there instead.” “Say sat, take off the t (phoneme) and put a p (phoneme) there instead”. (sap)</td>
</tr>
<tr>
<td></td>
<td>Say sap, put a l (phoneme), after the s (phoneme) the word is slap and now put a p (phoneme) after the s (splat)</td>
</tr>
<tr>
<td><strong>Alphabetic Principle</strong></td>
<td>1. Teach explicitly</td>
</tr>
<tr>
<td>Ratio for teaching 4:1 known to</td>
<td>Teacher phonemes in context of a word.</td>
</tr>
<tr>
<td>unknown in Noughts and Crosses</td>
<td>Known: slap, better, ey, day, bait, cow, about, think, both</td>
</tr>
<tr>
<td>Use same sound different look</td>
<td>New: feast, giant</td>
</tr>
<tr>
<td><strong>Fluency Reading</strong></td>
<td>Basal series text - book number 31</td>
</tr>
<tr>
<td>Read through text, then one minute</td>
<td>Fluency – 80-100 WPM</td>
</tr>
<tr>
<td>read and graph</td>
<td></td>
</tr>
<tr>
<td><strong>Games for Skills Practice</strong></td>
<td>1. Building vocabulary from modelled read:</td>
</tr>
<tr>
<td>See SPAT</td>
<td>Consider vocabulary words (group words meaning the same): shack, hut, cabin, shelter</td>
</tr>
<tr>
<td>Focus on areas of need and skills</td>
<td>Use Visuwords to assist Beau to find related words</td>
</tr>
<tr>
<td>for generalisation</td>
<td>2. Blending: teach explicitly</td>
</tr>
<tr>
<td>i.e. phonological awareness, sight</td>
<td></td>
</tr>
<tr>
<td>words, vocab etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Word Study</strong></td>
<td>Blending phonemes to words – use white board and white board marker words it, sit, spit, split</td>
</tr>
<tr>
<td>See Educheck</td>
<td></td>
</tr>
<tr>
<td><strong>Spelling</strong></td>
<td>Words from fluency read and family word</td>
</tr>
<tr>
<td>Family words from Basal Series text</td>
<td>Giant, picture, feast and Aunty</td>
</tr>
<tr>
<td>May add 1 or 2 sight words</td>
<td></td>
</tr>
<tr>
<td><strong>Oral Language</strong></td>
<td>“Tell me about what you learned today”</td>
</tr>
<tr>
<td>Prompt: “Today I learnt”</td>
<td>Beau to write own journal</td>
</tr>
<tr>
<td><strong>Journal Writing</strong></td>
<td>Beau to write what he had learned during session</td>
</tr>
<tr>
<td><strong>Reading for Enjoyment</strong></td>
<td>Aboriginal symbols, revise vocabulary words</td>
</tr>
</tbody>
</table>

*Figure 5-15.* The initial reading program prepared by Isla to support Beau in learning to read.
During the initial session, Isla chose to read from a book based on modern Australian Aboriginal life to Beau. Despite her careful planning, Beau yawned continuously and refused to look at the illustrations. He sat with his arms crossed and a totally disinterested look on his face and demonstrated zero engagement during the lesson. Beau’s attitude changed, however, when he was given the opportunity to choose a book at the end of the lesson from the library. The book he chose had a high incidence of illustrations and colour with few words.

Over the course of the tutoring program, Isla was supported in her planning and teaching. As the tutoring program progressed, she and Beau settled into a routine. The results of this collaboration are shown in Figure 5-16. It can be seen that Beau progressed from PM Level 21 to PM level 26 during the seven weeks of the program. While he improved steadily in his reading level, his decoding efficiency increased to a level that was commensurate with that of his peers.

![Figure 5-16. Beau’s Spache, PM Benchmark level and passage-reading rate assessed over the course of the program.](image)

In Figure 5-17, Beau’s comprehension attainment can also be seen to grow across the seven weeks of the program. The PM Benchmark results report gains made from the pretest to the posttest. On all features of comprehension he improved, with only two areas (i.e., creative and inferential) not reaching ceiling on the test.
Finally, Table 5-11 shows the data for the Specific Level Assessment Tasks (SLAT), which Isla administered at the beginning of the program, and again at the end of the program. These data confirms the improvements Beau made over the seven weeks across most areas of reading. While he did not improve greatly in single-letter sounds and digraphs, he made more pronounced gains in comprehension and phonological awareness.

The pre- and post-study scores display the skills and knowledge for reading that Beau brought with him to the study, and that he had achieved at the end of the study. The comparison provides a realisation of the gains made. These data do not give an insight into what happened during the tutoring sessions. The following discussion will examine in detail three observations undertaken during the tutoring program (i.e., beginning, middle, end).

**5.2.3.1 Observations Isla and Beau.** During the seven-weeks of the in-school program, each of the case study dyads was observed on three occasions. Each of these observations was video recorded. In the case study involving Isla and Beau, the observations got off to a very quick start due to Isla being absent from the orientation workshop held prior to the in-school program.

![Graph showing pre- and post-study scores](image-url)
5.2.3.1.1 Observation 1. During the first observation, Isla was working hard to orientate herself to the requirements of the tutoring program. As she came to grips with these requirements, she also needed to develop a relationship with Beau. Through the initial assessment period, Isla developed a prickly relationship with Beau; in turn Beau made it abundantly clear that he was not happy about being part of the program. Despite his protestations, he did not withdraw despite the opportunity to do so.

Isla worked with the initial assessment results to develop her first tutoring sessions under the guidance of her mentor at the school. The initial program of instruction was designed with consideration to empowering Beau in knowing what reading should sound like (i.e., modelled read), and having him attempt to read in a like manner (i.e., fluency read, reading for pleasure). As Isla established in her initial assessment, it was going to be important to support this focus through reviewing and learning vital elements within the alphabetic principle and phonological awareness. She achieved this to some extent through integrating these elements during the spelling and journal writing parts of the lesson.

The video analysis of Observation 1 reflected these attempts to cover all big ideas of the learning to read process (see Figure 5-18). The majority of time was spent on the modelled read (15%), reading and fluency (13%), and comprehension (22%). Review and coverage of elements within phonological awareness and the alphabetic principle were relatively equal, with spelling taking up 11% of the time. This time allocation provides a good reflection of what Isla was attempting to address during this first observation session.

While the data in Figure 5-18 represents what Isla was attempting to achieve, how this was achieved is possibly better represented in Figure 5-19. The initial parts of the session were dedicated to the modelled read, and comprehension of the material covered. The qualitative aspect of this observation gives a deeper insight into these data, with much time given over to attempts by Beau to side-line the tutoring session through escape behaviours (e.g., not answering question) and stalling tactics.
Figure 5-18. Percentage of time spent on each reading element by Isla and Beau during Observation 1.

Figure 5-19 indicates that Isla needed to keep the focus on one or two big ideas of reading. In the initial stages, this focus was the modelled read and associated comprehension. After about forty-minutes, the emphasis was solely on reading and fluency, with some word study included. While the qualitative data indicate that distracting behaviour was occurring, these data also give an insight into the early learning about the teaching of reading (e.g., during modelled reading, word meanings were being explained to facilitate greater comprehension).
In the middle of this first observation, Isla was observed to bring together more than one big idea. At about minute 25 she was addressing deletion of sounds, using explicit instruction strategies she had been shown and prompted to use by her teacher mentor. During Minute 26, the following interaction was recorded:

Isla: *Could you please sound out the word ‘bless’* (oral language, phonemic awareness, teacher curriculum)?
Beau: *b/l/e/ss* (phonemic awareness, alphabetic principle, student curriculum)
Isla: *Now take off the sound /b/ from bless, and you will have?* (phonemic awareness, teacher curriculum).
Beau: *bless* [think time] *bess* (phonemic awareness and student curriculum)
Isla: *no, can you take /b/ out of bless* (phonemic awareness, curriculum correction, teacher curriculum).
Beau: *bless* [think time] *less* (phonemic awareness and student curriculum).
Isla: *Good! The next word is blight. Take out the /l/ in blight* (phonemic awareness, oral language, affirmation, teacher social-smile and teacher curriculum).
Beau: [body language indicated that he was struggling]
Isla: *I will write the word blight for you. OK?* (oral language and teacher curriculum).
Beau: *OK, blight* (oral language, spelling and student curriculum)
Isla: [*Wrote the word blight on small white board*] (spelling, teacher curriculum)
Isla: *Take the /b/ sound out of blight* (phonemic awareness, spelling and teacher curriculum).
Beau: *light?* (phonemic awareness, spelling and students curriculum)

Isla: *Good, now take the /l/ out of blight* (pointing at the written word blight) (phonemic awareness, spelling, affirmation, teacher curriculum).

Beau: *huh!* (confused facial expression) (oral and body language).

Isla: *Take the /l/ out of blight* (phonemic awareness, spelling, teacher curriculum).

Beau: *But…* (pointing to the written word blight)

Beau had learned to spell bite previously and was unaware of alternate vocabulary and spelling that is used for geographical formations (e.g., The Great Australian Bight).

At this point, the mentor modelled the teaching strategy, reiterating the need to scaffold the process through being aware of his prior learning, and attempting to reduce example sequences that may confuse. After the teaching session, the mentor and Isla discussed phonemic awareness, how to explicitly teach it, and how to choose practice examples to avoid confusion and distress.

The initial program of instruction was designed with consideration to empowering Beau in knowing what reading should sound like (i.e., modelled read), and have him attempt to read in a like manner (reading and fluency). Further, it was vital that the elements of alphabetic principle and phonological awareness became integrated and interactive to enable Beau to decode fluently and to comprehend the author’s intended meaning of the text.

During Observation 1, engagement data (see Figure 5-20) showed that teacher curriculum dominated. This was due partly to the avoidance behaviour demonstrated by Beau, but also appeared to mask the insecurity that Isla had with understanding the content being taught. Over the 52 minutes of the sessions, teacher curriculum took up about 25% of the time. This was followed by student curriculum (21%), which comprised Beau initiating or responding to curriculum, for example, by asking questions, making statements, or participating in discussion around teaching and learning.

As indicated previously, the mentor quietly intervened in the session to model the use of explicit teaching strategies. The mentor spoke quietly to Beau, explaining that some words sounded the same but were spelled differently. She showed him dictionary examples and visuals for the words *bight/bite*. The mentor explained the purpose of the game was to play word gymnastics that required the players to listen and manipulate phonemes in words. She then wrote the word *light* at the top of a mini white board, and again in the lower section of the board before saying to Beau: “*This word is light, if we take away the l (phoneme – rubbed out) and put in f, (phoneme - wrote grapheme f), what word have we got?*” Beau read “*fight*”. The mentor continued and said, “*we read about a*
bird that took flight. To change fight into flight we need to add a sound to the word. Let’s listen!” She spoke the word slowly, dragging the phonemes out in one continuous stream.

Representative of the time and effort required to keep Beau engaged, teacher affirmation took up about 11% of the time or about 6 of the 53 minutes. This is exemplified in the transcript above, when Beau realised that the phoneme /b/ could be removed from bless to make less. This affirmation was combined with teacher social, in an attempt to motivate the session, and to engage Beau (13%). Little explicit instruction was observed in engaging Beau within this first observation. Overall, these engagement behaviours within the session comprised about 25% of the total time.

![Figure 5-20. Analysis of engagement recorded between Isla and Beau during Observation 1.](image)

5.2.3.1.2 Observation 2. Observation 2 occurred mid-study. It revealed some changes to the time spent on each lesson element (Figure 5-21). More time was spent on the alphabetic principle, phonological awareness and comprehension. Knowing the correct phoneme for letters, and hearing and manipulating those sounds in words in an integrated interactive manner, directly impacts word recognition and comprehending the meaning of the word. While the time spent on vocabulary and using the words in oral language was basically the same, these elements, when integrated with comprehension as demonstrated
in the Minute 34 of Figure 5-22, enhanced gaining the author’s intended meaning of the text.

*Figure 5-21. Percentage of time spent on each reading element by Isla and Beau during Observation 2.*

Comparing Observation 1 and Observation 2 reveals a shift in focus time from phonological awareness, alphabetic principle and, fluency to teaching decoding skills. During Observation 2, less time was spent on modelled reading. The side–line issues around social behaviour had disappeared thus less time was required to settle and engage Beau in learning. During Observation 3 less time was dedicated to alphabetic principle and additional time was given to focusing on comprehension and oral language. Beau was keen to retell texts and wanted to relate his background knowledge during comprehension instruction.

Isla had progressed to design a program that matched Beau’s specific needs and had changed and continuously modified instruction to meet those needs. This was exemplified in her knowledge in integrating differing big ideas of reading (e.g., alphabetic principle, phonological awareness) within differing sections of the program (e.g., modelled read, word study, spelling).
Spelling was an element of reading Beau struggled with prior to the intervention. He often could not discern and manipulate the sounds in words, leading to incorrect spelling. With gains in phonological awareness and the integration of phonemes during spelling and word study, he was provided with the skills and knowledge to allow him to begin to hear the sounds and to sequence them correctly in words.

The choice of words in spelling was complex, motivating and presented a challenge that Beau had taken up willingly as seen in slice 48 of Observation 2. It provided evidence of Beau using skills associated with reading (i.e., phonological awareness).

Isla: *Would you like to do some spelling now?* (oral language)
Beau: *Yes* (oral language).
Isla: *The words are from the book we read. The first word is ‘dining’* (oral language and teacher curriculum).
Beau: *Wrote the word on in his work book* (spelling, student curriculum)
Isla: *Giant. A giant is very tall.* (teacher curriculum, strategy)
Beau: *Wrote the word* (spelling, alphabetic principle, student curriculum)
Isla: *Now picture. We looked at a picture in the book. Picture* (oral language, teacher curriculum)
Beau: *Segmented the word (mouthing) then wrote the word* (spelling, alphabetic principle, phonological awareness, student curriculum)
Isla: *Feast. They ate a lot at the feast* (oral language, teacher curriculum)
Beau: *Recorded the word* (spelling, alphabetic principle, student curriculum).

Isla: *Aunty, this word is very tricky. I struggle to get it right. Aunty. My mother’s sister is my aunty* (oral language, teacher curriculum).

Beau: *Wrote the word* (spelling, alphabetic principle, phonemic awareness, student curriculum)

Isla: *Excellent work, let’s have a look at the words* (affirmation, oral language, teacher curriculum, teacher social (smile)).

Beau: (student social – smile)

Isla: *The sounds and the order of the letters are right in dining. You have the right letters in giant, picture and feast, but we need to put them in the correct order for the words to be considered correct. The word aunty has the right letters and they are in the right order. You did an excellent job of getting the right letters in all of the words and the right order in some of the words* (affirmation, oral language, spelling, strategy, teacher curriculum)

Isla: *Let’s see if we…* (oral language, teacher curriculum)

Isla worked with Beau to sequence the letters with correct placement…

Isla had learned to moderate the pace of the tutoring sessions and allow Beau time to think through and respond in his own time. Beau, while making strong gains in learning to read as evidenced in his improvement in the Spache and PM weekly assessments (Figure 5-16), he continued to require support in the form of written text to manipulate the sounds in words that begin with two consonants.

While Isla and Beau demonstrated engagement in teaching and learning (Figure 5-23), Beau struggled to settle at the beginning of the session, rocked on his chair and yawned on occasions.
During minute 24 Isla and Beau engaged in teaching and learning. They worked together in a respectful manner on the literacy elements being learned. Isla provided think time that enabled Beau to process the communication between them and the element being taught, and provided affirmation of positive responses. Beau in turn responded with a smile, seemingly knowing he had succeeded in his learning.

During Observation 2, engagement data revealed the neutral behaviours had changed from boredom to weariness. Beau appeared to be perpetually tired and yawned frequently. He explained that he did not have a set bedtime and he had stayed up late watching a movie. In turn, Isla had watched explicit instruction being modelled by her mentor and had begun to apply the new skills she was learning. She used these skills (e.g., feedback and affirmations) to motivate and engage Beau. Isla started to show how she could change her behavior to impact Beau’s participation.
5.2.3.1.2 Observation 3.

Observation 3 occurred at the end of the study. By week seven of the tutoring program, Beau and his teacher Isla had settled into a routine. Isla had become quite independent in her programming for each session that now addressed the needs of Beau and motivated him to be involved in the sessions. Figure 5-24 shows break down of the time spent each reading element within Observation 3.

![Pie chart showing percentage of time spent on each reading element by Isla and Beau during Observation 3.]

*Figure 5-24. Percentage of time spent on each reading element by Isla and Beau during Observation 3.*

Beau had become engaged in learning and was keen to attend the sessions. Comprehension skills, and knowledge and generalisation of reading elements were the main focus throughout the intervention. This is represented in the session by the high proportion of time given to comprehension (28%), oral language (18%) and vocabulary (5%). While the decoding comprised a relatively smaller proportion of the session, a finer analysis of the session (Figure 5-25) showed that this had become integrated into comprehension tasks and oral language (e.g., minute 33- to 35) and spelling (e.g., minute 19-21).
Figure 5-25. The elements used by Isla in the teaching of reading to Beau during Observation 3.

Further examination of Figure 5-25 shows how Isla integrated differing elements of reading into her program. At minute 27, the analysis recorded six elements (i.e., vocabulary, phonological awareness, comprehension, word study, oral language, revision) of reading behavior. An analysis of the transcript provides greater insight how these elements were brought together, and how expectations of Beau had become much higher, and motivating.

Isla: Could you please say bicycle.
Beau: Bicycle (student curriculum)
Isla: What can you hear in bicycle? (oral language, teacher curriculum)
Beau: Bi and cycle (phonemic awareness and student curriculum)
Isla: Excellent. Do know what these word parts mean? (affirmation, oral language, teacher curriculum)
Beau: Yes, I am studying lifecycles in class (oral language).
Isla: That's good, that is another word with cycle. Do you know any others? (affirmation, oral language, teacher curriculum)
Beau: (think time) recycle and tricycle (phonemic awareness and student curriculum).
Isla: Excellent! What about unicycle, does that have cycle in it? (affirmation, teacher curriculum).
Beau: Nodded his head.
Isla: Do you know what ‘uni’ means? (teacher curriculum)
Beau: Nodded his head. A unicycle has one wheel (oral language and student curriculum).
During Observation 3, the engagement data in Figure 5-26 revealed that neutral behaviours displayed by Beau had stopped and were no longer apparent. He had stopped objecting to attending. Neither was he yawning and saying he was tired. Through the programming motivating and instructionally relevant material for Beau, Isla was illustrating how her behaviour could engage Beau. She was using explicit instruction and strategy instruction to teach key elements of reading. Beau initiated social interaction with smiles and pointing out features of the colourful illustration in the magazines and books of interest. Isla elaborated on this shift as part of her post study interview discussing her thoughts, ideas actions and knowledge taken from the project.

![Figure 5-26. Analysis of engagement recorded between Isla and Beau during Observation 3.](image-url)
5.2.3.2 Interview data.

The analysis of interview data followed that outlined in Case Study 1, and based on the work of Harry et al. (2005). Isla made direct links to the material covered in lectures on campus, and the importance of literacy in one's life.

*In the lecture yesterday, we heard how not knowing how to read is a health hazard. Not being able to read signs, or make sense of the world, can cause bad things to happen. About 70% of people in goal have literacy problems and cannot read, and those who are educated in prison are less likely to reoffend.*

Isla then projected the importance of reading onto her understanding of learning to read. Her limited understanding was accentuated when it came to assessing students. Isla discussed her knowledge of assessments for reading and identified that she had little knowledge of reading before commencing the study. Learning and implementing the assessment package used in the study proved to be challenging for Isla (e.g., learning the phonemes for single and digraphs). Her comments reflected the concept of the Peter Effect (Binks-Cantrell et al., 2012), where she indicated that she could not teach something she did not know about herself.

*I had only done reading records before (the study). “In the beginning I found the assessments (Johnston’s sight word test, Educheck, SPAT, and fluency) overwhelming. Mostly, it was because I wasn’t confident with the letter sounds (phonemes). There was a lot of scaffolding done at university and here at the school for my learning.*

Isla had demonstrated during her initial engagement with the project a belief that reading was something that students learned from experiences. For those students like Beau who did not learn to become skilled readers, it was ‘their problem’; there was little accountability for her part in the learning achieved by students. In the final interview Isla’s language and beliefs had changed dramatically. Isla indicated that her learning had been scaffolded by the university lectures when on campus, and by the mentor when at school. Isla identified she read the assigned journal articles and relied on the scaffolding to learn. She had learned a level of specialized procedural knowledge and changed her own behaviours in response to her learning. Isla had changed her attitude to support Beau’s learning. Interestingly Isla discussed that Beau was now using micro and macro-skills and had gained greater confidence in reading.

*I worked with a mentor to make sure of what I needed to do... I used the readings...and the assessment results for planning. I am really conscious of how I speak to my student, eye contact, body language, and use concise language. I didn’t bombard him. In previous teaching experiences, I know that I just rattled off a list of instructions. I know I can’t do that now, and from doing this study I have learned to break it down. No verbal running on, really simple instructions are needed, and fun to maintain engagement. He (Beau) didn’t want to make mistakes. His sight words have really ... increased and he can spell better now. He can pick the sounds on the*
end of words and blend now. He can remember how to work with CCVC words and he is getting better at reading. I can see it and he is becoming more confident.

5.2.3.3 Isla: Summary of case study

Isla and Beau had both rejected the opportunity to learn the knowledge required to teach and to learn to read. Isla decided to excuse herself from the initial workshops, while Beau demonstrated in early sessions his dislike for the reading and the tutoring program. Yet with careful negotiation and individual support both made positive gains in learning. Beau demonstrated at the end of the study that he could decode and comprehend texts with similar fluency and accuracy as his peers, and that he was reading age and grade appropriate books with comprehension, as evidenced through retell. The post-study Woodcock Mastery Work Identification sub-test (AGS, 1998) revealed, however, he knew fewer sight words than his same-aged peers.

During the interview, Isla discussed her own lack of knowledge prior to the study and identified her lack of ability to calibrate her own specialised knowledge for reading. She spoke of her own struggles with letter-sound knowledge prior to commencing the study, and identified the use of explicit instruction as new learning. These knowledge gains were evidenced through the Teacher Knowledge Test data analysis with pre- and post-study analysis showing improvements. Additional new learning for Isla was the discovery that she needed to teach Beau specific strategies (e.g., blending, word study) that would enable him to learn reading and not just expect him to learn from “her way of teaching”. She also needed to know the student and his learning needs as projected in the graduate teacher standards.

Cunningham et al. (2005) found that K-3 teachers who overestimated their reading-related content knowledge were often unaware of what they knew and didn’t know. They reported that teachers who had minimal knowledge described themselves as having adequate knowledge. Further, they found that overestimating the knowledge for teaching reading could limit or constrain teachers’ willingness to learn new information.

Isla’s TKS data revealed limited knowledge in the decoding elements of alphabetic principle and phonological awareness knowledge (Figure 5-14). These data were supported by Isla’s post-study interview identifying the alphabetic principle as an element she struggled to learn. While Isla expressed surprise during the interview that Beau did not know all of the single letter and digraph phoneme; she was also surprised at the limited understanding she felt she had of this content. Isla needed to learn about how phonemes and phonological awareness are needed to learn to read, and relate this to the tacit
knowledge she possessed as a skilled reader. She also needed to become aware of how children learning to read have to learn how to relate the sounds in words to their letter representations in English and relate the graphemes to the phonemes if she were to teach them to Beau. Isla learned these with the support of her mentor who modelled and gave Isla a strategy for remembering what she had learned (i.e., to listen to the sounds within words). Hearing and manipulating the sounds in words was reinforced and practiced by the teachers during the tutorials and by asking for assistance from the mentor, peers and the tutorial leader. When practicing the phonological awareness tasks, the teachers were presented with spoken words only. They were required to listen and segment the words. They could all hear sounds so were aware of the phonemes, but this awareness has become tacit (Milton, 2017).

The SLAT assessment analysis revealed that Beau had acquired early phonological awareness skills but had yet to generalise the information to blending unknown, novel words accurately and with automaticity. Isla taught Beau the skills required to identify the onset and rime of words and to blend by dragging the phonemes together over about three seconds, as described by Kame’enui (1999), with the mentor listening to the instruction to ensure accuracy. Isla reverted back to previous behaviours on occasion while learning new skills, and on reflection noted that her students this at times. Further, Beau assisted Isla with learning by modelling the appropriate procedures. For example, when Isla was teaching Beau to blend the word bleed in Observation 2 - slice 26 (Figure 5-22). When spoken to by the mentor, Isla (in her own words) explained that she had slipped back to the “old way of doing things” and would have to be “more vigilant in future to maintain new learning”.

The observation analysis and the pre- and post-study PM assessments indicated that Isla taught Beau strategies for answering retell questions (e.g., identifying the key words at the beginning of questions) and to answer questions that required literal, inferential and creative comprehension (Figure 5-17). Beau made positive gains in comprehension, but on completion of the study will require further instruction on how to answer inference and creative questions. One possible reason for this outcome may have been Beau’s limited richness of vocabulary knowledge (Sinatra, Zygouris-Co, & Dasinger, 2011) identified as part of the PM assessment.

Blachowicz et al. (2006) reported that students from low socio-economic backgrounds such as Beau do not learn the same number of words as children from a more literature advantaged settings. Similarly, Hempenstall (2016) reported that children who are not exposed to books are at a significant disadvantage when learning vocabulary. The
school learning and support team reported that Beau avoided reading outside school as a result of struggling to learn to read. Through her readings, Isla had become aware of the strong relationship between comprehension, vocabulary and engaging in print. Isla attempted to teach the maximum number of words throughout the study by addressing groups of word taught over several days and being explicit in instruction and teaching morphographical knowledge. Post-study results indicate that Beau had achieved a positive percentage gain in acquiring vocabulary as reported in the PM Vocabulary Word meaning results (Table 5-9).

Motivating Beau to engage with text beyond the tutoring program is a complex task, and will involve motivating Beau to do so. Given Beau’s initial state of ‘anti-reading’ this goal appeared distant, yet Isla achieved small gains with Beau in this area. During Observation 3, Beau chose a book outside the participation agreement negotiated between Isla and Beau in week two of the study. He asked Isla to read it for the modelled read. Isla read the book and linked the illustrations to pieces of text for the purpose of teaching inferential comprehension.

_Isla: What does finding all the leaves off the tree on the ground tell you?_
_Beau: I don’t know_
_Isla: That tells us that it is autumn or winter because that is when some trees loose their leaves._
_Isla continued to read the text and stopped to ask_
_What do you think the old soldier meant when he said we were as smart as paint? Not like we looked before._

After examining the pictures and information provided earlier in the book, they reached the conclusion that this description was meant to portray that during the ANZAC memorial service, the old soldiers had smart new winter uniforms on, rather than the tired and dirty ones discussed in the text and detailed in pictures taken during the war (i.e. the soldiers in a trench looking dirty, tired and very weary).

_Isla: Let’s put this together. What does this tell us?_
_Beau: I don’t know but I think it means it was wintertime when the service was and the old soldiers looked smart in their winter uniforms instead of how they looked in the war._
_Isla: Excellent!_

This context demonstrated motivation by Beau to engage with new and different texts. This development was supported by Isla, and will hopefully encourage Beau to take chances with differing texts. This context had a corollary in that Isla was observed to support higher order comprehension skills (i.e., inference questions). It was later found
through reviewing Isla’s programming that she had not explicitly taught inference questions, and this incidental teaching was first incursion into this skill area. It would appear that Beau was indirectly supporting Isla’s learning.

This situation provided evidence of how the initial prickly relationship between Beau and Isla had grown over the seven weeks. During Observation 2 it was apparent that a positive relationship had been formed with social interactions occurring (smiling and social talk). During Observation 3, this relationship had grown to a point where Beau was motivated to take risks, with Isla supporting these changes. This relationship was important for learning to take place.

At the completion of the study Beau was able to fluently read books within the mid-range of his grade expectancy. However, he had yet to gain the skills and knowledge required to answer all questions relying on comprehension. A focus for future teaching should be in creative comprehension, which is built on life experience, and inferential skills, which require the reader to connect three or four pieces of information to gain the author’s intended meaning.

Isla demonstrated by Observation 3 that she had acquired the foundations of specialised conceptual and procedural knowledge for teaching reading. She had gained an understanding of how to work with a student with significant diverse learning needs and used micro and macro-skills within her instruction. Isla had changed her attitude and thoughtfully used strategies to engage Beau to assist his learning as described in the interview. While having demonstrated some gains in achieving outcomes within the Stable Procedural Knowledge level with one source of evidence, Isla demonstrated two sources of evidence for all outcomes of the Stable Procedural Knowledge level - she had the knowledge for teaching reading expected of a teacher at the end of their first year of teaching.

5.2.3.3.1 Isla’s knowledge for teaching reading. Using the data collected from the observations, interview and Teacher Knowledge Survey, Isla’s knowledge for the teaching of reading was plotted onto the adapted Snow et al. (2005) matrix shown in Table 5-12. Isla demonstrated her new knowledge by identifying additional short vowel sounds, and voiced digraphs in words that she had missed in the pre-study TKS. She made progress in correctly answering phonological awareness questions (e.g., correctly identified examples for segmenting and blending). In the pre-study assessment Isla failed to identify syllabification and comprehension related questions correctly yet succeeded during the
post study TKS assessment. While it is unclear when Isla learned her new knowledge, she was observed teaching these big ideas to Beau.

Isla discussed and demonstrated gains in teaching, learning and applying the specialised knowledge to teach reading. The first level, Declarative Knowledge had been acquired prior to the study. Isla attended the lectures and tutorials and participated in in-school practicums and had successfully completed her assignments across three units of study in English prior to commencing the study.

The TKS results were supported by Beau’s assessment data. Isla had successfully taught a student with difficulties in learning to read in a 1:1 situation while she acquired foundational levels of the specialised knowledge to teach reading as expected of a first year teacher. Isla had learned how to use assessment findings (e.g., correct single and digraph phonemes and assessment administration requirements) to program for a student who was amongst the hardest to teach. Evidence was based on Beau’s continuous gains in reading fluency and accuracy, the post TKS data and the observations.

Isla demonstrated she had acquired and could implement most areas seen within the Expert Adaptive Knowledge at a minimum standard. Isla while having made positive gains in learning did not have a sophisticated level of conceptual and procedural knowledge to teach reading that is gained through research, reading research articles and recommendations, and professional development learned over time. Isla was unable to demonstrate she could fulfill the role of whole class teacher, as the situation did not lend itself to the situation. She did, however, have a solid foundation to begin to build the specialised knowledge for teaching reading on as evidenced through the TKS results, the interview, observations and Beau’s gains in learning to read.

The final level of teacher development, the Reflective, Organised Analysed Knowledge (Figure 5-12), is representative of a teacher of many years of deliberate experience and study (Snow et al., 2005). Isla had the beginnings of this level being able to assess and program for a student identified as experiencing difficulties in learning. While having assisted one child with complex learning needs she was yet to demonstrate she had gained the knowledge to assist all students in class with diverse learning needs. It was also apparent during Observation 3 that Isla had not developed automatic understandings and knowledge that provides rapid and fluent reaction to any complexity of learning needs encountered.
### Table 5-12
*Isla’s Knowledge for Teaching Reading Represented on the Adapted Snow et al. (2005) Framework*

<table>
<thead>
<tr>
<th>Post-study data</th>
<th>5. REFLECTIVE, ORGANISED, ANALYSED KNOWLEDGE</th>
<th>Is well versed in historical and current research and considers theories. Has extensive knowledge of concepts, and theories. Designs integrated reading programs specific to students’ needs. Understands what is easy and hard for students and is able to present concepts so that they are understood. Evidenced through:</th>
<th>Evidence of deep procedural knowledge for engaging students in learning to read. Engages teachers in learning the knowledge required to teach reading. Evidenced through:</th>
<th>Selects resources (for example: games, basal series text level of difficulty, ebooks or paper books) to teach reading to all students including the hardest to teach. Evidenced through:</th>
<th>Is considered to be an expert in reading and literacy and is responsible to mentor school staff and lead professional development at school, conferences, universities and through written materials. Evidenced through:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Master Teacher. Has highly developed expertise for integrating conceptual and procedural knowledge for teaching reading</td>
<td>□ Pre- and post-study survey □ Interview data □ Observations</td>
<td>□ Pre- and post-study survey □ Interview data □ Observations</td>
<td>□ Pre- and post-study survey □ Interview data □ Observations</td>
<td>□ Pre- and post-study survey □ Interview data □ Observations</td>
</tr>
<tr>
<td>Post-study data</td>
<td>4. EXPERT ADAPTIVE KNOWLEDGE</td>
<td>Demonstrates acquired conceptual knowledge for teaching reading to diverse students. Knows and integrates micro and macro- skills for reading (for example onset/rime). Shows evidence of student gains in reading</td>
<td>Demonstrates acquired procedural knowledge for teaching reading to all students regardless of diversity. Integrates elements and knowledge for reading. Shows evidence of student gains in reading. Evidenced through:</td>
<td>Demonstrates empathy and patience and uses resources with consideration to the students needs. Integrates resources (for example: games and text level to teach reading to all students including the hardest to teach. Evidenced through:</td>
<td>Demonstrates sophisticated level of conceptual and procedural knowledge required to teach reading. Teaches whole class reading using universal design for learning. Provides professional development for peers. Evidenced through:</td>
</tr>
<tr>
<td></td>
<td>Knowledge to promote literacy across the school programs (Snow et al., 2005)</td>
<td>□ Pre- and post-study survey □ Interview data □ Observations</td>
<td>□ Pre- and post-study survey □ Interview data □ Observations</td>
<td>□ Pre- and post-study survey □ Interview data □ Observations</td>
<td>□ Pre- and post-study survey □ Interview data □ Observations</td>
</tr>
</tbody>
</table>
| Pre study data | 1. DECLARATIVE KNOWLEDGE | Acquired some disciplinary knowledge about a range of issues within education. Evidenced through:  
☑ Progression through University study | Acquired some disciplinary knowledge about promoting literacy. Evidenced through:  
☑ Progression through University study | Acquired some disciplinary knowledge of resources that support the teaching of reading. Evidenced through:  
☑ Progression through University study | Acquired and recalls some procedural and content knowledge about teaching reading. Evidenced through:  
☑ Progression through University study |  
| --- | --- | --- | --- | --- | --- |  
| Post study data | 3. STABLE PROCEDURAL KNOWLEDGE | Identifies and implements some micro and macro-skills of the elements required for literacy, for example: pure phonemes & retelling oral story, key words to find the answer (of a question) in text Evidenced through:  
☑ Pre- and post-study survey  
☑ Interview data  
☑ Observations | Recognises appropriate procedural knowledge to teach reading that includes micro and macro-skills and strategies (for example: systematic and explicit teaching of the concepts) Integrates elements and knowledge for reading. Evidenced through:  
☑ Pre- and post-study survey  
☑ Interview data  
☑ Observations | Selects technologies to support the teaching of the micro and macro skills of the elements required for reading, for example: levelled texts, fluency graphs, strategy sheets, e-thesaurus, games, books (e-books or paper), visuals. Evidenced through:  
☑ Pre- and post-study survey  
☑ Interview data  
☑ Observations | Consistently using correct conceptual and procedural knowledge to teach reading. Engages students in learning. Monitors gains and adapts teaching programs to facilitate learning. Evidenced through:  
☑ Pre- and post-study survey  
☑ Interview data  
☑ Observations |  
| Post study data | 2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE | Aware of the Big Ideas within reading and recalls some information Evidenced through:  
☑ Pre- and post-study TKS  
☑ Interview data  
☑ Observations | Selects appropriate procedural knowledge (strategy) to plan a reading activity that provides success in learning Evidenced through:  
☑ Pre- and post-study survey  
☑ Interview data  
☑ Observations | Identifies, implements and analyses reading assessments to inform programming needs. Plans a reading program that includes the Big Ideas, strategies and resources. Evidenced through:  
☑ Pre-post Survey  
☑ Interview data  
☑ Observations | Identifies, implements and analyses reading assessments to inform programming needs. Implements a reading program that includes Big Ideas, strategies and resources. Teaches a small group of 1 to 3 students. Evidenced through:  
☑ Pre- and post-study survey  
☑ Interview data  
☑ Observations |  
| Post study data | 2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE | Working with small group or 1:1 with a developing reader. The teachers are often not able to detect or observe other features of the learning environment | Selects appropriate procedural knowledge (strategy) to plan a reading activity that provides success in learning Evidenced through:  
☑ Pre- and post-study survey  
☑ Interview data  
☑ Observations | Identifies, implements and analyses reading assessments to inform programming needs. Plans a reading program that includes the Big Ideas, strategies and resources. Evidenced through:  
☑ Pre-post Survey  
☑ Interview data  
☑ Observations | Identifies, implements and analyses reading assessments to inform programming needs. Implements a reading program that includes Big Ideas, strategies and resources. Teaches a small group of 1 to 3 students. Evidenced through:  
☑ Pre- and post-study survey  
☑ Interview data  
☑ Observations |  
| Pre study data | 1. DECLARATIVE KNOWLEDGE | This knowledge alone is not sufficient for teachers to be engaging in “good practice” (Snow et al., 2005, p. 8) | Acquired disciplinary knowledge about a range of issues within education. Evidenced through:  
☑ Progression through University study | Acquired some disciplinary knowledge about promoting literacy. Evidenced through:  
☑ Progression through University study | Acquired some disciplinary knowledge of resources that support the teaching of reading. Evidenced through:  
☑ Progression through University study |  
| Pre study data | 1. DECLARATIVE KNOWLEDGE | This knowledge alone is not sufficient for teachers to be engaging in “good practice” (Snow et al., 2005, p. 8) | Acquired some disciplinary knowledge about a range of issues within education. Evidenced through:  
☑ Progression through University study | Acquired some disciplinary knowledge about promoting literacy. Evidenced through:  
☑ Progression through University study | Acquired some disciplinary knowledge of resources that support the teaching of reading. Evidenced through:  
☑ Progression through University study |
5.2.2 **Case Study 3.** Case Study 3 participants were Janice, a teacher who was weeks away from completing her Bachelor of Education (Primary) degree, and Angel, a Year 1 school student. Janice and Angel were both from diverse cultural and language backgrounds.

Angel came to the tutoring program with a history of support from the school. The School Learning Support Team reported that Angel had been diagnosed with having a moderate receptive and expressive language disorder, experienced literacy-learning difficulties and was refusing to participate in reading circles. They noted that Angel was hyperactive, had difficulties following instructions, sulked when he did not get his own way and had experienced considerable trauma and disruption during his life. Angel had a small social group that he related to. Prior to the program, the school’s Learning Support Teacher had helped Angel through intensive interventions in reading. The school was aware that Angel responded well to affirmation for his efforts and outcomes; his participation in the tutoring program was strongly recommended due to his intensive and personalised needs.

Janice indicated during the interview prior to commencing her tutoring program that her knowledge of teaching reading was supported by the studies she had undertaken as part of her degree. These studies included four units that focused on English and literacy. She believed that all students learned by hearing stories being read and naturally gain the skills for reading as one does for language development. During the initial interview she indicated she had become emotional in the first workshop when she realised that she did not know the common sounds for letters and letter combinations in the English language. Janice found learning the specialised knowledge for teaching reading a challenge.

Before participating in the program Janice had assumed that students would learn through emersion in a rich literature environment. She became quite anxious when she realised that students she had taught during her practicum were not lazy as she had told them, but experienced genuine difficulties with learning to read. During the initial tutoring sessions, Janice talked continuously and expected Angel to listen while she poured her knowledge into his head. When he tried to speak, she talked faster and louder, eliminating any opportunity for Angel to talk. With modelling and guidance from her mentor she moderated her speaking fluency and expectations, and gave Angel opportunities to communicate with her.

Janice completed the *Teacher Knowledge Survey* in the first week of the tutoring program, and again in the final week. Her pre- and post-study test scores are shown in
Figure 5-27. The pre-study scores for Janice totaled 16 out of a possible score of 29 (55%), and 75% for the post-study survey.

Initial areas of strength for Janice were vocabulary and word study. These areas of strength are not surprising, given the focus of the courses she chose for her degree prior to participating in this program (i.e., language, meaning). These two areas were at a similar level at the end of the tutoring program.

Janice had more noticeable changes in phonological awareness, strategies and alphabetic principle over the seven-week in-school program. Given the focus of the program that Janice developed for Angel, and the content of lectures and in-school tutorials, this result was not surprising. This outcome highlighted a key aim of the study program – to juxtapose the theory and practice to develop teachers’ key knowledge and pedagogical understanding of how to teach reading.

Figure 5-27. Janice’s pre- and post-study TKS results as percentage of correct answers by element of reading.

Angel, a Year 1 student, was six years and nine months when the program began. While the school identified Angel as speaking English as a second language, they also indicated that school assessments had shown he had difficulties with language generally, and learning to read specifically. Table 5-13 provides Angel’s scores on the Woodcock Reading Mastery Tests-Revised (American Guidance Service, 1998) both in the pre- and
post-study test. His raw scores on the WRM Word Attack subtest (i.e., the ability to read non-words) increased from 0 to 24, indicating an equivalent growth of three years and ten months. This result demonstrated that Angel improved his skills in applying phoneme and phonological awareness knowledge and skills to decode unknown or non-sense words. His learning gains for reading everyday words was six months. The WRM Word Identification sub-test demonstrated that Angel could only read 8 CV and CVC words pre-study, yet read 26 words post-study.

Table 5-13

*Angel’s Pre- and Post-Study Woodcock Reading Mastery Sub-Test Results*

<table>
<thead>
<tr>
<th></th>
<th>Word Attack Raw Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
<th>Word Identification Raw Score</th>
<th>Age Equivalent</th>
<th>Grade Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-study</td>
<td>0</td>
<td>5.0</td>
<td>K</td>
<td>8</td>
<td>6.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Post-study</td>
<td>24</td>
<td>8.10</td>
<td>4.3</td>
<td>26</td>
<td>7.0</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Figure 5-28 reports the results of Angel’s pre- and post-study comprehension scores as assessed using the *PM Benchmark* (Smith, 2010). Prior to the study, Angel demonstrated that he could not retell what he had read, and could not answer inferential or creative questions relating to the story. He did answer all the literal questions correctly.

After the program he scored 100% correct for retell, and provided some age-appropriate answers to inferential (33%) and creative questions (66%). While the demands of these questions were not complex, Angel demonstrated progress over the seven-week period of the study in regard to his understanding of text.
Figure 5-28. Pre- and post-study scores achieved by Angel in the PM Benchmark comprehension test.

The SLAT results shown in Table 5-14 provide the information Janice used to write a program of instruction that would support Angel’s specific learning needs. Janice learned how to administer and interpret the data with the support of her school mentor. Angel’s pre-program strength lay in his knowledge of sight words and single phonemes. Angel showed that he had acquired early phonological skills (e.g., identifying and producing rhyme, identifying the first and last phoneme in a given word and detecting syllables) often demonstrated by a student beginning Year 1. Areas that he worked on with Janice included blending, segmenting, generalising and intertwining phonemes, and phonological awareness to decode unknown words. His sight word score of 25 was well below the Year 1 expectation of 90 words (Commonwealth of Australia, 2006). His post-program results of 35 words provided evidence of progress, with work needed to enhance these skills further.
Table 5-14
Angel’s Pre- and Post-Study Specific Level Assessment Tasks (SLAT) Results

<table>
<thead>
<tr>
<th></th>
<th>Pre-study</th>
<th>Post-study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper and Lower Case Single Letter Sounds</td>
<td>16</td>
<td>23</td>
</tr>
<tr>
<td>Digraph</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>SPAT</td>
<td>23</td>
<td>45</td>
</tr>
<tr>
<td>Educheck</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Johnson’s Vocabulary Test</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Basal Series Decodable Text</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>PM Level</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Fluency</td>
<td>46</td>
<td>68</td>
</tr>
<tr>
<td>Vocabulary Meanings %</td>
<td>20</td>
<td>58</td>
</tr>
<tr>
<td>Comprehension %</td>
<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>

The specific details of the pre-study assessment results were recorded on the student SLAT Assessment Results Recording Sheet (Table 5-15). Janice reported in her interview that learning to write a program to meet Angel’s needs supported her greatly in understanding how the general elements of evidence-based reading linked together. While vocabulary was part of every tutoring session, she would need to continue explicit instruction to develop skills in retelling story details, and in answering inferential or creative questions.

Janice used the SLAT data to design the first reading lesson plan to address Angel’s learning needs with the assistance of her mentor (see Figure 5-29). The lesson plan began with Janice modelling reading from a book appropriate for Angel’s age and within his area of interest. This was established during their initial meeting where Angel discussed with Janice the chickens his family kept, his pet chicken and how it regularly laid eggs.

Using this information, Janice chose a literary text with the main character being a chicken to enhance engagement. The words within the picture book were used to capture Angel’s interest and build his vocabulary. Janice purposefully explored and revised selected phonological awareness skills (i.e., identifying end sounds, blending words) as part of reading the book. Angel, while given a choice of books for reading enjoyment, chose the same book used for the modelled read. He closely examined the visual representations of the characters and listened to Janice re-reading the text.
Table 5-15
Detailed Pre-study SLAT Results and PM Assessments for Angel Used to Design his Reading Program

<table>
<thead>
<tr>
<th>Alphabetic Principle</th>
<th>Phonological awareness</th>
<th>Educhek Generalisation</th>
<th>Continuous text reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>V=vowels C=consonants B= blends Dig=digraphs Dip=diphthongs</td>
<td>Fluency and PM level of difficulty and PM comprehension</td>
</tr>
<tr>
<td>Phonemes Test</td>
<td>SPAT (Neilson, 1995)</td>
<td>vc and cvc 3/14 C dig 0/12 C B ccvc 0/14 C B ccvc &amp; Cx2 0/16 C B x3 C dig 0/12 cvcc &amp; ccvc B 0/16 Vowel dig/dip 0/27 Multisyllabic 0/12 Misc 0/18 Non-words 0/10 PM Benchmark Level 4</td>
<td></td>
</tr>
<tr>
<td>Known single phonemes (highlight) abcd efg hijkl mnp qrs tuvw XYZ</td>
<td>Symbol counting 4/4 Rhyme detection 4/4 Rhyme production 4/4 Id of onset 4/4 Id of rime 4/4 Segmentation 1 1/4 Blending 1/4 Deletion of 1st phoneme 0/4 Deletion of 2nd phoneme 0/4</td>
<td>Difficulties with: Onset Y/N End of words Y/N Medial Y/N Vowel confusion Y/N Digraph errors Y/N Long e errors Y/N Blends words Y/N Blending fluently Y/N Comment Level 1 was not achieved</td>
<td></td>
</tr>
<tr>
<td>Known digraphs (circle) ch sh wh th ck er ir ur ea ay ai ei ee ey ou or aw ow oo ie igh ar au kn ph oi oy qu wa ee ss ff ue wa</td>
<td>Total Score 21/58</td>
<td>Comprehension correct 20% - retell Y/N - literal Y/N - inferential Y/N - creative Y/N Vocabulary 20%</td>
<td></td>
</tr>
<tr>
<td>Total Score 32/52</td>
<td></td>
<td>Comment Uses punctuation Vocabulary 20% correct</td>
<td></td>
</tr>
<tr>
<td>Known digraphs (circle) ch sh wh th ck er ir ur ea ay ai ei ee ey ou or aw ow oo ie igh ar au kn ph oi oy qu wa ee ss ff ue wa</td>
<td>Total Score 21/58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total score 12/34</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sight Words: Correct-25/100 Number Attempted: 30

<table>
<thead>
<tr>
<th>Errors</th>
<th>Onset</th>
<th>Rime</th>
<th>Medial</th>
<th>Vowels</th>
<th>Long e</th>
<th>Visual errors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y/N</td>
</tr>
</tbody>
</table>

Comment
- Requests text be read before attempting to read
- A number of single phonemes were pronounced incorrectly
- Kindergarten skills and beginning Yr 1 skills met for SPAT
- Relies on sight word recognition
- Oral and written comprehension is poor
<table>
<thead>
<tr>
<th>Reading Element</th>
<th>What to Teach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modelled Read</strong>&lt;br&gt;Vocabulary&lt;br&gt;Paper book or iPad</td>
<td>Book: Little Red Hen&lt;br&gt;Teach: Author and Illustrator&lt;br&gt;Explain and show illustration: plant, goose, sprouted</td>
</tr>
<tr>
<td><strong>Comprehension</strong>&lt;br&gt;Retell, key question words. See PASH Book (Department of Education &amp; Communities, ND.)</td>
<td>Teach: Discuss the characters in the book and sequence events that occurred using visual from the book&lt;br&gt;Teach Meaning of who – character or person</td>
</tr>
<tr>
<td><strong>Big Word - Little Word:</strong>&lt;br&gt;Whole words, prefix suffix</td>
<td>Word: football&lt;br&gt;Focus: finding small real words in big words</td>
</tr>
<tr>
<td><strong>Phonological Awareness</strong> (SPAT)&lt;br&gt;Teach explicitly first&lt;br&gt;Oral exercises</td>
<td>Revise identifying the first sound in words&lt;br&gt;Discuss looking at the last sound in the word and identifying it.&lt;br&gt;Practise blending at, on, it and am</td>
</tr>
<tr>
<td><strong>Alphabetic Principle</strong>&lt;br&gt;Phonemes for single letters &amp; digraphs&lt;br&gt;Ratio for teaching 4:1 known to unknown&lt;br&gt;Use same sound different look</td>
<td>Revise known: i, b, s, a&lt;br&gt;New: f and ox&lt;br&gt;Teach sound explicitly</td>
</tr>
<tr>
<td><strong>Fluency Reading</strong>&lt;br&gt;Read through text, then 1 minute read and graph</td>
<td>Basal series text - book number 7&lt;br&gt;Revise meaning of den, and lid</td>
</tr>
<tr>
<td><strong>Games for Skills Practice</strong>&lt;br&gt;Focus on areas of need and skills for generalization&lt;br&gt;i.e. phonological awareness, sight words, vocab etc.</td>
<td>Play game to identify and delete beginning sound – who is in the first carriage and dice</td>
</tr>
<tr>
<td><strong>Word study</strong>&lt;br&gt;Focus on learning need (see Educheck)</td>
<td>Teach blending using VC, CV and CVC</td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
<td>Review the new vocab words presented today.&lt;br&gt;Use 8 known words and 2 unknown words for success in learning Talk about what it means to learn&lt;br&gt;“Tell me about what you learned today”</td>
</tr>
<tr>
<td><strong>Spelling</strong>&lt;br&gt;Words from Reader (family words) or Johnston’s sight words</td>
<td>Oral and written practice: fox, box, lid and sit</td>
</tr>
<tr>
<td><strong>Oral Language and Journal Writing</strong>&lt;br&gt;<strong>Prompt:</strong> “Today I learnt”</td>
<td>“Tell me about what you learned today”&lt;br&gt;Scribe for Angel</td>
</tr>
<tr>
<td><strong>Reading for Enjoyment</strong></td>
<td>The Little Red Hen and discuss sequence of happenings - Angel chose book</td>
</tr>
</tbody>
</table>

*Figure 5-29.* The initial reading program prepared by Janice to support Angel in learning to read.
Angel, while initially displaying neutral behaviours towards participating appeared to be drawn in by the illustrations during the ‘book for enjoyment’ element. He identified similarities between the family fowls and the hen in the story and identified the main characters.

The explicit teaching of specific skills followed with Angel reading a decodable text with a focus on accuracy and fluency. His ability to read at a specific level of difficulty had been established during the initial assessment and Janice used the results as a guide. Janice indicated during her interview that she had made a conscious decision to select an easy text that would provide success. Janice began teaching comprehension by focusing on retell and question words (e.g., when, who and where) before moving to inferential and creative question instruction.

Janice provided explicit and systematic instruction and selected carefully planned practice tasks. She selected games that initially focused on phonological awareness skills of identifying the onset (first sound) of words and blending during the beginning week of the study and changed them as required to practice new learning. Janice was required to deliberately plan games or word activities to facilitate practice of what was being learned, and revise known material. Over the course of the study Janice and Angel continuously learned from each other. They developed a relationship of trust and learned, practiced and generalised to continuous reading.

Figure 5-30 shows the reading accuracy and fluency results in PM Benchmark level (i.e., numbers in green square), Spache Readability score (at top of columns) and Reading Fluency (i.e., red line graph). These data provide evidence that over the course of the seven-week program Angel made gains in learning to read. The difficulty of text went from Level 4 to Level 16, a level that many students would achieve by the end of Year 1. While the difficulty of text increased, so did his decoding fluency. He improved from 46 words correct per minute on Level 4, an easy text, to 68 words correct per minute on Level 16, a much more complex text. Angel’s reading fluency rate was within the benchmarks recommended (NSW Department of Education and Training, 2006) for students in Year 1. Angel’s pre- and post-study reading comprehension scores (Figure 5-11) demonstrate strong gains in learning to comprehend the author’s intended meaning from the texts.
5.2.3.1 Observations Janice and Angel. In line with the research plan for this study, Janice and Angel participated in three observations. The observations at the beginning, middle and end of the study were videotaped, analysed and transcribed.

5.2.3.1.1 Observation 1. The tutoring session began with Janice showing Angel a visual timetable and explained what would occur during the lesson and her behavioural expectations. When Janice tried to read a book to Angel he pulled at the book, and when asked to listen, crossed his arms, pulled faces, turned his face away and ignored Janice. Janice kept talking to him, and eventually Angel responded to the promise of stickers for appropriate behaviours. Janice gave acknowledgement for his positive behaviour.

Figure 5-31 provides an overview of the reading elements or big ideas within Observation 1 for Case Study 3. Assessments for reading administered in the first week of the study provided the information required for a program tailored to Angel’s needs. The student had limited early skills and knowledge for reading, so the program was designed to systematically and explicitly teach him the key reading elements - language (including oral language), phonological awareness, alphabetic principle, comprehension skills and knowledge, and reading and fluency. A focus on decoding skills, oral instruction and reading (i.e., modelled reading, reading for pleasure) formed the focus of the first lesson, the subject of this observation.

Figure 5-30. Angel’s Spache, PM Benchmark level and Passage Reading rate taken over the course of the study.
Figure 5-31. Percentage of time spent by Janice and Angel on each of the reading elements during Observation 1.

Figure 5-31 highlights that Janice allocated much of the lesson to the big ideas of reading. The concern about Angel’s language skills highlighted in the initial assessment, and through collaboration with the school, was addressed through a number of features within the lesson. Oral language was addressed for 13% of the lesson, comprehension for 16% and vocabulary for 2%, all of which directly address language development. These elements of the lesson were addressed through modelled reading, reading for pleasure, spelling and games for practicing skills.

The lesson also provided opportunity for working on specific decoding skills. These skills included phonological awareness (13%), alphabetic principle (13%) and word study (3%). In viewing the video of this lesson, it was clear that Janice was having difficulty bringing all the elements together, and seeing how they interacted with each other. Despite this, and with some guidance from the school mentor, she went on to deliver the lesson she had planned (Figure 5-29). The following analysis, however, will bring a closer insight into how Janice managed to bring these elements together.

Figure 5-32 illustrates visually the teaching and learning observations that occurred during Session 1. The minute-by-minute slices provide a general overview of the lesson planned (e.g., commences with model read, fluency read in the middle part, concluding with journal writing and spelling). It is also evident that during any minute there were
multiple exposures to differing elements of reading. During minute 43, for example, the student was involved in the big word/little word activity. During this time, the student looked at a multi-syllabic word and identified whole words within the identified word. The word *grandmother* required the student to syllabify the compound word into grand and mother, and then find other words within (i.e., moth, her, the, he, a, and, other) and also provided the opportunity to identify and discuss prefix, suffix and base words. This exercise provided an alternate method of recognising a word, that is, identifying the small word within the word and blend additional phonemes to decode the word. It also provided an opportunity for studying the word and responding to morphographs, syllables and vocabulary.

![Reading Elements Diagram](image)

*Figure 5-32. The elements used by Janice and Angel in the teaching of reading during Observation 1.*

It became apparent during this observation that Janice was integrating differing elements with some proficiency. Despite her initial comments and anxiety about how students learn to read (i.e., through exposure to literature), she was using some of these previously learned skills (i.e., focus on language) alongside those taught within the course (i.e., alphabetic principle, phonemic awareness). This was evident in minute 43.
In minute 43, about ten minutes from the end of the lesson, Janice was observed to include five of the elements being recorded. The minute involved journal writing, which quite naturally included spelling. Janice was also seen to use a number of oral components that drew on Angel’s strengths including oral language and phonological awareness.

While the multi-layered nature of the minute provides evidence of Janice’s skills, the transcript of the following minute provides additional understanding of what was occurring. The transcript from minute 44 is below:

Janice: Spell the word peck
Angel: peck (phonemes – wrote peck (alphabetic principle, phonological awareness spelling and student curriculum)
Janice: How did you know to write ck on the end of the word and not k? (oral language, alphabet principle and teacher curriculum)
Angel: I learned this. My sister has ck on the end of her name and you told me before, so I will write it like that all the time now on the end of a word (alphabetic principle, oral Language, and student curriculum).
Janice: Well done! You have learned that ck (letters) says ck (phoneme) and we could have it in the Naughts and Crosses game again (alphabetic principle, affirmation and teacher curriculum)
Angel: yahhhh! (student social)
Janice: Angel, what have you learned today? (oral language and teacher curriculum)
Angel: Today, I learned to listen to sounds in spelling, and to read and I won the word game (oral language and student curriculum).
Janice: Now write what you learned today in your journal. Do the first sentence and we will look at the spelling (oral language, teacher curriculum).
Angel wrote: Today I lerned to lisen…(journal writing, alphabetic principle, spelling and student curriculum).
Janice: The word learn has more letters than that. It looks like this (wrote word correctly). The word learn has an ea here and finishes like this (points to word) (oral language, spelling, strategy and teacher curriculum)
Janice: In the word listen almost all your letters are correct. The word listen has one more letter. It has a t (phoneme) in the middle. It's a bit hard to hear, but it is there (spelling, oral language and teacher curriculum).
Angel: No it is not! L-i-s-e-n (oral language, phonological awareness, curriculum correction, strategy and student curriculum).
Janet: That's right, we can’t hear the t sound in the word listen. It does have a t when we write it though (oral language, spelling, alphabetic principle and affirmation).
Social interaction: Smiling at one another (social).

The transcript highlights that Angel and Janice were focused and engaged in the lesson. While Angels neutral behavior (e.g. folding arms, turning away) continued during the first part of the lesson, his reluctance to be part of the lesson had dissipated after about 25 minutes and he was academically and socially involved. His talkative nature allowed Janice to draw out the use of his oral language, and practice it with guidance.
Janice’s engagement was appealing to Angel. It was evident in this minute that Janice had erred in telling Angel that the letter /t/ was a bit hard to hear. Angel was quite sure that /listen/ did not have a /t/ sound in it. This statement provided a cue for Janice to correct this misconception. Janice had yet to learn to listen to the sounds in words before deflecting to the spelling of the word. She acknowledged that Angel was correct in what he could hear and identify.

The teacher-student interaction demonstrated that Janice had elements of conceptual and procedural knowledge to teaching and learning. During lectures and tutorials she had learned the single phonemes, digraphs and morphographs and applied these to her teaching. She used teaching moments (e.g., spelling a word) to address a number of reading big ideas as shown in minute 43 and 44. The session ended with Angel politely requesting a repeat of the session – Janice appeared to have hooked Angel into the sessions.

Figure 5-33 provides some further evidence about Janice’s impact on, and change in, Angel’s social behavior. In the first twelve minutes of the lesson, Angel engaged in regular neutral behaviours. This dissipated over the next 10 minutes with a final observation of neutral behavior at minute 27. During this time, Janice maintained a very strong focus on curriculum. Examination of Figure 5-35, for example, provides evidence that the big word/little word game was played between minute 7 and 11; then the lesson moved to phonological awareness – an oral skill and a one of Angel’s strengths.

Throughout the 53rd minute of the lesson, Janice also worked at giving Angel affirmation for his efforts and achievements. This teaching strategy was one that Janice had become aware during their first meeting, and she continued to use this strength to foster a relationship with Angel. Janice also allowed Angel to engage in social behaviour, comprising 13% of the overall lesson time.

During Observation 1, engagement data revealed that the percentage of time spent on each element was as follows: teacher curriculum 23%; student curriculum 15%; explicit instruction 2%; strategy use or instruction 9%; curriculum correction 6%; teacher affirmation 12%; teacher social 14%; student social 13%; and neutral behaviours 8%. During the teacher curriculum time Janice provided explicit and systematic instruction, asked and answered questions, modelled reading, played games with Angel to practice learning, engaged in oral language and addressed vocabulary words.
Figure 5-33. Analysis of engagement recorded between Janice and Angel during Observation 1.

5.2.3.1.2 Observation 2. Observation 2 occurred mid-way through the seven week tutoring program. Figure 5-34 displays the time spent on the specialised content knowledge elements required to teach reading. As in Observation 1, the predominance of time was given to oral language development (i.e. oral language (12%), comprehension (12%), modelled reading (8%)).

Janice throughout Observation 2 maintained a balance between coding and meaning. She integrated those skills through the big word/little word activity, word study and games, for the purpose of generalising known and new skills and knowledge to continuous text reading. The modelled read provided a picture of what reading looked and sounded like, as well as providing aural and text reading comprehension opportunity. This was supported by gaining meaning from vocabulary instruction from the text being.
During Observation 2 Janice increased the time for teaching the alphabet principle and comprehension (Observation 1 - 4% and Observation 2 - 18.5%). She motivated Angel to this aspect of reading through the use of carefully selected and constructed games and activities.

Janice recognised Angel’s need to learn the digraph phonemes and to generalise his new learning to decoding and reading words. Both Janice and Angel read aloud for a longer period during Observation 2. It would appear that Janice recognised the need for Angel to be fluent in decoding and encoding words accurately as she worked towards generalisation of the learning, and had him practice reading accurately and fluently in a fashion demonstrated during the modelled read. Further, Angel had learned the meaning of the key words at the beginning of a session and could retell what he had read.

Figure 5-35 represents the second lesson observation for case study 2. The line representing minute 33 indicates that the elements of word study, alphabetic principle, phonological awareness and spelling were taught and practiced for generalisation. The word study game was played with the aim of practicing recognition of the rime (end) for proficiency of a given word. During the previous minute the teacher had explained the phonological awareness concept. Minute 33 demonstrates that Angel was able to hear and
manipulate sounds in words, taking ownership of his learning and enjoying the process. The development of this knowledge is shown through examining the transcript of minute 33.

**Figure 5-35.** The elements used by Janice and Angel in the teaching of reading during Observation 2.

Janice: *Angel, you need to be looking here.* (looking at a book)
Janice: *I am going to read a few words to you, and I would like you to tell me the last sound you can hear. Let’s have a practice, What is the last sound in fox?* (oral language, and teacher curriculum)
Angel: *Sssss* (phonological awareness, alphabetic principle, student curriculum)
Janice: *... hop. What is the last sound?* (phonological awareness, teacher curriculum)
Angel: *p* (phonological awareness, alphabetic principle, student curriculum)
Janice: *If I said pick, what would be the last sound?* (alphabetic principle, phonological awareness, teacher curriculum)
Angel: *ck* (phonological awareness, alphabetic principle, student curriculum)
Janice: *Absolutely correct. Now, if I said mum?* (affirmation and teacher curriculum, teacher social (smile))
Angel: *Mmm* (phonological awareness, alphabetic principle, student curriculum).
Janice: *Good, now I am going to read the words out, are you ready?* (oral language, affirmation teacher curriculum)
Angel: *Can we have box? The word box has an /Λ/ (letter name) on the end, not a /s/ (letter name).* (Oral language, alphabetic principle and student curriculum)
Janice: That’s right, now listen, the last sound in box (affirmation, phonological awareness and teacher curriculum)

Angel: Ssss (nodding his head) (phonological awareness, alphabetic principle, student curriculum)

Angel began to sing (oral language, student social).

Angel, while listening for and identifying the last letter sound of the given words, had begun to think about the spelling of words, the letters used and how they sounded. Angel had learned the letter sound for “x” during the lesson and could see the written word box. The letter sound for “x” is pronounced as two letter sounds, “cs”. He had to identify the sound at the end of a word that differed from the spelling of the word. Janice did not take the time to discuss the letter and letter sound difference but moved on quickly to the next word. This is typical of a teacher within the Situation Can-Do Knowledge level of the Snow et al. (2005) matrix. Angel initially did not want to be involved in learning to read, yet he posed a question that showed he understood the complexity of the phonemes in a word ending with one letter that appeared to have two phonemes used consecutively (x – with cs as the phonemes). With this success he began to sing, showing his happiness and enjoyment in his learning.

During Observation 2, engagement data (see Figure 5-36) revealed that the percentage of time spent on neutral behaviours was almost non-existent. Neutral behaviours appeared less than during Observation 1, and had changed from resistance to grabbing extra books and looking around. It appeared that Angel had developed a love for books and was keen to read. The percentage of time spent on curriculum by Janice and Angel increased from Observation 1. Janice provided more incidences of explicit instruction as her specialised content knowledge and relationship with Angel grew.
Figure 5.36. Analysis of engagement between Janice and Angel recorded during Observation 2.

5.2.3.1.3 Observation 3. Figure 5-37 provides a visual representation of Janice and Angel during Observation 3. During this teaching and learning session the single letter phonemes were revised and the digraphs were taught in isolation, within a word game and by spelling for generalisation. During the session Janice explained that exceptional letters (x and q) are different because they can make two phonemes instead of one, for example, /x/ in box (sounds like bocs) and quick (sounds like cwick). During phonological awareness, these sounds were manipulated and blended to form words.
Figure 5-37. Percentage of time Janice and Angel spent on each reading element during Observation 3.

Figure 5-38 visually represents the teaching and learning that occurred during the third observation. During minutes 51 to 59 the teacher and student read alternate pages of the text. The student examined the illustrations as the teacher read the text and pointed out an animal that he had seen the day before in a narrative written by the same author. This was a substantial shift from the Observation 1 when the student found it difficult to attend to learning.

Minute 33 identified that regardless to the progress made, Angel required more repetitions of the phonological awareness skill of hearing and identifying the onset of a word if he was to achieve automaticity. He spoke of finding this task hard to complete. A closer examination of minute 33 also shows the multiple elements that were addressed including alphabetic principle, phonological awareness, oral language, spelling, word study games and revision. This minute provides an example of interaction between Angel and Janice.
Figure 5-38. The elements used by Janice and Angel in the teaching of reading during Observation 3.

Janice: *Angel, what is this word?* (teacher curriculum)
Angel: *P/u/t* (phonemes), *put, is that it?* (alphabetic principle, spelling and student curriculum)
Janice: *What is the first sound in put?* (oral language, teacher curriculum).
Angel: *This is so hard* (oral language)
Janice: *“I think you can do it. What is the last sound?”* (alphabetic principle, phonological awareness, and teacher curriculum)
Angel: *“t”* (letter sound) (alphabetic principle, phonological awareness student social-smile and student curriculum)
Janice: *what is the word?* (teacher curriculum and teacher social - smile)
Angel: *put* (social – smile, student curriculum)
Janice moved on to the next word and wrote, Yak
Janice: *What is this?* (Pointing to the letter Y) (oral language and teacher curriculum)
Angel: *Y* (letter sound) (alphabetic principle, and student curriculum)
Janice: *What is the word?* (oral language and teacher curriculum)
Angel: *Yak. Can we do that word (Pointed at football)?* (student curriculum, oral language)
Janice: *football? This sound (underlining oo) is the oo sound. Oo (revision, short sound)* (alphabetic principle, strategy and teacher curriculum)
Angel: *oo* (short sound) (alphabetic principle and teacher curriculum)
Janice and Angel: *foot* (blending) (alphabetic principle, phonological awareness and student curriculum).
Janice: *good* (affirmation and teacher social-smile)
Angel: *that’s ball, football* (phonological awareness, student curriculum and student social-smile) Angel reaches for a storybook and began to look at the front cover
Janice: *Not now, later. Put the book down, thank you.*
Janice: *Now this one. This sound also makes an oo (long sound) sound* (alphabetic principle and teacher curriculum)
Angel: *Poool, pool!* (phonological awareness, alphabetic principle spelling and student curriculum)
Janice: *Good work!*

During this discussion, Janice demonstrated an increasing level of conceptual and procedural knowledge for reading, how to maintain high expectations, teach explicitly by clarifying digraph pronunciations, model and teach blending and generalisation skills and taught them with confidence. She allowed Angel to take some responsibility for his own learning during minute 33, when she allowed him to choose the word he wished to practice on. Janice chose an irregular example (a sight word) that was not readily decodable (put) to examine and blend. While this word may be considered by some as inappropriate because of the irregularity in hearing the phonemes with ease, the example was a word that is frequently found in texts. With encouragement, Angel was able to decode and generalise the pronunciation of the word regardless of the specific spelling and corresponding phonemes. Comparison of Observations 1 and 2 to Observation 3 shows that Angel had moved from oral to literate, was able to read and identify the sounds at the beginning and end of the words as required for reading text, could identify the specific phonemes and generalise them to words, and transform or decode a word that is not pronounced as written in Australian English.

By the final session Janice used the big ideas for teaching reading to assess Angel’s reading progress and used the data for programming lessons that met Angels learning needs. Janice continued to monitor and change the one-on-one program throughout the study as seen throughout the observations. Janice, as the other teacher participants, observed the same process for teaching reading being applied to the whole class setting. The study, however, did not provide the opportunity for her to teach the reading lessons in a whole class situation regardless of the success she had achieved while working with Angel.

Janice assessed Angel’s learning gains through the original assessments (as discussed in the interview) and by continuously monitoring his learning. She programmed using the scaffold page provided during the workshop sessions as it guided her to hierarchically teach and build up the elements required for teaching reading. Janice used the strategy of wait time to allow Angel time to think about questions and answers and to respond.
Subtle changes in the time spent on each engagement element were made to reflect Angel’s continued learning with additional explicit instruction being provided. During minute 33, the engagement elements observed were: teacher curriculum; student curriculum; strategy; teacher social; and student social. Janice was aware of the impact of explicit instruction on Angel’s learning and continued to provide this element as occurred in Observations 1 and 2.

The neutral behaviors had changed from resisting learning (i.e., crossing arms, turning face away and ignoring the teacher) as seen in Observation 1 (minutes 1-5 and on occasions to minute 28) to snatching at books and looking around in Observation 2, to minimal chair rocking and tapping in Observation 3. It was quite apparent that Janice and Angel had developed a relationship that allowed for a productive learning session to be conducted.

Increasingly more time was spent on teacher and student social interaction, with Angel’s social moving from 8% in Observation 1 to 15% in Observation 2 and 13% in Observation 3. This included smiles, chatting, touching and singing. Teacher and student
curriculum where within 3% of each other, with Angel taking an active part in his curriculum initiation and response to the explicit instruction provided by Janice.

5.2.3.2 Interviews data. The interview codes for Case Study 3 were established using the same analyses as for Case Studies 1 and 2. The codes for Case Study 3 are reported in Table 5-16.

Table 5-16
Data Analysis and Integration of Results Flowchart. An overview of the Thematic Analysis of the Interview with Janice

<table>
<thead>
<tr>
<th>4. Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complex sets of diverse knowledge are required for the teaching and learning of reading to students not meeting National Benchmarks. Predominant contributors include teacher preparation for teaching reading; acquisition of Specialised Content Knowledge (SCK) required to teach reading; practical application of integrated new and accumulated knowledge; calibration of the teacher’s own learning; common content knowledge (CCK); knowledge of the student and content (KSC); content and teaching (KCT); and horizon content knowledge (HCK).</td>
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<table>
<thead>
<tr>
<th>3. Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student’s individual needs for learning</td>
</tr>
<tr>
<td>Specialised sets of knowledge for teaching reading</td>
</tr>
<tr>
<td>Teacher knowledge and skills required for teaching reading</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>2. Categories</th>
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</thead>
<tbody>
<tr>
<td>Knowledge of student and content (KSC) (assessment and curriculum related)</td>
</tr>
<tr>
<td>Conceptual and procedural knowledge for teaching reading</td>
</tr>
<tr>
<td>Calibration of own knowledge for teaching reading</td>
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<tr>
<th>↑</th>
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</thead>
<tbody>
<tr>
<td>External knowledge of student</td>
</tr>
<tr>
<td>Curriculum knowledge for teaching reading</td>
</tr>
<tr>
<td>Demonstrated gains in the specialized knowledge and skills for teaching reading</td>
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<table>
<thead>
<tr>
<th>1. Open Codes</th>
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<tr>
<td>based on an interview with Case Study 3 - Janice</td>
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</table>

Janice explained that she did not have previous knowledge of or experience in using assessments for reading. At the beginning of the study Janice indicated in her interview that she did not know how to assess a student’s reading skills and knowledge, nor did she have clear knowledge of the macro and micro-skills within the specialised content knowledge for teaching reading (TKS). Prior to participating in the study Janice appeared to assume reading was acquired naturally, based on her statement that she would have taught reading by providing a novel to ability groups of students (interview data). During the study, Janice appeared to have come to the realisation that for students to learn to read, it was necessary that they learn the specific knowledge and skills to do so.
The most I had done (before commencing the study) was to observe a teacher going through a PM benchmark. Learning the assessments was a bit overwhelming at first. Having to go through the SPAT test, the Educheck and Johnston’s (sight word test), and having to learn the digraphs ourselves as pre-service teachers was overwhelming for some. I had to put up my hand and ask what Q is, and what the sound for that was (during the workshops). But once you sit down and work on the assessments practically and have a practice experience yourself, it was a little more comfortable.

Janice discussed her struggle with learning the theoretical underpinnings of the alphabet principle and her feelings of being overwhelmed. As a second language speaker, she found the complexity more challenging than her peers may have as she was confronting the graphemes and letter names for the first time on occasions. The assessments assisted her strengthen her skills and knowledge, as well as support her in programming.

The tests really helped me see what Angel needed to learn and what his gaps in learning were. What Angel knew and didn't know helped me plan and program for him. It let me see where the issues were, for example, he had no understanding of digraphs. He got two, and they were not pronounced properly, out of the forty something.

Janice needed to learn about how phonemes and phonological awareness are needed in learning to read. This including understanding how children learning to read relate the sounds in words to letter representations in English, and relate the graphemes to phonemes.

She acknowledged the usefulness of the assessments in programing and teaching the macro and micro-skills and knowledge specific to Angel’s needs. This was further enhanced through acquiring the knowledge and understanding of how to systematically and explicitly teach these skills.

A lot of that (my) really explicit teaching has really helped my child. I think that the greatest thing I have learned is that children need you to tell you the actual sound the letters make, and how we are meant to blend the words together. It was helpful to teach really explicit steps for segmenting and looking at the first sound, the last sound and the middle sound (of the word) and for teaching the meaning of words.

Linking theory and putting into practice was something that Janice found beneficial over the eight weeks of study. The material on campus was supported in the school through working with your student, peers and the mentor; while the practicalities from in school were used to elaborate points on campus.

One thing that really stood out from the lectures for me is that we tend to ask just one question and we are happy with that. We need to ask questions differently so that we know if they understand.

To actually see that progress and getting it, is so fun and rewarding as well.

You can immerse them and hope they learn through osmosis but then you will leave a lot of kids out, and they will be left behind. Teaching explicitly and having that 1:1
time has been invaluable. I learned at university and at school that students need explicit instruction.

This has been a really practical study as well and the theory hasn't just sat there. I have been able to manipulate some of that and slide it into practice. The theory has just slotted into this in-school experience.

Finally, elaborated that her position in regards to teaching reading changed over the duration of the unit of study. While she did not dismiss her previous seven semesters of study, she supplemented it with her learning from working with Angel. The following quotes do not, however, deepen to acknowledging the individual needs of students within a whole class context.

*I think I would have just divided them into ability groups and given them a novel and get them to read through it. A lot of that whole approach to literacy, I would have given them wide texts to read independently and work with drama, maybe teach some comprehension. I would teach them differently now and include the alphabetic principle, phonological awareness, fluency, vocabulary and comprehension. I would play the games and teach them to spell and write as we have done here.*

5.2.3.3 Janice: Summary of case study.

Janice’s pre-study TKS score identified that Janice had poor specialised knowledge for teaching reading and needed to learn that knowledge if she was to teach students to read (Figure 5-27). Her decoding skills, phonological awareness and alphabetic principle, comprehension and knowledge of strategies scores were limited and while Janice was able to recall some of the content knowledge learned before completing the unit of study it was insufficient for teaching students to read (Snow et al., 2005). Janice spoke of not knowing specific letter names or associated phonemes before completing the unit of study. She also spoke of being overwhelmed by having to learn the digraphs and conceptual and procedural knowledge in assessments that were presented in the workshops and used by the teachers to assess the students reading knowledge for programming purposes.

If Janice was to assess and teach Angel to decode, she needed to learn the phonemes and phonological awareness herself before doing so. During the post-study interview Janice spoke about learning the correct letter names and associated phonemes during the workshops. Angel assisted Janice to strengthen her learning as evidenced during Observation 1 - minute 43 (Figure 5-33). She demonstrated post-study TKS gains in the alphabetic principle and phonological awareness knowledge (Figure 5-27); she showed that could administer the assessment with integrity.

Janice initially struggled with engaging Angel in learning. Angel demonstrated his displeasure in being asked to participate initially but settled with a reward system being
implemented (stickers) and wriggle brakes as required over five seconds. This change in relationship was also associated with a growing confidence by Janice in how to program for Angel’s needs, understanding of the content, and the building of a positive relationship with Angel.

Angel also showed advances in his learning over the duration of the program. When he completed the pre study WRMT-WA and WRMT-WI (administered by the a trained research assistant) he demonstrated limited-decoding skills yet had a bank of sight words that fell within the average range (Table 5-13). The letter sound knowledge assessment data collected by Janice revealed Angel had poor single and digraph phoneme knowledge (Table 5-14 and 5-15) and a lack of generalisation skills as shown by the Educheck (Table 5-15). He also had poor decoding fluency when reading continuous texts and had weak comprehension skills as reported in Table 5-19.

During the teaching and learning sessions Janice taught Angel explicitly to hear and manipulate sounds in words and how to relate the sounds in words to their letter representations in English, and relate graphemes to phonemes. She initially provided a white board as visual support, and later orally without visual support (Observation 1 - minute 44 (using single letter phoneme) and Observation 2 - minute 33 (using digraph phoneme). By Observation 2 Angel and Janice had developed a trusting relationship and Angel had developed an interest in words and enjoyed working with Janice. He smiled and offered word examples he wanted Janice to work with (e.g., box as seen in Observation 2 - minute 33). Observation 3 saw Janice introducing complex words with letters that that did not follow the usual phoneme patterns for decoding words. In Observation 3 Angel used blending of a word to hear the phonemes within that word and segmented it for spelling purposes. These actions revealed a contrast with Observation 1 and the results of the pre-study assessment results.

Angel read books based on repetitive sight words with visual supports pre-study. The School Learning and Support Team reported that Angel had been discontinued from a Year 1 program of support earlier in the year because of lack of timely progress. The vocabulary for meaning PM assessment revealed Angel was able to give the meaning of one known word of four unknown words presented and had poor comprehension knowledge and skills (Figure 5-28). Post-study results revealed Angel had made positive gains in learning vocabulary (Table 5-14). These gains were crucial to Angel’s learning as he was from a family from a low socio-economic background and begun speaking English as additional language on commencement of school. Janice’s use of picture books and examination of visuals facilitated opportunities for predicting what would occur within the
story supported understanding of new vocabulary and comprehension, similar to that of a
more skilled teacher (Brownell, 2008).

Pre-test TKS revealed that Janice did not have the specialised content knowledge to
teach comprehension. She talked during the post-study interview about learning about
teaching questioning and the impact of learning the theoretical underpinnings during
lectures and through unit of study readings. She also spoke about the value of being taught
to teach explicitly, using modelling and the selection of high quality resources as taught
during the lectures and workshops conducted prior to Janice commencing in school. The
mentor throughout the unit of study continued the teaching and modelling. Janice’s
programs of instruction were checked constantly and the mentor circulated amongst the
dyads over the weeks in school to ensure high quality instruction based on assessment was
occurring. Attention was given when required (or asked for) to make corrections, provide
additional information and to encourage Janice and Angel in their pursuit for learning.

Janice and Angel demonstrated that they had both made significant gains in learning
reading over the period of the study. Janice acknowledged the value of learning the
specialised knowledge for teaching reading during the interview, and the marked
difference in her specialised knowledge for teaching reading from pre-study to post-study
was evidenced by the adapted Snow et al. (2005) matrix through the collection and
combination of evidence from multiple sources (Table 5-17). The gathering of the
different sources of information provided a rich collection of evidence to confirm findings
in greater detail. When applied to the matrix the information created a picture of
knowledge gained by the teachers.

Angel’s achievements demonstrated that he was able to read accurately and fluently
with comprehension (Figure 5-31) at the completion of the study. He had learned to
decode and had made gains in learning to read sight words as demonstrated in Table 5-13.
Angel demonstrated positive gains in learning that allowed him to grasp the author’s
intended meaning of the text, and in retelling he story he had read (Figure 5-28). He had
advanced his reading ability by almost two years as demonstrated by the Spache, PM and
fluency scores (Figure 5-33). On completion of the study he was able to read at a level
expected of a student in year 3. He had moved from being a student who was considered
to have difficulties in learning to read by the School Learning Support Team to a student
with advanced reading ability.
### Table 5-17
**Janice’s Knowledge for Teaching Reading Represented on the Adapted Snow et al. (2005) Framework**

<table>
<thead>
<tr>
<th>Data source</th>
<th>LEVELS OF KNOWLEDGE FOR TEACHING</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-study data</td>
<td>5. REFLECTIVE, ORGANISED, ANALYSED KNOWLEDGE The Master Teacher. Has highly developed expertise for integrating conceptual and procedural; knowledge for teaching reading&lt;br&gt;☑ Pre-post-study survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
<td>Is well versed in historical and current research and considers theories. Has extensive knowledge of concepts, and theories. Designs integrated reading programs specific to students needs. Understands what is easy and hard for students and is able to present concepts so that they are understood. Evidenced through:&lt;br&gt;☑ Pre-post-study survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
<td>Evidence of deep procedural knowledge for engaging students in learning to read. Engages teachers in learning the knowledge required to teach reading. Evidenced through:&lt;br&gt;☑ Pre-post-study survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
<td>Integrates resources (for example: games, basal series text level of difficulty) to teach reading to all student including the hardest to teach Evidenced through:&lt;br&gt;☑ Pre-post Survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
<td>Is considered to be an expert in reading and literacy and is responsible to mentor school staff and lead professional development at school, conferences, universities and through written materials. Evidenced through:&lt;br&gt;☑ Pre-post Survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
</tr>
<tr>
<td>Post-study data</td>
<td>4. EXPERT ADAPTIVE KNOWLEDGE Knowledge to promote literacy across the school programs (Snow et al, 2005)</td>
<td>Demonstrates acquired conceptual knowledge for teaching reading to diverse students. Knows and integrates micro and macro- skills for reading. Shows evidence of student gains in reading. Evidenced through:&lt;br&gt;☑ Pre-post Survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
<td>Demonstrates acquired procedural knowledge for teaching reading to all students regardless to diversity. Integrates elements and knowledge for reading. Shows evidence of student gains in reading. Evidenced through:&lt;br&gt;☑ Pre-post Survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
<td>Selects resources (for example: games, basal series text level of difficulty, ebooks or paper books) to teach reading to all students including the hardest to teach. Evidenced through:&lt;br&gt;☑ Pre-post Survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
<td>Demonstrates sophisticated level of conceptual and procedural knowledge required to teach reading. Teaches whole class reading using universal design for learning. Provides professional development for peers. Evidenced through:&lt;br&gt;☑ Pre-post Survey&lt;br&gt;☑ Interview data&lt;br&gt;☑ Observations</td>
</tr>
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</table>
### Post study data

<table>
<thead>
<tr>
<th>Knowledge Level</th>
<th>Description</th>
<th>Evidence and Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. STABLE PROCEDURAL KNOWLEDGE</td>
<td>This level is typical of a teacher in their first year of teaching</td>
<td>Identifies and implements some micro and macro-skills of the elements required for literacy. For example: Pure phonemes &amp; retelling oral story, knowing how to find the answer (of a question) in text. Evidenced through: Pre-post Survey, Interview data, Observations. Recognises appropriate procedural knowledge to teach reading that includes micro and macro-skills and strategies (for example; systematic and explicit teaching of the concepts). Evidenced through: Pre-post Survey, Interview data, Observations. Selects technologies to support the teaching of the micro and macro skills of the elements required for reading. For example, levelled texts, fluency graphs, strategy sheets, thesaurus, games, books (e-books or paper), visuals. Evidenced through: Pre-post Survey, Interview data, Observations. Engages students in learning. Monitors gains and adapts teaching programs to facilitate learning. Evidenced through: Pre-post Survey, Interview data, Observations.</td>
</tr>
<tr>
<td>2. SITUATED, CAN-DO PROCEDURAL KNOWLEDGE</td>
<td>Working with small group or 1:1 with a developing reader. The teachers are often not able to detect or observe other features of the learning environment.</td>
<td>Aware of the big ideas within reading and recall some information. Evidenced through: Pre-post test TKS, Interview data, Observations. Selects appropriate procedural knowledge (strategy) to plan a reading activity that provides success in learning. Evidenced through: Pre-post Survey, Interview data, Observations. Identifies, implements and analyses reading assessments to inform programming needs. Plans a reading program that includes the Big Ideas, strategies and resources. Evidenced through: Pre-post Survey, Interview data, Observations. Identifies, implements and analyses reading assessments to inform programming needs. Implements a reading program that includes Big Ideas, strategies and resources. Teach a small group of 1 to 3 students. Evidenced through: Pre-post Survey, Interview data, Observations.</td>
</tr>
<tr>
<td>1. DECLARATIVE KNOWLEDGE</td>
<td>This knowledge alone however is not sufficient for teachers to be engaging in “good practice” (Snow et al, 2005, p 8)</td>
<td>Acquired disciplinary knowledge about a range of issues within education. Evidenced through: Progression through University study. Acquired some disciplinary knowledge about promoting literacy. Evidenced through: Progression through University study. Acquired some disciplinary knowledge of resources that support the teaching of reading. Evidenced through: Progression through University study. Acquired and recall some procedural and content knowledge about teaching reading. Evidenced through: Progression through University study. Pre-post Survey, Interview data.</td>
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CHAPTER 6  
Discussion

This final chapter discusses the findings of this study, beginning with a summary of how teachers learn the specialised knowledge required for teaching reading to students who were identified to have difficulties with learning to read. The teachers’ learning is presented with regard to the adapted Snow et al. (2005) matrix and to engagement in learning. Student learning is reported with reference to the reading elements taught and engagement with learning to read. In the conclusion, the study implications and limitations will be discussed, along with recommendations for further research.

6.1 Background

Past research identified the need for teachers to possess specialised content knowledge and procedural knowledge for teaching reading (Moats, 2009; Snow et al., 2005; Washburn, Joshi, & Binks-Cantrell, 2011). This need for specialised knowledge has also been raised in Australian Government reports (e.g., Learning to Read, DEST, 2005; Review of the Australian Curriculum - Initial Government Response, 2014; Action Now: Classroom Ready Teachers, Craven et al., 2014). How teachers acquire this knowledge, and ways to maximise knowledge gains, are of major concern given that teachers consider they have minimal understandings of how students learn to read (Piasta et al., 2009; Snow et al., 2005; Walsh, Glaser, & Dunn-Wilcox, 2006), and reports that Australian students are slipping behind their international peers in literacy (PIRLS, Mullis et al., 2011).

It requires years of ongoing professional learning for teachers to develop the specialised knowledge for teaching reading (Snow et al., 2005; Walsh et al., 2006). For all teachers, the journey begins being with their initial teacher education programs, yet teachers report that they feel unprepared to teach reading, especially to students experiencing difficulties learning to read (Milton, Rohl, & House, 2007: Moore & Evans, 2011).

The teachers involved in this study were in their final semester before graduating from a four-year Bachelor of Education (Primary) degree in a major metropolitan district of Australia. They were all enrolled in a school-based unit of study dedicated to supporting students experiencing difficulties learning; the area of specific focus was the specialised knowledge required to teach students who were struggling to learn to read.
The participating schools’ Learning and Support Teams had identified the school students suitable to participate in this study based on their struggle with learning to read. Students predominately demonstrated acquisition of sight words, yet were unable to accurately and fluently decode words and comprehend texts of the same complexity as their peers. All student participants were enrolled in Years 1 to 6.

Within this context the following research questions were examined:

Question 1: To what extent does a field-based unit of study prepare pre-service teachers to use specialised content and pedagogical knowledge to enhance student literacy outcomes?

Question 2: To what extent does a field-based unit of study enhance pre-service teachers’ content knowledge of reading?

Question 3: To what extent do pre-service teachers gain the specialized content and procedural knowledge required for teaching reading as represented on the Snow et al. framework?

When analysing the data, it became evident that research questions 2 and 3 were closely aligned, and to a large extent intertwined, and thus are addressed together. They will therefore be addressed together. Prior to discussing the impact of the study on teachers, the impact on students is presented (Research Question 1).

6.2 Student Outcomes

All school students demonstrated improved academic and social outcomes at the conclusion of the reading program. While the improvements were not uniform across all students, the benefits are apparent through a range of sources. The results of the Woodcock Reading Mastery subtests (i.e., Word Identification (WRMRT-WI), Word Attack (WRMT-WA)) provided evidence of a general level of improvement in decoding skills. As a group, the mean score for the WRMT-WA pre-study assessment (M=13.58, SD=11.4) increased to a post-study test score of (M=23.93, SD=0.84). This increase is statistically significant (t (84)=11.4, p=0.001). The mean score for the WRMT-WI pre-study assessment (M=28.45, SD=10.00) increased significantly (M=38.46, SD=0.84); (t (84)=10.00, p=0.001).

The WRMT-WA assessments demonstrated that during the seven weeks of the intervention students who spoke English as an additional language at diverse achievement levels gained of between 3.1 to 4.7 years in reading decodable non-words, while those who only spoke English made gains of between nine months and 4.1 years. Case study students demonstrated gains by using the skills of phonological awareness and alphabetic principle,
and entwining them interactively to read the isolated decodable words in text. The gradual interplay with the alphabetic knowledge facilitated hearing and manipulating the phonemes in words and students’ ability to apply these skills to identifying unknown words in texts. As the students learned, they moved from recognising isolated phonemes to recognizing whole words and to decoding words within texts. Reading of basal texts demonstrated successful generalisation and mastery of skills (Moats, 2003).

The WRMT-WI sub-test demonstrates that those students who spoke English as an additional language made gains of between two and four months when decoding sight words, and those for who spoke English only made gains of between one month and 1.9 years. Gains in identifying sight words required the students to learn the words as pictures when non-decodable, or decode them so often that they are automatically recalled and read (Chard et al., 2000). Some of these skills were learned as part of the study (e.g., Table 5-5). The students progressed from decoding words (e.g., Figure 5-38, minute 33), to automatically recognising words by sight, and practiced reading words in isolation by playing games and reading carefully selected texts.

Noticeable gains in learning to read were visually reported (e.g., Table 5-2). The students read a variety of texts that allowed them to practice many examples of what they were learning (i.e., during reading for enjoyment) and to practice fluency and automaticity of word recognition (i.e., during the fluency read) (Vadasy, Sanders, & Peyton, 2005).

6.2.1 Case Study student outcomes. Three students were involved in the case studies in the main phase of the study. The two upper primary students were Jericho in Year 6 and Beau in Year 5, while the one lower school student was Angel in Year 1.

The pre-study assessment data collected by the teachers indicated that all three students required explicit and systematic instruction to learn the knowledge for decoding words, and to obtain meaning from text (e.g., knowing the single letter and digraph graphemes, using phonological awareness micro-skills, and using those skills together to decode words). Jericho and Beau had acquired different sets of knowledge (Table 5-5 and 5-10). Laura, Jericho’s teacher, reported that at the beginning of the study Jericho knew more than half of the single letter phonemes and almost half the digraph phonemes, yet was unable to blend those together (see Table 5-4, Educheck scores). Beau’s teacher Isla reported that he knew almost all of the single letter and digraph phonemes. Beau, however, could not use his known phonological awareness skills (Table 5-4, SPAT results) to blend VC or CV words as demonstrated by the poor score in the pre-study Educheck test. Despite having received the core class programs that enable most students to read, s well
as supplementary reading interventions within the school, he had failed to become a skilled reader (Hempenstall, 2016). He had not been able to achieve the intertwining of decoding and comprehension as portrayed by Scarborough (2001) and shown in Figure 2-1. This is essential for comprehension, understanding and interpretation of what we decode (Duke, Pearson, Stratcher, & Billman, 2011), and the key outcome of reading.

Through analysing the reading assessment data under the guidance of the school-based mentor, Laura and Janice carefully and deliberately programmed their lessons the micro and macro-skills required for reading. By week three of the intervention, the teachers were able to construct a basic reading program independently, with the mentors only reviewing the programs for maintenance of professional skills and providing feedback in the form of advancing professional knowledge. The mentors were on occasions required to assist with the teaching of some micro-skills as seen in Observation 2 - minute 33 of Figure 5-9. The students also supported the teachers on occasions as demonstrated by Beau. He initially followed Isla’s incorrect procedural instructions for blending, and then demonstrated to Isla the correct procedure for blending. Isla acknowledged his demonstration as correct and they moved on.

Jericho demonstrated strong gains in all reading elements during the seven weeks with Laura. The Learning and Support Team participated in professional development to facilitate continued support for Jericho to enable him to enter secondary school with similar reading-specific conceptual knowledge and decoding skills as his peers. This is in line with Australian Government goals that every child leaving primary school should be numerate and be able to read, write and spell at the appropriate level, and to ensure that Indigenous students improve to match their peers (MCEETYA, 1997; 2008).

Beau, while taking a while to engage in learning, made considerable gains in reading (Figure 6-1) during the intervention, and at completed of the program was no longer considered to be at risk by the school Learning and Support Team. His class teacher was provided with ongoing professional development in vocabulary and comprehension instruction, as Beau required continued support to answer inferential and creative questions (Figure 6-2). Beau’s gains in coding (Table 5-6 and Figure 6-1), comprehension (Figure 6-2) and new vocabulary meanings (Table 5-9) appear to have been transferred to writing, spelling and reading new texts of greater complexity (5-15 and 5-16). Teachers Laura and Isla had learned to assess and to program specifically to meet Jericho’s and Beau’s respective learning needs and to teach reading integrating the alphabetic principle, phonological awareness, comprehension, vocabulary and fluency (Boyd, Grossman, Loeb,
& Wyckoff, 2009). How they might transfer this knowledge to another student, or to class of students is the subject of another research project.

The focus of teachers differed depending on the needs of the student. Laura, for example, spent considerable time teaching vocabulary and this appeared to have supported Jericho in establishing the authors’ intended meaning. She also taught comprehension strategies as seen in Observation 1 - minute 3 (Figure 5-6) and within the lesson program (Figure 5-3).

Angel’s pre-study WRMRT-WA scores indicated he could not decode any non-words (e.g., eg and ip). He was able to read simple CV and VC words on the WRMT-WI and was six and five months behind grade expectations for reading those words. Using the data from the SLAT, Janice, with the assistance of her mentor, programmed sessions to meet Angel’s needs. The focus was more heavily weighted to the decoding part of reading, with ongoing development of vocabulary and oral language and of listening comprehension.

Prior to the study Angel demonstrated some knowledge of the alphabetic principle and phonological awareness skills that could have facilitated decoding and encoding. Similar to Jericho and Beau, he was unable to enact decoding skills and needed to be explicitly taught how to do so (e.g., Figure 5-3 and 5-15). Janice taught Angel to blend the phonemes to hear the word being coded (Figure 5-29) and the macro and micro-skills necessary for phonological awareness. Janice took care to teach onset rime and Angel began to request he be asked “tricky” questions (e.g., ‘what is the last sound in box?’ Figure 5-35, minute 3).

Retell, a form of comprehension assessment, encourages readers to focus on the meaning of the text and the key elements of the story. It can be highly useful in planning reading interventions (Gunning, 1996; Reed & Vaughn, 2008). Retell was unknown by all case study students pre-study and the teachers needed to teach the prerequisite knowledge of who, when and where and the text sequence required for retell. They used visual supports to support the new learning. Post-study retell scores demonstrated that all students had gained the skills to undertake a retell and answer comprehension questions successfully (Figure 6-2).

Figure 6-1 demonstrates student progress with the red-numbered line reporting the student’s fluency rate with an accuracy of three or less errors in 100 words. The blue and green sections of the column graph indicate the complexity of the text being read. The Spache’ measure records the expected grade level of the student.
Jericho’s accuracy and fluency rate moved from what was expected of a student in Year 2 (80-100 WPM) to that of a student in Year 6 (100-120 WPM). He commenced the study reading a text with the complexity expected of a student in Year 2 and 9 months, and completed at Year 4 and 7 months.

Beau’s accuracy and fluency rate moved from what was expected of a student in Year 3 (80-100 WPM) to that of a student in Year 5 (100-120 WPM). He commenced the study reading a text with the complexity expected of student in Year 3 and 5 months, and completed at what would be expected of a student in Year 5.

Angel’s accuracy and fluency rate was within expectations at the lower end at 46 WPM (50-80 WPM) to the upper end (68WPM) of the stage expectancy (from Early Stage 1 to Stage 1). He commenced the study reading a text with the complexity expected of beginning Year 1 and 2 months, and completed at Year 3.

Figure 6-1. A comparison of students’ weekly reading results including accuracy, fluency and SPACHE levels.
Figure 6-2. Pre- and post-study scores for each of the four comprehension measures

Figure 6-2 demonstrates the pre and post-study comprehension score and illustrates demonstrates gains made in comprehending the meaning of the text read. For example, in all measures the student made positive gains in comprehension with exception to inference questioning where Beau did not progress.

Figure 6-2, when read with Figure 6-1 demonstrates the percentage of the specialised question types that have been answered correctly at the beginning and end of the study.
For example, at the beginning of the study Angel independently read a basal series decodable text suitable for a student at Year 1 with a PM Benchmark level 4 complexity with a fluency rate of 46 correct words per minute. He correctly answered 66% of literal questions and 33% of creative questions correctly but was unable to retell the story being read or answer inferential questions.

Pre-study comprehension revealed the three students had minimal knowledge in two of the three comprehension areas assessed (i.e., retell, literal, inference, creative). Post-study results provided evidence of gains made by the three students, yet further comprehension instruction was required, specifically regarding inferential and creative questioning.

Comprehension of text is an extraordinarily complex task that demands the reader or listener to use active and constructive processing to gain meaning from the written language used by someone else (Snow et al., 2005). The reader may have difficulties gaining the meaning of the author’s written words and sentences unless they have the background knowledge and vocabulary to do so. The readers or listeners use their own personal background knowledge and disposition to decipher the author’s intended meaning, question it, confirm and revise, or transform it to understand the words and ideas presented (Macintyre, Doecke, & Parr, 2011; Snow et al., 2005). Having wide background (creative) knowledge brings an understanding of differing expectations; experiences brought from cultural, home, school and language facilitates understanding of the author’s intended meaning (Macintyre et al., 2011). All three students demonstrated that they struggled with using and/or gaining the background knowledge to answer creative questions correctly.

The teachers programmed for comprehension as seen in the teaching programs (Figures 5-3, 5-15, 5-29). Evidence of comprehension teaching can be seen within the Observation 1-3 visual reports. By Observation 3 the students demonstrated recalling the oral or written story, as well as answering literal, inferential and creative questions (discussion for Figure 6-2).

The increase in student reading outcomes at this general level does not give an insight into the sophisticated growth by individual students and teachers. Prior to the study, the case study students demonstrated weaknesses in phonological awareness. Beau and (Year 5) and Jericho (Year 6), for example, based on the Sutherland Phonological Awareness Test (Neilson, 1995) demonstrated they had skills indicative of many students in Year 1. This restricted the students from decoding unknown words and comprehending the author’s intended meaning in the texts being read.
The students demonstrated their learning when completing the *Educheck* (Neal, 1988). For example, Jericho moved from being able to use skills from the alphabetic principle and phonological awareness for decoding VC and CVC words, to being able to decode the most complex words presented in the assessment including compound suffix, prefix and multi-syllable words.

Each of the case study students demonstrated oral reading fluency. Not only did they increase their rate of decoding, but achieved this within more difficult basal texts. Anecdotal information also shows that students improved their use of expression when reading, providing further evidence that they were comprehending text (Kuhn, 2003).

Key to the teachers’ and students’ learning was trust in the university staff, tutorial and mentor leaders, peers, and mentors as specialists in the field. The university lectures and stimulus readings (e.g., Chard, Simmons, & Kame’enui, 2006) supported the development of the theoretical understanding of learning to read. The mentors provided the link between theory and practice within the school setting that promoted both conceptual and procedural knowledge for teaching reading. The relationship-based learning the teachers experienced with their teachers, with their students, provided high-quality support and successful learning (Cunningham, Etter, Platas, Wheeler, & Campbell, 2015).

The teachers modelled and demonstrated strong attitudes towards the value of reading through modelled reading, reading of basal text materials, and reading for pleasure. Modelled reading allowed students to hear and see what reading sounds and looks like, with punctuation, parsing and emphasised expression. This was essential as not all students came from a literacy-rich home background, and in at least one instance where parents were functionally illiterate. Students witnessed the enjoyment and obvious excitement of the teacher when reading a range of literary and factual texts, and became engaged and focused on the message within the book.

The students practiced decoding and fluency in context by reading basal series decodable texts that facilitated careful introduction of words with thought to complexity. Building on the success in decoding and comprehending these basal texts, teachers engaged students within reading for pleasure. Students chose these books and read them with the teacher. They examined the visual literacy together, discussed and used vocabulary words and the content of the book to personalise learning. The teachers were encouraged then to integrate and make evident skills being learned (e.g., vocabulary words, digraphs, morphographs) so that students could ‘see’ them in use across literature.
As the study progressed, the teachers gained knowledge on the structure of reading and the necessary research-endorsed big ideas of oral language, phonological awareness, alphabetic principle, comprehension, vocabulary and fluency (Hempenstall, 2016; Snow et al., 2005). They gained insight that frequency and interactions between complimentary elements supported spelling when writing a learning journal. By understanding the complimentary nature of the elements involved in learning to read, teachers placed more emphasis on spelling and writing during the sessions (Figure 5-3).

The spelling element consisted of three to seven family words taken from the basal series fluency text. After the case study student had attempted to spell the word, the teacher with the student verified that the student wrote the correct letters, and that the sequence of the letters given were in the correct order. The teacher wrote the word correctly as a model for the student and first checked the letters used, and then the accuracy of the spelling sequence. Subsequently the students wrote and spelled the word correctly.

A new willingness to participate in spelling replaced the students’ initial groans on hearing the teacher mention the word ‘spelling’. This method of assessing and providing feedback was used as a positive learning experience with consideration for developing the students’ graphophonemic knowledge for spelling (i.e., the recognition of letters and the understanding of phoneme grapheme relationships and spelling patterns) (Moats, 2006). Rather than seeing a cross (×) indicating failure, the student experienced a measure of success in learning. The single phonemes, digraphs and words being learned were revised during the next session to build confidence in the use of differing skills and knowledge.

At the end of the sessions the students talked about what they had learned that day, how the learning could be applied or its impact on their work, and wrote these insights into their journal. When a student was unable to do this due to lack of ideas or anxiety, the teacher scribed for them. The teachers reflected on the student journal entries, and considered what they had learned and added to their specialised content and procedural knowledge for teaching reading, knowledge of the child, knowledge of themselves and how this might impact on their teaching. The teachers recorded in their own journal new knowledge, and used this information to program for the next session.

Post-study data revealed that the students had gained confidence with obvious successful gains in learning to decode. The lower primary school student reached levels typically expected of students their age within the seven weeks of the study. One of the students in the upper primary grades made rapid progress in learning to read, but required further instruction to make the positive learning gains necessary to bring him up to the
same level as his peers. The enhanced student outcomes, however, were only part of the positive outcomes.

Engagement was essential to learning, and a positive relationship played a critical role (Davis, Summers, & Miller (2012). The case study students demonstrated changed behaviours as the relationship with their teacher developed and grew. While there is no claim that this is causal, research has shown the importance of a positive relationship.

Shaddock (2012) discussed the crucial role relationships play in learning. Positive teacher and student relationships allow students to feel safe and secure in their learning environments, which assists with scaffolding important social and academic (curriculum) knowledge and skills (Baker, Grant, & Morlock, 2008; O’Connor, Dearing, & Collins, 2011). The teachers who supported students in the learning environment enhanced the social and academic outcomes, which is important for the long-term attendance and learning achievement (O’Connor et al., 2011; Silver et al., 2005). Students who had positive relationships with their teachers took on academic challenges and worked on social-emotional development (Hamre & Pianta, 2001). They developed self-esteem and believed that they could make mistakes without retribution, thus enhancing learning. This was critical for the students who had experienced the failure cycle, who found that the regular classroom learning environment posed many barriers; many of those students were from low socio-economic backgrounds (Hamre & Pianta, 2001). Initially Beau and Angel resisted participation and demonstrated neutral behaviors, yet when offered the opportunity to withdraw refused to do so. Both had experienced failure-cycle impacts, but with the development of the relationship with their teacher took risks and continued to participate regardless of errors. (For example, Beau in minute 25 of Observation 1 made errors yet continued to work, and Angel during minute 44 of Observation 1).

Positive relationships provided an environment where the students felt safe and were willing to have a go. These relationships provided the students with a voice so they were more likely to ask for assistance from the teacher, and attempted a learning task multiple times (Koplow, 2002). In this study, provision of support from the teacher and peers facilitated success in learning (e.g., explicit instruction, scaffolding and feedback, and careful selection and sequencing of practice samples).

Students who trusted their teachers were seen to seek them out to talk about associated information (e.g., what they did on the weekend). Observation 1, Figure 5-10 for example, provided a visual example of the social engagement that occurred between the student and teacher during the teaching sessions. Doda and Knowles (2008) captured the beliefs of students like Jericho during his research on relationships:
The key to being a good teacher is to know the kids. You know every single one and have a good relationship with every single one. I think that the one thing that allows me to work hard is knowing that my teacher knows where I am in life at the moment. If they don’t know me, I tend not to work as hard for them. (p. 28)

A roller coaster ride in behavioural and emotional change was evident during the initial week of the study. Pre and post study interviews revealed that the teachers felt confident in their ability to teach reading prior to commencing the study. During the workshops the teachers were alerted to their lack of knowledge for teaching reading and required the assistance of the tutor and mentors. The assessments, programming and Observation 1 revealed low confidence by teachers and students. As the students and teachers participated in the teaching and learning sessions over the following weeks, the students demonstrated learning gains in reading while the teachers used the content and procedural knowledge they were learning and established a foundational level of the specialised knowledge required to teach reading with growing confidence (Snow et al., 2005). The students appeared to grasp the notion that they were learning to read, began to get excited and confident, and volunteered to read aloud to other students. During the observations, the teachers demonstrated learning and engagement and showed that they were able to plan and implement a program of instruction for teaching reading that intertwined the big ideas for teaching reading as presented in the Snow et al. framework based on the need of their student.

The teachers and students developed a sense of achievement and confidence from making successful gains in learning the knowledge and skills for reading; something the school environment had not afforded them. Figures 6-1 and 6-2 demonstrate the focus and modifications of time allocated to the various elements of reading and the engagement during each phase of the study. All students made educationally significant gains in decoding fluently with comprehension while reading more complex texts.

The use of a relationship-based learning approach and practice-based opportunities within a field study fostered rapid change, with the teachers acknowledging the advantage of having a knowledgeable expert in reading as a mentor who consulted, gave technical assistance, modelled and coached the teachers while carefully monitoring conceptual and procedural knowledge (Benedict et al., 2016; Cunningham et al., 2015).

Over the course of the study the teachers and students mastered the keys to successful learning (i.e., intensive and ongoing learning experiences that built procedural and conceptual knowledge) and developed firm relationships. The teachers and students practiced and applied newly acquired skills and knowledge and both received feedback from a mentor, from each other and from peers. While learning about reading they also
learned to self-reflect, write learning journals and to calibrate their own learning (interview data) (Benedict et al., 2016; Cunningham et al., 2015).

6.2.2 Engagement. In this study student engagement referred to the degree of attention to curriculum, behaviour and social interactions. Observation 1 saw teachers attempting to engage students in learning. Some students willingly participated while others demonstrated a reluctance to engage during the initial sessions by crossing their arms, looking away, head shaking and poking fingers in ears (Beau in Figure 5-20 - minutes 1-5 and 13-15; Angel in Figure 5-33 - minutes 1-5).

During Observations 2 and 3 the teachers and students demonstrated they had formed a trusting relationship and the careful and deliberate lesson pacing allowed the students to participate with minimal distraction. Teachers kept a routine in an attempt to minimise the student’s anxiety, and to provide an understanding of what would happen next. Motivation was heightened when the teacher and student played games to practice and generalise the new learning to reading continuous text. For example, the naughts and crosses phonemes game was used for teaching the alphabetic principle and long word/short word for teaching syllabification, morphographic knowledge and word identification.

In developing a rapport, the pairs laughed at each other’s attempts and at times, the student gave prompts or clues to assist the teacher to be successful in playing the games or corrected the teachers errors (e.g., Figure 5-32 - minute 44 commentary). The use of games facilitated more practice and enhanced learning (Garris, Ahlers, & Driskell, 2002). Camilleri (n.d.) suggested that harnessing interest and involvement in games (e.g., electronic and paper) offers an opportunity to meet learning outcomes. The researcher stated:

*Games create a gripping need to know, examine, a need to ask, assimilate and master specific skills and content areas. Some experts argue that games are, first and foremost, learning systems, and that this accounts for the sense of engagement and entertainment players experience.* (p.14)

When the student and the teacher felt safe (Shaddock, 2012), they showed passion and compassion, excitement in learning, and enjoyment of each other’s company and in being together. They worked together during sessions and walked together before and after sessions. The teachers had high expectations and communicated this to their students, just as the mentor, lecturers and tutorial leaders did with the teachers.

The teachers’ and students’ efforts were acknowledged, as was the noticeable achievement of both teachers and students. Observation 2 saw the demise of the neutral behaviours, and the students looked forward to the session as shown when they ran to the
building where the teaching periods were held. This represented a significant change in attitude. Initially some students agreed to attend on the basis that peers would not be informed, as they were embarrassed about their own literacy performance. By session 4 these students explained to peers in their classes their enjoyment of the sessions, and they in turn begged to be allowed to attend and to participate in the lessons along side the participants. On study completion, the classroom teachers and support staff in each school were taught to deliver reading lessons in the same manner as occurred during the study, and they continued with this throughout the year.

It appeared that for teachers to learn the specialised knowledge to teach reading they required the opportunity to tie together the specialised conceptual and procedural knowledge through integrating and achieving an ever-moving interaction between the macro- and micro-skills found in each of the big ideas of reading. The teachers appeared to learn with greater intensity when required to put their new (theoretical) learning into quality practice (Benedict et al., 2016). This knowledge development was in part dependent on the learning that was achieved by students; the frequent engagement with students, safe relationships, and carefully monitoring of their progress provided teachers important information about their learning. It would appear that the interactive relationship between teachers and students that was important to the overall learning process. The teachers increased their knowledge, understandings, skills and capacities as their learning was scaffolded, high standards were set, and expectations were clearly communicated (Darling-Hammond, 2011; Benedict et al., 2016: Krause, 2005).

6.3 Teachers Learning and Specialised Content Knowledge

A teacher’s content knowledge is key to assisting all students to become skilled readers. When teachers have the procedural and conceptual knowledge to assist those students who find the typical classroom program challenging, they are often better able to cater for the needs of all students (Darling-Hammond, 2011). Within the Australian context, the report Teaching Reading (DEST, 2005) and the 2011 PIRLS data (Mullis et al., 2011) provide evidence that Australian Aboriginal children, children from low socio-economic backgrounds, and children with English as an additional language continue to be most challenged by typical classroom instruction. These are the students that teachers report inadequately prepared to teach (Brownell, 2006).

The limited knowledge of some teachers to teach phonological awareness at the beginning of the program was noticeable yet aligned with other research and reports (Arrow, Tumner et al., 2015; Moats, 2009). The teachers’ group pre- and post-study
results from the phonological awareness knowledge section of the TKS provided further evidence of the limited knowledge-base amongst teachers; they also showed significant learning gains on the TKS by these teachers during the program. The two initial case study observations demonstrated teacher error when teaching phonemic awareness primarily due to misconceptions about pronouncing phonemes. While mentors commonly assisted the teachers, interaction between the teachers and students occasionally saw students clarifying the correct articulation of specific phonemes for the teacher’s learning. The third observation demonstrated greater teacher independence in knowing the phonemes they were teaching.

Teacher’ knowledge of the alphabetic principle was not much different to that found within the phonemic awareness. While teachers were quietly confident in their knowledge of the alphabetic nature of the English language, their actual knowledge was often discrepant. Discussion of the alphabetic principle during the interviews revealed the difficulties the teachers faced. The teachers were unaware that they did not know the correct phoneme articulation for the digraphs and morphographs the students needed to acquire to gain fluency and efficient comprehension. Teachers experienced articulation difficulties and corrections initially extended to sorting out the confusions between phonemes (e.g., saying uhhh or arrr for the letter-sound of A, and adding er onto i so that it was articulated as terr or tuh). While completing the pre-study workshops, the teachers learned how to administer synthetic alphabetic knowledge (sound to word) and articulate phonemes as modelled. They observed and practiced voiced and voiceless phonemes, and the differing positions the tongue is placed in when articulating specific phonemes.

The teachers then progressed the students from letter-sound to whole words, as occurs when working from the oral to literate (Moats, 2003). Exercises in phonological awareness skills sequentially moved from easy to harder skills during the teaching program progressed. The teachers explicitly taught the students to manipulate phonemes in words and facilitated oral - aural exercises (e.g., Teacher (T): say cat, Student (S) repeats word: cat. T: Is the first sound in cat c (phoneme)? S – Yes.) A higher order example involved - T: say black. S: repeats word black. T: Now take out the a (phoneme) and put in o (phoneme). What word? S: block (Rosner, 2009).

Some words do not follow the common phonemes for each letter (e.g., a as in fat or a as a schwa in father) leading to readers mispronouncing words. Chard et al. (2000) report that when the word (vocabulary) is correctly stored in the mental lexicon, the student knows how the word is pronounced. A Year 1 student, for example, encountering water for the first time might attempt to pronounce the word by segmenting it into two sections.
The first section *wat*, so it rhymes with *hat*, then *er*. It is necessary then for the teachers to assist students to examine and experiment with blending syllables together to create a word. They must also teach words that cannot be decoded during word study so that they are able to move forward from *wat* to *wort* and add *er* to make *water*, and that sense and correct pronunciation is achieved (Chard et al., 2000; Snow et al., 2005). Post-study, those teachers who before the study demonstrated faulty and incomplete knowledge, showed evidence of understanding this interplay between the alphabetic principle and phonological awareness. The mean score for the *alphabetic principle* section of the TKS post-study (M=2.36, SD=0.90) showed significant gains when compared to the pre-study score (M=1.8, SD=0.68; p=0.001).

Teacher *vocabulary* pre-study scores on the TKS (M=1.46, SD=0.84) showed significant gains of knowledge when compared to the post-study score (M=2.23, SD=0.84; p=0.001). The TKS vocabulary question asked about the least effective way to teach vocabulary to students. Teachers who answered the question correctly during the pre-study assessment created a ceiling effect and no gains could be identified.

The TKS did not provide a strong sense of teacher knowledge growth in vocabulary, and this limitation has been acknowledged. The teachers were differently challenged by the role that vocabulary played in learning to read. During the pre-study workshops and initial tutorial discussions the teachers spoke of being challenged during the first three weeks of lectures and tutorials by the domain-specific vocabulary related to teaching reading (e.g., digraphs, phonological awareness and morphographical knowledge). There was confusion about Tier 3 words (Beck et al., 2002) in relation to the teaching of reading that the teachers heard about in schools, specifically segmenting and blending. Instead of blending or dragging together the phonemes over about three seconds to hear and identify the word (Kame’enui, 1999), the teachers articulated each phoneme with gaps between. Over the course of the study the teachers were required to participate in tutorial discussions where they discussed this vocabulary, applied this knowledge in teaching students, and wrote about it in their assignment in manner that reflected the reading science literature (Snow et al., 2005).

During the seven-week in-school program, teachers became aware of the parallel of their struggle with technical vocabulary, and what they expected students to bring to the learning context. In the case of Jericho, his teacher integrated a strong vocabulary component to support his reading and his future studies in high school the next year. Other teachers, through the programming scaffold, planned to teach and revise vocabulary in every session.
As a group, the teachers’ mean score for the word study section of the TKS post-study (M=0.83, SD=0.64; p=0.003) demonstrated significant gains (p=0.003) when compared to the pre-study score (M=0.53, SD=0.63). Word study was deliberately included in the program of instruction to ensure the skills and knowledge for generalisation was taught. Word study facilitated interaction between the micro- and macro- skills for decoding and comprehension. Students on occasion were seen to have knowledge that should have enabled them to decode unknown words, yet they struggled because they were not accessing or intertwining required knowledge. For example, Beau on pre-study assessment had substantial knowledge of the phonemes and phonological awareness, yet, as seen in the EducHECK (Neal, 1988) results, was unable to access unknown VC words (e.g., if) and CVC words (e.g., pug), unless they were words known by sight (e.g., at and -rod) (Table 5-10). In this instance Isla needed to be coached and supported to teach the strategy of blending sounds together to support Beau with his decoding.

At the beginning of the study the teachers struggled with the conceptual and procedural knowledge required to teach blending, segmenting, and examining the suffix, prefix and root of words. They also struggled to choose and align games or activities to practice the interaction and integration of skills for bringing the words to life within text reading. During Observation 3, the teachers demonstrated that they had learned how to integrate the many elements and sub-elements into strong skills and knowledge for reading, as illustrated by Scarborough (2001) in the form of a rope (e.g. oral (language) revision of spelling, with consideration to alphabetic principle and phonological awareness). This involved capturing up to five processes within one minute of time (Figure 5-12 minute 16).

As a group, the teachers’ mean scores for the comprehension section of the TKS pre-study (M=7.20, SD=1.62) demonstrated significant gains when compared to the post-study score (M=8.17, SD=1.37; p=0.001). The teacher and student pairs engaged in working on foundational skills and strategies for comprehension over the course of the study that included examining key words (e.g., who, when and where), retell and literal, inferential and creative questioning (Reed & Vaughn, 2012). They also taught the students to listen to themselves read, to use fix-up strategies and to re-read the text when it didn't make sense. They used visual posters and explicit and systematic instruction for each process taught, while correcting and supporting the decoding of more complex word they encountered. The teachers learned to provide the comprehension instruction that Durkin (1997) reported is an element that teachers usually spent little time on. The teachers focused on teaching comprehension knowledge and strategies (e.g., Laura was seen teaching comprehension in all three observations for about 18% of the lesson time (Figures 5-5, 5-8 and 5-11). The
teachers taught morphographical knowledge and word meaning to provide understanding of what was read (Mokhtari, Neel, Matatall, & Richards, 2016) as seen when Laura checked Jericho’s understanding and explained the meaning of allergy in minute 3 of Observation 1 (Figure 5-6).

6.3.1 Practice opportunities. The university-school unit of study opportunity allowed teachers to improve their understanding of abstract concepts, reason logically, manipulate micro-skills, and learn and use the domain-specific language of reading (American Association for the Advancement of Science, 1990; Benedict, 2016). This approach was crucial for teaching teachers the specialised science for teaching reading. It allowed them to learn and change their ideas about how reading should be taught as described:

*Through my experiences in this unit of study, my thoughts and attitudes towards reading have immensely transformed and I have come to value the need for direct, explicit and systematic teaching in reading in everyday classroom contexts. Prior to this study I thought the best way to improve reading was simply to read more and more. I assumed decoding came naturally and placed greater emphasis in identifying meaning in texts. This study has taught me that students who lack the necessary foundations for developing decoding skills are in no position to read, read and read some more (teacher).*

The case study interviews highlight the changes Janice, Isla, and Laura experienced in their own beliefs and ideas. They described that they had learned specialised conceptual and procedural knowledge for teaching reading during the unit of study. Laura discussed her new learning, and Isla highlighted the changes she had made saying:

*In previous teaching experiences, I know that I just rattled off a list of instructions. I know I can’t do that now, and from doing this study I have learned to break it down. No verbal running on, really simple instructions are needed, and fun to maintain engagement.*

6.3.2 Implications from case studies. All case study teachers brought different yet valuable background experiences and ideas about teaching to the study (Richmond, 2017). Laura had worked as a reading tutor in a Year 1 classroom, administrating a commercial reading program. Janice was learning English as an additional language, and believed that reading English language texts came naturally when the student was exposed to text. Isla inaccurately calibrated her knowledge for teaching reading and believed being strong in literacy qualified her to teach reading. This is an important issue as teachers need to be able to calibrate their knowledge correctly so they can adjust their instruction for teaching students to read (Arrow, Turner, & Gearney, 2015). The three case study
teachers portrayed backgrounds that were replicated across other teachers within the group, upholding ongoing concerns within professional bodies about the preparedness of new teachers to teach reading to primary school students (Grainger & Adie, 2014). They demonstrated in the pre study TKS that they did not have the knowledge for teaching reading.

Figure 6-3 provides evidence of the limited PCK knowledge the teachers brought to the study for all elements of reading. On close examination they had limited knowledge of the use of single letter and digraph phonemes when decoding orally and demonstrated poor understanding of the application of tacit phonological awareness knowledge. The teachers failed to understand the complexity of word types (e.g., VC, CVC), and what made one word more difficult to blend than another (e.g., CVC with an initial stop sound versus a CVC word with an initial continuous sound. All teachers required assistance from their mentors for planning and teaching during the beginning weeks of the study.

Laura received assistance from the mentor during the second observation when Jericho confused the phonemes for letters related to the two languages he spoke (i.e., Samoan and English). The mentor modelled and assisted Laura to learn the link between of theory and practice and during Observation 3 Laura was observed successfully teaching Jericho to complete tasks involving the alphabetic principle and phonological awareness. Observation 3 (Figure 5-12 and Figure 6-1) demonstrates Jericho decoding, reading fluently, using new vocabulary and answering comprehension questions correctly.

During Observation 3 Laura demonstrated PCK by successfully implementing assessments independently and programming sessions using macro and micro-skills and knowledge from assessment data to teach Jericho, a student with complex learning needs, being from a low socio-economic Aboriginal and Islander background and speaking English as an additional language. While meeting the Snow et al. (2005) matrix outcomes at foundational levels, Laura will require on-going study to acquire a stronger specialised knowledge for teaching reading. Pre assessment reading measures demonstrate that Jericho had gained 33 months in reading growth during his seven years of enrolment in Australian schools and an additional 22 months during the seven weeks of the in-school program.

The researcher presented the theoretical information and modelled requirements for assessing, programming, selecting practice materials and modelling as presented during the workshops prior to Isla commencing the practice opportunities at school. Isla, was observed implementing the assessments with fidelity (Situation Can Do Knowledge). Isla
observed a whole class lesson before implementing the same methodology during first teaching session that saw a somewhat prickly interaction between Isla and Beau.

Laura made positive gains in learning phonological awareness (PA), alphabetic principle (AP), comprehension and strategy. The greatest improvements were in phonological awareness with a 50% gain and in alphabetic principle with a 44% gain in TKS results.

Isla made learning gains in phonological awareness (PA), alphabetic principle (AP), comprehension and strategy. She made the greatest improvements in comprehension with a 60% gain and strategy with a 60% gain in the TKS results.

Janice made learning gains in phonological awareness (PA), alphabetic principle (AP), comprehension and strategy. The greatest improvements were made in strategy with a 75% gain and alphabetic principle with a 50% gain in the TKS results.

**Figure 6-3.** Pre-study and post-study TKS results for the four case study teachers.

The benefits of juxtaposing the PCK required for teaching reading had a strong impact on Isla’s knowledge base. While Isla programmed for the second lesson with reduced support from the mentor she continued to rail against ideas put forward by her mentor. Substantial and lively communication between the researcher and Isla was required before subsequent negotiations and agreements between the mentor, Isla and Beau
occurred. While not having a high level of knowledge at the beginning of the study, Laura completed the study gains in learning the PCK for teaching reading (Figure 6-4).

![Figure 6-4. Pre-study and post-study comparison of the teachers’ TKS results.]

Continuation of modelling, teacher instruction, correction, and ongoing coaching saw Isla develop a positive relationship with Beau and her mentor. During Observation 2, Isla explicitly and successfully taught macro and micro-skills for decoding and comprehension of text successfully. During Observation 3, Isla demonstrated independent explicit and systematic instruction of the five big ideas, a strong enjoyable relationship with positive social interactions and respect for the agreements made by both parties. No neutral behaviours were apparent (Stable Procedural Knowledge). She spoke of the significant changes to her beliefs in teaching as discussed by Rutherford (2009) and demonstrated PCK. During the six years enrolled prior to the study, Beau had demonstrated ongoing difficulties in learning to read and was reading texts appropriate for a student in Year 3. Positive improvements made during the study saw Beau reading at his expected age as shown by post-study data (Figure 6-1).

Janice demonstrated solid gains in acquiring the specialised PCK for teaching reading. She learned how to engage Angel in learning and experienced the importance of developing a positive working relationship with positive social interactions (Figure 5-29).
Janice provided continuous affirmations and repeated her high expectations for Angel’s learning and engagement. He moved from resisting engagement in learning to beginning to take responsibility for his own learning, participated willingly and enjoyed the learning sessions as demonstrated in Observation 2 - minute 33 conversation transcript (Figure 5-35,). Janice taught Angel to decode and modified her teaching focus as Angel learned how to learn and engaged in reading (Figures 5-31, 5-34 and 5-37). Humming and singing replaced neutral behaviors as Angel succeeded in learning to decode. Before the study Angel was reading as a student commencing Year 1 but during the study he made improvements that saw him reading texts considered suitable for a student commencing Year 3. Janice demonstrated the use of PCK when engaging Angel in learning to read by explicitly teaching the elements required for reading within a routine format. Angel, a student from a low socio-economic background who was learning to speak English as an additional language was no longer behind his peers in his ability to read on completion of the study. The impact of early intervention has been recognised by researchers as more successful than intercession later in life (DEC, 2016; Suggate, 2106; Torgeson, 2001, 2004).

The case study teachers improved their PCK knowledge for teaching reading, planned and implemented instruction based on the student-specific learning needs and demonstrated differing levels of achievement in three of the four outcomes of the Expert Adaptive Knowledge outcomes. The depth and strength of their understanding in these three initial outcomes was still developing; ongoing professional support during the initial years of teaching will play an important part in strengthening this knowledge (Brownell et al., 2016).

6.3.3 Mentors and tutor. Dawkins, Ritz and Louden (2009) recommended that links be established between universities and schools to provide teachers opportunities to be mentored by classroom teachers to acquire and use valuable pedagogical and content knowledge. Unfortunately, many teachers do not have the specialised knowledge for teaching reading and have learned generalised knowledge for teaching reading on the job, or have training on how to run a one size fits all, top down program that does not help those students who are the hardest to teach how to read and does not provide assistance with learning to decode (Moats, 2009). Further research has shown that teachers’ research knowledge gained at university is frequently diluted by classroom teachers who see their own pedagogy as the best teacher model, condemning teachers to teach as the classroom teacher does (Aydin, Demoirdogen, Akin, Uzuntiryaki-Kondakci, & Tarkin, 2014).
Snow et al. (2005) recommended the involvement of an expert with specialised knowledge for teaching reading to mentor teachers in the use of the specialised knowledge and language for teaching reading. Aydin et al. (2014) found that support teachers who held the specialised knowledge for teaching literacy were a better alternative to classroom teachers. They encouraged the teachers to use their new knowledge and built on it. This produced excellent results while the conceptual and procedural knowledge learned was retained.

In this research mentors were highly trained learning and support teachers who were experts in the reading science and the specialised conceptual knowledge required to teach reading, as were the mentors for the Aydin et al. (2014) study. They assisted the teachers in their new learning as tutorial leaders, made connections between and within conceptual and procedural knowledge, answered questions, modelled procedures, coached the teachers and formed trusting relationships with the teachers and students. These interactions kept the integrity of the study safe and ensured that the students received a high standard of teaching and made significant progress. They were essential to the success of the unit of study as they guided the learning of the teachers during tutorials and ensured the quality of the teaching programs and teaching.

One academic who was the Designation Coordinator, Special and Inclusive Education provided seven weekly one-hour lectures on Campus for the teachers. This academic held strong knowledge of the specialized content and procedural knowledge required to teach reading.

6.3.4 Unit of study.

The structure of the university-school program was developed and refined collaboratively by the researcher and university personnel. While its focus was around exposing teachers to evidence-based processes for supporting primary students experiencing difficulties in the regular classroom, the context was supporting teachers to provide intensive reading instruction to students experiencing difficulties learning to read. Previous iterations of this unit of study when students came onto campus (Graves & Rohl, 2005) while beneficial were costly and detached from schooling contexts. While the model used in this study had specific features that appear to have supported teacher learning, it also posed challenges and exposed limitations.

The project provided teachers with a broad range of specialist knowledge about teaching reading. Due to the intensive delivery of the unit of study (i.e., eight weeks including introduction and conclusion), teachers were exposed to this specialist knowledge
within the first weeks of the project. This situation highlighted dramatic gaps and/or misconceptions in teacher knowledge, supporting previous research and reports that graduating teachers are poorly equipped to teach reading (Department of Education and Training, 2015). Teachers reported through interviews and post study evaluations that they were overwhelmed and disorientated by the vocabulary they faced (e.g., systematic and explicit instruction, phonemic awareness, alphabetic principle, segmenting).

Teachers in this unit of study announced loudly that they had limited knowledge of assessments they could use to gauge reading (e.g., running record). At the end of the project they were grateful for the chance to use a range of measures. While they demonstrated rigorous use of assessment data to report on student progress and inform programming, if or how they will maintain and enhance these skills beyond the project is an unknown.

Assessment data, progress monitoring, domain-specific language, and teaching and learning were constant features of the in-school sessions to ensure the teachers were addressing the students’ needs rather than experimenting on how to teach reading (Portner, 2008; Snow et al., 2005). This was supported through in-school tutorials, short on-line quizzes, and checks during lectures.

Around week 3 of the program the teachers experienced light bulb moments. They became aware (a) of how reading developed (as the demands of the vocabulary and language for teachers diminished), and (b) that explicit and systematic instruction in the big idea for reading lead to enhanced reading outcomes and improved social behaviour. This was achieved to a large extent through the intense support from the mentors. Their impact supports the call to support mentoring from Inquiry into the Teaching of Reading (DEEWR, 2005) and past research (e.g., Snow et al., 2005). Teachers like Isla also started to realise the importance of their role to engage students in learning, and their responsibility to provide a quality reading program.

Continuous student assessments undertaken by the teachers during the teaching sessions confirmed that the students were progressing in decoding and comprehension skills. Both teachers and students articulated newly learned single letter and digraphs phonemes correctly and blended phonemes together to form previously unknown words. Through ongoing in-school tutorials and dialogue with their mentors, teachers started to converse using the specialised domain-specific knowledge with little confusion by about week 5. Importantly, the programming for each session overseen by the mentor provided evidence that student’s assessment data were being used to personalise their program (Arrow, Turnner, et al., 2015).
In about week 4, teachers taught explicitly and systematically without stopping to check what they should be doing next, and were starting to monitor the progress of students through data collected during the lesson. They were better able to select resources to effectively deliver progressive lessons and ensured the students integrated and generalised their new and old knowledge, and were able to apply it to reading. For example, the deliberate selection of text tailored to the student’s skill level and interest lead to progressive reading accuracy and fluency attainment with consideration to complexity and fluency rate. The selected games provided practice in sight words, vocabulary, spelling practice or phonological awareness and provided the required practice to retain what has been learned.

The teachers had become comfortable with the lesson format and gradually required less individual support to design their learning activities.

*I feel really confident now (week 5) that I can recognise the student’s learning needs and am programming based on continued assessments and monitoring. The programing scaffold assisted me to include and get the elements of reading needed in my head and established a routine the students needed for feeling safe. I’ve also noticed a change in my student’s engagement in reading as her interest in reading has sky-rocketed so much she is picking up books that are in reach all the time and asking if we can read them. (teacher)*

Observation 3 in week 8 further highlighted how teachers fostered their understanding of the big ideas for teaching reading. They consulted one another when verifying their own knowledge or additional information required, before bringing their questions to the group discussions or mentor. The lectures and tutorials while continuing to support content, procedural knowledge, engagement and technological knowledge, provided evidence of that this approach could be used to teach numeracy. The mentors revised programs to ensure content remained personalised, was taught explicitly and systematically, and integrated old and new knowledge for generalisation (Reutzal & Cooter, 2012).

There was recognisable engagement by teacher and student participants. The teachers, as discussed during the interviews and observed during Observation 3, were at ease when teaching big ideas of reading explicitly and systematically. They were no longer anxious after the first three weeks of the unit of study. The calibration of their own knowledge for teaching reading became finely tuned, and their views on how to teach reading changed considerably. Teachers who initially believed that learning to read was a natural process that occurred for every child similar to learning to speak changed their view (Goodman & Goodman, 1979). By the end of the study they understood the
development of reading depended on the specific learning needs of the student being met, and what they brought to the learning context (Arrow, Tumner et al., 2016; Moats, 2014).

Other substantial changes in the dynamics of the sessions included recognisable engagement by both teacher and student participants. The initial hesitancy to engage was replaced by interest, dedication and a new confidence and belief they will succeed in teaching (teacher) and learning (student) reading (Cambria & Guthries, 2010). The students needed a safe environment where they felt safe to take risks and make errors. Learning to successfully read even one sentence fluently removed their belief that they are failures in reading (Cambria & Guthries, 2010).

The teachers involved in this study learned during the field study beyond what was expected of a first year teacher. As intended by the university and researcher, the participant teachers had gained foundations of the specialised knowledge for teaching reading to build upon through professional development and professional reading. They were observed teaching the big ideas of reading and the related micro-skills and knowledge required to learn the specialized content knowledge for reading when teaching. Teachers were able to identify the micro-skills needed for decoding (e.g., voiceless phonemes versus voiced phonemes and digraphs that had the same sound yet looked different) and comprehension knowledge (e.g., teaching key words, retell and inferences), and they were able to identify, through assessment, the individual learning needs of students experiencing difference in learning to read.

6.3.3 Engaging teachers in learning

Over the last decade, the engagement of university students in learning has emerged as a cornerstone of higher education (Krause, 2005). Chen, Gonyea, and Kuh (2008) defined engagement as the time, resources and energy the students devote to activities designed to enhance their learning during university studies. By being engaged, the students developed habits of the heart and mind that will stand them in good stead for a lifetime of continuous learning. This is very important as teachers who did not engage in learning did not appear to engage school students, form relationships, teach students how to learn or display positive social behaviours that ultimately draw students to learn (Chen et al., 2008). The teachers involved in this research were surprised when presented with the elements of engagement, as they appeared to believe that engagement was the responsibility of the student alone.

At the beginning of the study I believed that engagement was my student’s responsibility. That it was up to him to sit there quietly, listen and take in what I taught. That’s what I did at school and learning came easy.
I knew about differentiation but not about engagement so the lines were blurred. I now know the importance of a positive relationship and positive social interactions and how they play a huge role alongside the knowledge I use and explicitly teach. I recognised the crucial importance of engagement on my own and my student’s learning as a result of the study (teacher).

The teachers reported the impact of the study. This included a new understanding of Professional Learning Standard 1:1 of the Australian Teacher Standards: knowing the child and how they learn.

Prior to engaging with this study I interpreted this as what is their personal interest and backgrounds they bring to the classroom.

This study has made me stop and think differently. I had never considered the challenges children might face. The things they don’t want to share with their teacher or anyone else. Teachers can misconstrue their behaviour, like being off task. Teachers might see this as just bad behaviour and not consider what is happening to them. Some of our children face huge traumas that we as teachers have not experienced so don't understand they can't help it because of what they are going through. I’ve learned the need to develop compassion and care and be that person who has a positive impact in their life. The person who cares about their learning and makes sure they have a positive and constructive relationship that will make the difference for the rest of their life. This is what makes learning happen (teacher).

The theoretical context of this study relied on the framework developed by Snow et al. (2005). The framework and deductive matrix, while being originally designed for practicing school teaching staff reading knowledge growth, was applied to the teacher participants of this study. The teachers demonstrated declarative knowledge (see 1.2.2.1) and were about to begin learning the specialized SMK for teaching reading and PCK as described by Magnusson, Krajcik, and Borko (1999). That is the Situated, can-do procedural knowledge level (SCDPK) (see 1.2.2.2 for details) under the mentorship of an expert in the field as recommended by Nilssen, (2010). It makes sense then that the teachers within this study would be expected to have acquired SCDPK on completion of the study. This however, was not an accurate assumption as the participating case study teachers developed levels of specialized SMK for teaching reading in three of the higher ordered knowledge levels presented within the Snow et al framework. (See sections 1.2.2.3, 1.2.2.4 and 1.2.2.5 for details).

Working one on one with a student experiencing significant learning difference while attending to the explicit and systematic teaching and learning presented by university staff and experts in the field may have facilitated higher levels of knowledge gain in assessment, analysis of reading behaviour based on the assessment results, construction of teaching programs that incorporate multiple practice opportunities and teaching those students who are the hardest to teach independently by the end of the study (as described in
1.2.2.4) This differed from the expected gains for a pre service teacher (see 1.2.2.3 for details). These findings may contribute to the refinement of the framework presented by Snow et al. (2005).

The teachers involved in this study came with diverse knowledge and beliefs, diverse experience related to teaching, and individual learning needs. Differentiated instruction, scaffolds to support learning. The mentor and university staff in response to observations and requests from the teachers provided feedback, modelling and ongoing coaching. The teachers were required to provide the same individual support for their students based on the students learning needs identified through assessments and monitoring as occurred for Isla and Beau. The explicit presentation of reading science theory – learning the specialised content knowledge for teaching reading while engaging students in and entwining practice opportunities appeared to be a moving malleable (verses fixed layers) way of learning that provides strong results beyond that suggested by Snow et al.

6.4 Limitations and Future Research Directions

One of the primary purposes of this research was to identify how teachers learn the specialised knowledge for teaching reading when participating in a field-based unit of instruction. An integrated mixed methods research design was implemented and found to be challenging. A primary challenge in designing this study was the lack of models available to examine, critique and learn from. A literature research failed to provide any examples of an integrated mixed methods approach as discussed and illustrated by Tashakkori and Teddlie (2003) in an educational setting. This study provides some directions in how a similar design could be conducted, and potential pitfall to be avoided (e.g., multi-site versus one site implantation; maximising the depth of enquiry into teacher knowledge development). Replication and refinement of this study is key to an area that has received little research attention (Berry et al., 2016; Shanahan, 2017).

The quality of the research design implementation in mixed methods is an important consideration (Onwuegbuzie & Johnson, 2006). The issue of quality, or validity, has been conceptualised by Teddlie and Tashakkori (2003) to include a number of criteria that were relevant to this study (e.g., sample integration, weakness minimization, multiple validities). The use of the same sample for quantitative and qualitative design was a strength in the design. The small number of case studies in the main study (i.e., three) did not provide for a wide range of experiences to be captured in detail. Although mentors and the researcher were in constant contact with students and teachers, with resources available it was not possible with resources available to record a broader set of data.
The opportunity to use qualitative case studies along-side a broad set of quantitative data (e.g., student outcomes, TKS) allowed for the weaknesses of one methodology to be addressed by the other. Further, the fully integrated mixed model design (see Figure 3-4) provided the opportunity for data from teachers and students to be integrated in Phase 2 and the meta-inference phase. The complexity of the research context, and the available resources, did not allow for these interactions to be captured and fully included in the development of meta-inferences. Informal and anecdotal field notes may have assisted to overcome this limitation Teddlie and Tashakkori (2003), but would require the vigilant implementation regime from a range of research players (e.g., students, teachers, mentors). Future studies within education may consider further how the fully integrated mixed model design could be utilised to greater extent to capture this important intersection between participants.

A third criterion, multiple validities, appears to have been met in general. That is, the meta-inferences drawn using the qualitative and quantitative data was “greater than the sum” of the qualitative and quantitative parts (Onwuegbuzie & Johnson, 2006, p. 59). The researcher was vigilant in ensuring that the validities of both data sets were of high quality (e.g., peer checking of qualitative and quantitative data recording and analysis).

Consideration was also given to the validity and use of measures with each being piloted to ensure it measured what the researcher wanted it to (e.g., alphabetic knowledge, teacher knowledge). The TKS was selected for use after piloting and elimination of a previously selected measure. The TKS was then piloted and found to be appropriate, suitable for Australian conditions and measured what the researcher wanted it to (i.e., teacher knowledge of early reading skills). The Woodcock Reading Mastery sub-tests were also trialed within the pilot study and retained when found to establish a range of word attack and word identification skills amongst students.

The project relied on School Learning and Support Teams to identify students for the project (i.e., implemented a comparable selection process), and for mentors to be aware of all teachers and their actions in schools (i.e., fidelity of program implementation). The ability to check consistency and fidelity of implementation of these roles was difficult to address across multiple sites, and more than 80 teachers and 80 students.

A key metric of analysis was the Snow et al. (2005) matrix. This matrix provided a guide on how each teacher’s application of their knowledge for teaching reading developed. The creation of a modified matrix maintained the integrity of the original framework develop by Snow et al. (2005). It provided a strong guide as to how teacher’s knowledge of teaching reading developed within the study. The data for this study were collected
over a seven week period, during fourteen tutoring sessions. The level of achievement shown by teachers can at best be reported as a point in time; a number of the observations and conclusions made about teacher knowledge growth are based on a limited number of observations in teaching one student. Hence, conclusions drawn about teacher knowledge development should be viewed cautiously with regards to depth and breadth, as well as in whole class context. Future studies may consider limiting the scope of their study, and going deeper within a case study to examine how teachers develop their knowledge.

This exploratory study encapsulates teacher preparation within a collaborative partnership between schools and university with no control over external variables (e.g., student absences, incidence of everyday school practices such as excursions and celebrations). While every effort has been made to ensure full attendance by the students occurred but could not be enforced. As such the number of lessons attended by all students could not be regulated. The attendance of teachers, however, was supported by a 90% attendance requirement. While all teachers met this requirement, the motivational nature of the learning experience was sufficient to ensure attendance by teachers was not an issue.

A clinical approach like that reported by Graves and Rohl (2005) was not possible because of the naturalistic settings of the project. This project was delivered in three schools, all of which differed in their staffing, student clientele, resourcing and community expectations. Further studies in highly organised and structured schools that were flexible in attendance times would be desirable to ensure all students and teachers were provided with the optimal number of sessions. In this study the times and number of practice opportunities were fixed to accommodate school requirements and teacher university timetables.

A benefit of the clinical model described by Graves and Rohl (2005) was the control that could be placed over some of the extraneous variables (e.g., access to specialised resources, supervision within a controlled environment). The current study had a number of variables that were difficult to account for, or control. The impact of the lecture series was difficult to establish; the very real environment in which the tutoring took place may have had an impact on the quality of instruction interactions; while there was little inquiry into the ongoing discussions that teachers had between and within sessions. It was very apparent at anecdotal level that teachers shared ideas, and professional knowledge, before, during and after sessions at the schools.

Finally, the role of the researcher in this project needs to be carefully considered. The researcher was fully involved in the delivery and running of the unit of study. I had direct access to each of the student-teacher dyads within the project, and was able to
supplement the feedback from mentors. My active role in interpreting the quantitative and qualitative data, while checked and validated by an independent group of assistants, still leaves the development of meta-inferences and conclusions open to critique due to bias (Maxwell, 2005).

6.5 Conclusion

The findings of this study highlight the value of teachers studying the specialised knowledge for teaching reading (Snow et al., 2005) within a school context (Berry, Depaepe, & van Driel, 2016). This specialised conceptual knowledge includes the macro and micro-skills within the five big ideas of alphabetic principle, phonological awareness, fluency, comprehension and vocabulary as discussed by Snow et al. (2005), Hempenstill, (2016), and the Department of Education (2000), and how they interact and develop in an interdependent manner. This study highlights the importance of teachers possessing the skills and knowledge required to deliver a quality reading program (e.g., engagement, feedback, scaffolds, explicit and systematic instruction), and the benefit of being provided with expert level support in how to bring content and instruction together (Benedict et al., 2016; DEEWR, 2005; Shulman, 1987).

The teachers demonstrated during the study they had gained the base levels of the specialised knowledge for teaching reading to on a one on one level. They achieved this outcome through reading research reports and books, and attending lectures and tutorials, while participating in schools for practice-based opportunities under the mentorship of experts in the field who provided careful guidance, modelled teaching, feedback and coaching throughout the study (Brownell, Chard, Benedict, & Lignugaris-Kraft, in press; Pitfield, 2012). This study aligns with the work of Benedict et al. (2016):

*Planned, guided, and sustained interactions with students early and often during preparation are important. However, quality is more important than quantity. Practice-based opportunities are most effective when they are carefully planned, are interwoven with coursework, occur in high-quality settings, and are coupled with opportunities for feedback and reflection. (p. 3)*

The study required the teachers to learn about and implement assessments to evaluate their student’s reading ability. Using these data, they programmed teaching and learning sessions as reported in Chapter 5 and discussed in Chapter 6. While there was no opportunity for the teachers to demonstrate reading to a whole class, it is the researcher’s expectation that teachers who can teach students considered by many to be the hardest to teach are equipped to teach reading to every child (Darling-Hammond, 2008).
Ensuring every student gets off to a good start in reading is key to long-term social, economic and personal success. Many of the students who participated in this study had pre-study scores that suggested a trajectory in learning to read would make achieving independence in reading a distant hope, and subjecting them to the potential woes of the Matthew Effect (Stanovich, 1986). Recent high stakes testing outcomes (e.g., PIRLS, 2016; NAPLAN, 2016) indicate that the proportion of these students falling behind is growing larger (Australian Curriculum, Assessment, and Reporting Authority, 2016). As education sectors spend more money on enhancing teacher professional knowledge, there is an urgent need for tomorrow’s teachers to be equipped to cater for a diversity of personalised need in the classroom (Arrow, Tumner et al., 2016; TEMAG, 2015). This research project has supported emerging evidence that tomorrow’s teachers can be given a good start into how best to support students to become skilled readers. This is only the beginning, as there is a life-long need for teachers to be professionally skilled and ready to meet the needs of all students who enroll in their classrooms (Berry et al., 2016). In the words of one teacher stated: *Every child has the right to learn to read.* It is argued that every teacher needs to be a teacher of reading (Masters, 2009; TEMAG, 2015).
EPILOGUE

The program reported in this thesis ran in a similar format in 2015 and 2016 with similar results and learning by the teachers and students. A sample of the 2015 students were retested one year on and they demonstrated continued progress in learning to read. The 2016 teachers provided strong feedback on the benefits of the program in building their limited professional knowledge about the teaching of reading. Interviews brought admissions from teachers that they did not know how to teach reading before commencing the study. On completing the unit of study, the following comment was recorded:

I believe the essential features of phonological awareness; alphabetic principle, vocabulary, comprehension and fluency underpin the development of reading. Students who struggle with reading… get left behind because they lack the learning opportunities that explicitly teach the foundational skills and knowledge (required) to be a proficient reader. Participating in this study has confirmed my self-belief in being able to teach all students to read (teacher, 2016). As a researcher schoolteacher, I place great value in students – the adults of tomorrow - and recognise we must teach them to read for success in life. In my job I encounter students across K-10 who cannot read at a level that allows them to meet the demands of the class curriculum. The measures we use in schools demonstrate many of these students often do not know the phonemes for single letters, digraphs, morphographical knowledge and fluency (Milton, Rohl, & House, 2007).

I am disappointed that the 2016 NAPLAN data demonstrates the ‘Year 4 drop’, and that Aboriginal and Torres Strait Islander students continue to be left behind (Australian Curriculum, Assessment, and Reporting Authority, 2016). PIRLS data shows Australian children are recording the lowest reading results after New Zealand in the English speaking world with only 52% of students being above the low benchmark (Australian Research Alliance for Children and Youth. (2013). Many students under the benchmark have completed the costly discontinued Reading Recovery Program with poor success rates (Bagshaw, 2016). Yet this low-cost project has shown the strength of a university-school partnership and the benefits for (pre-service) teachers and students. My greatest wish is for every teacher to learn how to understand and use the science of reading. To explicitly and systematically teach the macro and micro knowledge that will allow every child to intertwine the five big ideas for decoding and comprehend the authors intended meaning of the text. That they place higher expectations on themselves as teachers and learners that are greater than the expectations for learning placed on their students (Groom & Hamilton, 1995), and to value every student for who they are and not what we want them to be so the students individual specific learning needs are met in every lesson.
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Appendix 3.1
Teacher Knowledge Survey (TKS)

Multiple Choice. Please circle the letter of the best answer

1. A schwa sound is found in the word
   (a) resume       (d) about
   (b) bread        (e) flirt
   (c) look

2. Which word contains a short vowel sound?
   (a) treat        (d) paw
   (b) start        (e) father
   (c) slip

3. A diphthong is found in the word
   (a) coat         (d) sing
   (b) boy          (e) been
   (c) battle

4. A voiced consonant digraph is in the word
   (a) think        (d) the
   (b) ship         (e) photo
   (c) whip

5. What type of task would this be? “I am going to say a word and then I want you to break the word apart. Tell me each of the sounds in the word dog.”
   (a) blending     (c) segmentation
   (b) rhyming      (d) deletion

6. What type of task would this be? “I am going to say some sounds that will make one word when you put them together. What does /sh/ /oe/ say?”
   (a) blending     (c) segmentation
   (b) rhyming      (d) manipulation

7. Count the number of syllables for the word unbelievable.
   (a) four         (c) six
   (b) five         (d) seven

8. For skilled readers, listening and reading comprehension are usually about equal. For developing readers in K-3, it is true that
   (a) Reading comprehension is better than listening comprehension.
   (b) **Listening comprehension is better than reading comprehension**.
   (c) Reading and listening comprehension are comparable, about the same.
   (d) There is no systematic relationship between reading comprehension and listening comprehension.

9. How many morphemes are in the word unbelievable?
   (a) one          (c) three
   (b) two          (d) four
10. How many **morphemes** are in the word *pies*?
   (a) zero  (c) two
   (b) one   (d) three

11. Mr. Drake recently read two nonfiction books to his class. One of the books was about ants and the other about spiders. Which of the following tools would be most useful in allowing his students to compare and contrast the characteristics presented in the two books?
   (a) semantic map
   (b) story map
   (c) KWL chart
   (d) Venn diagram

12. According to research, the **least** effective way to teach vocabulary to students is through the use of:
   (d) **ask students to write definitions of new vocabulary words**
   (e) teach new terms in context of subject-matter lesson
   (f) identify examples related to the word’s meaning
   (g) discuss synonyms for new vocabulary words

13. Mrs. Pink has assigned her students a short story to read independently. She wants to practice a strategy with her students in order to enhance their comprehension **during** reading. Mrs. Pink should instruct her students to:
   (e) ask her a question when they do not understand
   (f) when they come across a word that do not know, stop reading and look it up in the dictionary
   (g) **scan the text and prewrite questions that they want to have answered as they read**
   (h) write a reflection in their literacy journals immediately after reading the text

14. You plan time during your literacy block for students to engage in a reading activity that will improve fluency. Which of the following activities would be most effective in achieving this goal?
   (d) Students independently read a text and then answer a series of literal and inferential comprehension questions.
   (e) As a whole class, each student will take a turn reading a paragraph from a text related to your current curriculum. While one student in reading, the other students listen and read along silently in their own text. (Round-robin reading)
   (f) **The teacher reads a passage aloud to model fluent reading and then students reread the text independently. (Guided oral reading)**
   (g) In pairs, students are assigned a list of words for which they are asked to write definitions and sample sentences.

15. Ms. Jones’ students say they understand the text that they are reading in their science textbooks, but they are unable to correctly answer questions about the content. What comprehension strategy would best help her students to realize they may not understand the content **as they read**?
   (a) **self-monitoring and fix-up strategies**
   (b) making mental pictures of the text
   (c) activating their background knowledge
   (d) answering questions at the end of the chapter

16. You observe your student teacher asking students to think about things that happened to them that are similar to what happened to the character in the story. This is an example of:
   (a) predicting
(b) summarizing
(c) **activating prior knowledge**
(d) building background knowledge
17. After you read a story to your students, you ask your students to recall important details from the story. This is an example of:
   (a) **highlighting**
   (b) monitoring
   (c) generating questions
   (d) inferencing

18. You plan to read a story to your students about a rainbow. You want to be sure that your students will understand the story so you first provide them with a brief explanation of how a rainbow forms before you read the story. This is an example of:
   (a) building story structure
   (b) predicting
   (c) **building background knowledge**
   (d) making connections

19. One example of an activity that teachers can use to assist with multi-strategy instruction is:
   (a) explicit instruction
   (b) **reciprocal teaching**
   (c) sustained silent reading
   (d) journal writing

20. As you read a passage from a book about ants, you are telling the students what you are doing and why, as you do it. This is an example of:
   (a) monitoring comprehension
   (b) **using a think aloud strategy**
   (c) inferencing
   (d) highlighting

21. Kyle, one of Mrs. Valcourt’s first-grade students, reads the sentence, “The hot dog tasted great!” However, Greg pronounced the word great as greet. What should Mrs. Valcourt say?
   (a) Tell me the sound of each letter, then tell me the whole word.
   (b) Think, what do the first part and the last part of the word say? Now put them together.
   (c) Think what sound the ea spelling pattern makes. Now say the whole word.
   (d) **This word doesn’t follow the rules. This is the word ‘great.’**

22. Mrs. Funke is teaching her students to identify multi-syllable words. Which is an appropriate first step for her to do?
   (a) model analyzing words for familiar prefixes and suffixes
   (b) show students how to blend individual letter-sounds, left-to-right
   (c) model how to look for little words in big words
   (d) demonstrate sequentially blending onsets and rimes

23. Circle the word that is a real word when you sound it out:
   (a) churbit
   (b) wolide
   (c) **candadett**
   (d) rigfap

24. Circle the word that is a real word when you sound it out:
   (a) **vareaunt**
   (b) reatloid
   (c) lofam
   (d) foutray
25. Circle the word that is a real word when you sound it out:
   (a) napsate
   (b) pagbo
   (c) plizzle
   (d) beekahz

26. Circle the word that is a real word when you sound it out:
   (a) zipanewnew
   (b) agritolnal
   (c) bewtiphul
   (d) isengraneal

27. Read the following passage and select the best missing word:

   Trends in American instructional philosophy and practice parallel those in the world of parenting and in society as a whole over the latter half of the twentieth century. Battles over school reform have raged, ___________ back and forth pendulum-style between traditional emphases on rigor and discipline to progressive movements emphasizing freedom and openness.

   (a) move
   (b) the
   (c) swinging
   (d) converging

28. The tropical rainforest is earth's most complex biome in terms of both structure and diversity. Rainforests are home to two-thirds of all the living animal and plant ______ species ______ on Earth. This occurs under optimal growing conditions: abundant precipitation and year round warmth. However, ______ sunlight ______ is a major limiting factor. A variety of strategies have been successful in the struggle to reach light or have been able to adapt to the low intensity of light beneath the canopy.

29. Much of the information we have today about chimpanzees comes from the groundbreaking research of the conservationist, Jane Goodall. From an early age, Jane was fascinated by animals. Jane ______ travelled ______ to Kenya, where she met Dr. Louis Leakey, at the age of 23. She expressed an interest in studying animals by living in the wild with them, rather than studying dead animals through paleontology. One of the first significant ______ discoveries ______ that Jane made in her study was that chimpanzees made and used tools, much like humans, to help them get food.
Appendix 3.2
Woodcock Reading Mastery

### Woodcock Reading Mastery Subtest - Word Identification

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### Woodcock Reading Mastery Subtest - Word Attach

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